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Niti - real negative coordination inside a strict Negative Concord language?

Jovana Gajić

There are two negative coordination constructions in Serbo-Croatian: *ni...ni* and *niti...niti*. The present paper focuses on the latter one, examining its syntactic distribution, as well as the place it occupies in the system of strict Negative Concord. A hypothesis that *niti* is an inherently negative coordination marker is explored, but closer scrutiny reveals it to be untenable. I show that *niti...niti*-coordination has to be analyzed as a semantically non-negative disjunction, as well as how it can fit into the system of Negative Concord.

1. Introduction

1.1. Preliminaries

Serbo-Croatian is a strict Negative Concord language, which means that regardless of the number of morpho-syntactically negative elements inside one clause, the only possible interpretation is the single negation one. By ‘morpho-syntactically negative elements’ I mean those occurring only in sentences which are interpreted negatively. Such elements often have some morphological marker for negation, but do not contribute semantic negation on their own. Serbo-Croatian is transparent when it comes to this – *ni(-)* is the morpho-syntactic marker of negation. *Ni(-)* can be identified inside *wh*-based neg-words (*niko* and *ništa* in (1), but a whole class is available). Furthermore, *ni* serves as a negative additive and a negative scalar focus particle (similar to sentence-final *either* and to (*not*) *even* in English, as shown in (2)). *Ni* is also the form that the coordination marker(s) take in negative environments (3).

- (1) Niko *(ni)je pročitao ništa.
ni-who.NOM NEG-AUX.3SG read.PART-SG.M ni-whatACC
'Nobody read anything.'
- (2) Ni [Lea]_{Foc} *(ni)je uradila domaći.
ni Lea.NOM.FOC NEG-AUX.3SG do.PART-SG.F homework.ACC
'Lea didn't do the homework, *either*.'
/ 'Not even Lea did the homework.'

- (3) Marko *(ni)je (ni) slušao ni pisao.
 Marko.NOM NEG-AUX.3SG ni listen.PART-SG.M ni write.PART-SG.M
 ‘Marko *neither* listened *nor* wrote.’

As in every well-behaved strict Negative Concord language, none of the morpho-syntactically negative elements can be grammatical inside a clause if there is no overt verbal marker of negation, as shown with the asterisk in the examples (1 – 3). The verbal marker of negation in Serbo-Croatian is *ne* (4, 5), which transforms into *ni-* when attaching to some auxiliaries (1 – 3).

- (4) Sofija ne piše pesme.
 Sofija.NOM NEG writes poems.ACC
 ‘Sofija doesn’t write poems.’
- (5) Sofija neće doći na čas.
 Sofija.NOM NEG-will.3SG come.INF on class.ACC
 ‘Sofija won’t come to class.’

Discussion of the syntactic and semantic status of Serbo-Croatian neg-words such as (1) exists in the literature (Progrovac 1994; Bošković 2008; Gajić 2016a). At the same time, Arsenijević (2011) looks into negative coordination constructions with *ni* (3), whereas Gajić (2018, 2016b) discusses negative coordination marker *ni* together with its role as a focus particle (2). But *ni* is not the only coordination marker for negative contexts – Serbo-Croatian has another marker for negative coordination, (*niti...*)*niti* (6, 7).¹

- (6) (Ona) niti sluša niti piše.
 she niti listens niti writes
 ‘She neither listens nor writes.’
- (7) Lea *(ni)je uradila domaći, niti je
 Lea.NOM NEG-AUX.3SG do.PART-SG.F homework.ACC niti AUX.3SG
 oprala sudove.
 wash.PART-SG.F dishes.ACC
 ‘Lea didn’t do the homework, nor did she wash the dishes.’

Many languages do not have special forms for negative coordination markers. Of those that do, very few have more than one form or construction (Hungarian is the only such language that comes to my mind, cf. Szabolcsi (2018a,b); languages like English (with *neither...nor*) and German (with *weder...noch*, ‘neither...nor’) do not count here, as their two markers participate in one coordinative construction). The presence of two markers for negative coordination in Serbo-Croatian is thus unexpected and puzzling. Nonetheless, the two forms, *ni* and *niti* seem to be morphologically related. So what is then the relation between *niti* and *ni*? What are the correspondences between the two markers and what differences do they exhibit? What kind of analysis is the most appropriate for *niti...niti*-coordination?

¹Serbo-Croatian is a pro-drop language.

1.2. Outline of the paper

I will first examine and compare the syntactic distribution of *ni...ni* and *niti...niti* and summarize the differences between the two constructions (section 2). A brief presentation of the syntactic agreement approach to Negative Concord (Zeeijlstra 2004) will be provided (section 3). Next, I will offer a potential analysis for *niti* which treats it as an inherently negative element which does not participate in Negative Concord (section 4.1). I will then expose problems for such an approach which will motivate a thorough revision of the proposal (section 4.2). Finally, I will present an account which can cover the distribution and interpretation of *niti...niti*-coordination, treating it as a clausal participant in Negative Concord (section 5). The penultimate section will reveal some problems and discuss inter-speaker variation (section 6). The last section will conclude (section 7).

2. *Ni vs. niti*

2.1. *Ni-coordination*

Ni-coordination requires the presence of sentential negation, which must be signaled on the verbal element of the clause, otherwise the sentence becomes ungrammatical (8).

- (8) *Marko je ni slušao ni pisao.
 MarkoNOM AUX.3SG ni listen.PART-SG.M ni write.PART-SG.M
 ‘Marko *neither* listened *nor* wrote.’

In general, there are two options for the distribution of the marker *ni* – it can be attached to every member of the coordination (9), or, alternatively, it can appear only on the last member of coordination (10), without any difference in the truth-conditions of the sentence. But the verbal marker of negation must be there in either case. Furthermore, there can be more than two members of the coordination (11).

- (9) Marko *(ni)je ni slušao ni pisao.
 Marko.NOM NEG-AUX.3SG ni listen.PART-SG.M ni write.PART-SG.M
 ‘Marko *neither* listened *nor* wrote.’
- (10) Marko *(ni)je slušao ni pisao.
 Marko.NOM NEG-AUX.3SG listen.PART-SG.M ni write.PART-SG.M
 ‘Marko *neither* listened *nor* wrote.’
- (11) Marko *(ni)je (ni) čitao (ni) slušao ni
 Marko.NOM NEG-AUX.3SG ni read.PART-SG.M ni listen.PART-SG.M ni
 pisao.
 write.PART-SG.M
 ‘Marko *neither* read *nor* listened *nor* wrote.’

Ni can coordinate argument nominals in different structural positions (12, 13), adjuncts (14), VPs (15).

- (12) *(Ni) Sofija ni Lea *(ni)su išle u školu.
 ni Sofija.NOM ni Lea.NOM NEG-AUX.3PL go.PART-PL.F to school.ACC
 ‘Neither Sofija nor Lea go to school.’

- (13) Sofija *(ni)je upoznala (ni) mog brata ni tvoju
 Sofija.NOM NEG-AUX.3SG meet.PART-SG.F ni my.ACC brother.ACC ni your.ACC
 sestru.
 sister.ACC
 ‘Sofija met neither my brother nor your sister’
- (14) Marko *(ne)će doći (ni) sutra ni prekosutra.
 Marko.NOM NEG-will.3SG come.INF ni tomorrow ni the-day-after
 ‘Marko will come neither tomorrow nor the day after.’
- (15) Lea *(ni)je (ni) pojela sendvič ni popila
 Lea.NOM NEG-AUX.3SG ni eat.PART-SG.F sandwich.ACC ni drink.PART-SG.F
 jogurt.
 yogurt.ACC
 ‘Lea neither ate a/the sandwich nor drank (the) yogurt.’

The initial *ni*-marker cannot be omitted with coordinations of subjects such as (12). Regardless of the position of the *ni*-coordination (pre-verbal, post-verbal), the verbal marker of negation must be present in the clause. But *ni* is highly degraded as a clausal coordinator (16), even when the verb is overtly negated.

- (16) ??(Ni) Sofija ne jede sir, ni Lea ne pije jogurt.
 ni Sofija.NOM NEG eats cheese.ACC ni Lea.NOM NEG drinks yoghurt.ACC
 ‘(?) Neither does Sofija eat cheese, nor does Lea drink yoghurt.’

We thus see that in the distribution of *ni* there is a split roughly between clausal constituents and all those that are sub-clausal. However, there is a way for *ni* to felicitously coordinate clauses – namely, embedded *ni...ni*-coordination of CPs is acceptable, but only if the matrix verb is negated, as shown in (17).

- (17) ?Tamara nije rekla ni da Natalija pliva ni da
 Tamara.NOM NEG-AUX.3SG say.PART-SG.F ni that Natalija.NOM swims ni that
 Hrvoje skija.
 Hrvoje.NOM skis
 ‘Tamara said neither that Natalija swims nor that Hrvoje skis’

The example is marked with ‘?’ because a structure with *niti...niti* would be preferred here. I now turn to the distribution of *niti...niti*-coordination.

2.2. *Niti-coordination*

2.2.1. Basic distribution

Niti yields strong degradedness when coordinating nominal phrases, as shown for the subject position in (18) and for the object position in (19).

- (18) ??Niti Sofija niti Lea nisu uradile domaći.
 niti Sofija.NOM niti Lea.NOM NEG-AUX.3PL do.PART-PL.F homework.ACC
 ‘Neither Sofija nor Lea did (the) homework.’

- (19) ??Sofija nije upoznala niti mog brata niti tvoju
 Sofija.NOM NEG-AUX.3SG meet.PART-SG.F niti my.ACC brother.ACC niti your.ACC
 sestru.
 sister.ACC
 ‘Sofija met neither my brother nor your sister.’

Moreover, the verbal marker of negation cannot be omitted, otherwise ungrammaticality is ensured, for example, as in (20).

- (20) *Niti Sofija niti Lea su uradile domaći.
 niti Sofija.NOM niti Lea.NOM AUX.3PL do.PART-PL.F homework.ACC
 ‘Neither Sofija nor Lea did (the) homework.’

Recall that *ni* is perfectly fine when coordinating nominals, in either of these (or other) positions. Furthermore, *niti*-coordinated adjuncts (21) and VPs (22) are also degraded.

- (21) ??Nije uradila zadatak niti brzo niti tačno.
 NEG-AUX.3SG do.PART-SG.F exercise.ACC niti quickly niti correctly
 ‘She did the exercise neither quickly nor correctly.’

- (22) ?Lea nije niti pojela sendvič niti popila
 Lea.NOM NEG-AUX.3SG niti eat.PART-SG.F sandwich.ACC niti drink.PART-SG.F
 jogurt.
 yogurt.ACC
 ‘Lea neither ate a/the sandwich nor drank (the) yogurt.’

Again, recall that *ni* is grammatical when coordinating in these positions. On the other hand, *ni...ni* is degraded in coordination of clausal constituents, but *niti...niti* is fully grammatical with clausal structures (23 – 25).² Moreover, *niti* appears to induce negation inside the clause it introduces, although no negative marker is present on the finite element. If *niti* is attached only to the final member of coordination (25), i.e. if it introduces only the final clause, the preceding one must be negative as well.

- (23) Niti (Sofija) kuva niti (Marko) čisti.
 niti Sofija.NOM cooks niti Marko.NOM cleans
 ‘(?)Neither does Sofija cook nor does Sofija/Marko clean.’
- (24) Niti Sofija priča španski, niti je Lea upoznala Rubena.
 niti Sofija.NOM speaks Spanish niti AUX.3SG Lea.NOM meet.PART-SG.F Rubén.ACC
 ‘(?)Neither does Sofija speak Spanish, nor has Lea met Rubén.’
- (25) Sofija *(ni)je pojela sendvič, niti je Lea
 Sofija.NOM NEG-AUX.3SG eat.PART-SG.F sandwich.ACC niti AUX.3SG Lea.NOM
 popila jogurt.
 drink.PART-SG.F yogurt.ACC
 ‘Sofija didn’t eat a/the sandwich, nor did Lea drink (the) yogurt.’

²The situation in English is more complicated. Namely, most speakers judge a full clause introduced by *neither* as marked, with or without subject-auxiliary inversion. The ‘(?)’ is introduced in the translation for this reason.

Ni was not as successful when coordinating full clauses. What about embedded clauses? There is one parameter we have to take into account, and that is whether *niti*-coordination is above the complementizer or below the complementizer. *Niti* can coordinate embedded clauses only if it is below the complementizer (26). When *niti* is coordinating embedded clauses headed by the complementizer *da* (27), the sentence is ungrammatical.

- (26) Rekao je da niti će doći niti može zvati.
say.PART-SG.M AUX-3SG that niti will.3SG come.INF niti can.3SG call.INF
‘He said that neither would he come nor could he call.’
- (27) *Rekao je niti da će doći niti da može zvati.
say.PART-SG.M AUX-3SG niti that will.3SG come.INF niti that can.3SG call.INF
‘He said neither that he’d come nor that he can call.’

This seems to suggest that *niti* can only introduce TPs, but not CPs where the complementizer head is filled. *Ni* is ungrammatical in both structures. This is not surprising, however, as the matrix verb is not negated in the sentences in (28, 29), nor is there any marker of negation inside the clauses introduced by *ni*.

- (28) *Rekao je da ni (ne)će doći ni (ne) može zvati.
say.PART-SG.M AUX-3SG that ni NEG-will.3SG come.INF ni NEG can.3SG call.INF
‘He said that neither would he come nor could he call.’
- (29) *Rekao je ni da (ne)će doći ni da (ne) može zvati.
say.PART-SG.M AUX-3SG ni that NEG-will.3SG come.INF ni that NEG can.3SG call.INF
‘He said neither that he’d come nor that he can call.’

We thus see that *niti* seems to be the mirror image of *ni* – it is good when coordinating clausal structures, but quite bad with smaller constituents. It is important to note here that their distribution cannot be characterized as fully complementary, since both can yield only degradedness to a lower or higher extent with certain types of phrases, and not real, straightforward syntactic ungrammaticality like the one triggered when, for example, the verbal marker of negation is absent from a sentence with neg-words in Serbo-Croatian, *ni*-coordination included. Furthermore, *ni* and *niti* are interchangeable in a limited number of contexts, to which I will come later. In the next section, I draw attention to some facts about the interaction of *niti*-coordination with Negative Concord, as well as Negative and Positive Polarity.

2.2.2. *Niti* and the Negative Concord system

A few words are in order about Negative Concord in Serbo-Croatian and the so-called Bagel Problem (Pereltsvaig 2006; Błaszczałk 2008; Denić 2015). The language has *wh*-based classes of items for different quantificational expressions, where the difference among them depends on the prefix used. In this vein, neg-words are of the form *ni-wh*, whereas Negative Polarity Items (NPIs) are of the form *i-wh*. The two classes are in complementary distribution (30), where the *ni-wh* neg-words are restricted to local (clausemate) negation (31), whereas *i-wh* NPIs are accepted with non-local negation (32), as well as in other Downward-Entailing contexts, but they are ungrammatical with clausemate negation (31).

- | | Local negation | Non-local negation + DE |
|------|--|-------------------------|
| (30) | <i>ni-wh</i> ✓ | * |
| | <i>i-wh</i> * | ✓ |
| (31) | Nije {ništa / *išta} shvatio. | |
| | NEG-AUX.3SG ni-what.ACC i-what.ACC understand.PART-SG.M | |
| | ‘(He) didn’t understand anything.’ | |
| (32) | Nije rekao da je {*ništa / išta} | |
| | NEG-AUX.3SG say.PART-SG.M that AUX-3SG ni-what.ACC i-what.ACC | |
| | shvatio. | |
| | understand.PART-SG.M | |
| | ‘He didn’t say that he understood anything.’ | |

Now, *niti*-coordination cannot host neg-words inside the constituents it introduces (33), but the NPI class is grammatical here (34). This holds for coordinated clauses in which there is no verbal marker of negation present.

- (33) *Niti je nikoga slušao, niti je ništa
 niti AUX-3SG ni-who.ACC listen.PART-SG.M niti AUX-3SG ni-what.ACC
 shvatio.
 understand.PART-SG.M
 ‘(?)Neither did he listen to anybody, nor did he understand anything.’
- (34) Niti je ikoga slušao, niti je išta
 niti AUX-3SG i-who.ACC listen.PART-SG.M niti AUX-3SG i-what.ACC
 shvatio.
 understand.PART-SG.M
 ‘(?)Neither did he listen to anybody, nor did he understand anything.’

When verbal markers of negation are inserted into clauses introduced by *niti*, the whole structure becomes degraded, and the only possible interpretation is that of double negation (35). This also holds for cases when neg-words are present (36).

- (35)?#Niti nije slušao, niti nije shvatio.
 niti NEG-AUX.3SG listen.PART-SG.M niti NEG-AUX.3SG understand.PART-SG.M
 ‘(?)Neither did he not listen, nor did he not understand.’
 ⇒ *He listened and he understood.*
- (36)?#Niti nije nikoga slušao, niti nije ništa
 niti NEG-AUX.3SG ni-who.ACC listen.PART-SG.M niti NEG-AUX.3SG ni-what.ACC
 shvatio.
 understand.PART-SG.M
 ‘(?)Neither did he listen to nobody, nor did he understand nothing.’
 ⇒ *He listened to somebody and he understood something.*

This comes as somewhat a surprise, since double negation is normally not attested in a strict Negative Concord language such as Serbo-Croatian. At the same time, it is not entirely unexpected, given that *niti*-introduced clauses are negative already without a negative marker on the finite element. *Niti...niti* then does not seem to be merely a clausal counterpart of *ni*, but also displays some other peculiar properties.

2.3. Interim summary

Let us take stock. The distribution of *niti...niti* can be seen as primarily clausal coordination, and *niti XP niti XP* yields milder or stronger degradedness with other (smaller) types of constituents. In contrast to this, *ni...ni* is bad when coordinating clauses, but works well for sub-clausal constituents. Furthermore, clauses introduced by *niti* are interpreted negatively, in the absence of a negative verbal marker. If the negative marker is inserted, only double negation readings can be generated. Does this mean that *niti* is in any way special and an outlier in the system of Negative Concord in Serbo-Croatian? Let's first discuss an analysis of Negative Concord which relies on a syntactic agreement mechanism and treats all morpho-syntactically negative elements in strict Negative Concord languages as bearers of uninterpretable negative features.

3. Zeijlstra (2004) and Negative Concord as syntactic agreement

Zeijlstra (2004, 2008) offered an account in which both neg-words and verbal markers of negation are semantically non-negative in strict Negative Concord languages and this is the reason why only single negation readings are available (37). Such elements carry uninterpretable negative features ([uNEG]) which need to be checked by a c-commanding negative operator ($Op\neg$), itself bearer of an interpretable negative feature ([iNEG]), as sketched in (38). Thus in this system strict Negative Concord languages are special in that all their items which are overt and morho-syntactically marked for negation are merely bearers of uninterpretable NEG features, whereas the real negation is instantiated through a phonologically null semantic operator with an interpretable NEG feature. Crucially, all the participants in Negative Concord carry formal negative features. No elements have been discussed for strict Negative Concord that would be without formal features for negation.

- (37) Niko nije pročitao ništa.
 ni-who.NOM NEG-AUX.3SG read.PART-SG.M ni-what.ACC
 ‘Nobody read anything.’
- (38) $Op\neg_{[iNEG]} [niko_{[uNEG]} ni_{[uNEG]}-je [pročitao ništa_{[uNEG]}]]$

Such feature-checking is restricted to the domain of a single finite clause. Now, if we turn to a language which poses problems for analyses of Negative Concord and double negation, namely French, we can possibly find a useful hint for what is going on with *niti* in Serbo-Croatian, the latter seemingly not fitting well into the system of Negative Concord. Namely, French sentential negation is marked by the so-called embracing negation, *ne...pas*, where *ne* can be dropped in contemporary spoken French (39).

- (39) Il (ne) mange pas.
 he.NOM *ne* eats *pas*
 ‘He does not eat.’

As for French neg-words, they can co-occur with *ne* and yield a negative interpretation (40), but the presence of *pas* is incompatible with a single negation reading (41).

- (40) Il (ne) mange rien.
 he.NOM *ne* eats NEG-thing
 ‘He eats nothing.’

- (41)?#Il (ne) mange pas rien.
 he.NOM *ne* eats *pas* NEG-thing
 ‘He doesn’t eat nothing.’

French then exhibits only combinations of *ne* and *neg-words* or *ne* and *pas*, starting from the 17th century. Zeijlstra (2009) thus proposes that *pas* is the semantic negative operator ($Op\neg$). The non-obligatory element, *ne*, never negates a sentence on its own, i.e. without the presence of some other negative element in the sentence. Moreover, it does not occur only with *pas* or with *neg-words*, but also in some other characteristic environments (such as comparatives and ‘before’-clauses), for which reason Zeijlstra (2009) suggests that it could be analyzed as an NPI. In a sentence with sentential negation and without *neg-words* (42), *pas* is the overt realization of the negative operator which inverts the truth value of the whole sentence. However, *pas* does not bear any formal negative features, either interpretable [iNEG] or uninterpretable [uNEG].

- (42) Il (ne) mange pas \neg

What about sentences with *neg-words*? Zeijlstra (2009) proposes that French *neg-words* should be analyzed as only formally negative, i.e. they carry [uNEG] features which have to be checked by a c-commanding silent negative operator (43). The reason for this is that double negation readings are available in the *neg-word+pas* combination (44), but mostly not in cases when multiple *neg-words* co-occur without the presence of *pas* (45a).³

- (43) $Op\neg_{[i\text{NEG}]}$ Elle (ne) mange rien_[uNEG]
 (44) $Op\neg_{[i\text{NEG}]}$ Elle (ne) mange pas \neg rien_[uNEG]
 (45) a. Personne (ne) mange rien.
 NEG-person *ne* eats NEG-thing
 ‘Nobody eats anything.’
 b. $Op\neg_{[i\text{NEG}]}$ personne_[uNEG] ne mange rien_[uNEG]

Furthermore, the (*ne...*)*pas* negation is compatible with NPIs in French (46), resulting in single-negation readings.

- (46) Il (ne) mange pas {quoi que ce soit / du tout}.
 he.NOM *ne* eats *pas* what which this were / at all
 ‘He doesn’t eat anything / at all.’

In the next section, I will test an account for *niti* as an inherently negative element, which combines insights from Negative Concord of the two languages embedded in the syntactic agreement approach. Following that, I will discuss three problems for such an account and conclude that it is not tenable as such. I will then propose an alternative account, in keeping with Zeijlstra (2004)’s syntactic approach to Negative Concord.

4. Semantic status of *niti*

4.1. *Niti* as an inherently negative coordinator?

Could we then relate *niti* and French *pas*? It looks like *niti*, just like *pas*, induces negation in the clause it introduces without the presence of a verbal marker of sentential negation. Furthermore,

³Although recent experimental studies bring evidence that double negation is more available in French than what is usually considered, cf. Yeaton & Déprez (2018); Déprez & Yeaton (2018).

weak NPIs (the *i*-wh class) are licensed inside *niti*-introduced constituents. If a verbal marker of negation, alone or together with neg-words, is added to a *niti*-clause, double negation readings are triggered. All of this points to the possibility that *niti* could be an inherently negative element. If this is the case, *niti* would be the overt realization of a negative operator *Op*¬ (47). This would also make it a semantically, but not morphosyntactically negative element. In other words, *niti* would be without both [uNEG] and [iNEG] features.

- (47) Niti¬ Sofija priča španski, niti¬ Lea zna za Goju.
 niti Sofija.NOM speaks Spanish niti Lea.NOM knows for Goya.ACC
 '(?) Neither does Sofija speak Spanish, nor does Lea know of Goya.'

Since *niti* itself would be the source of negation, no verbal marker of negation would be needed in a clause introduced by *niti*. This would also explain why *niti* cannot license neg-words, since the syntactic agreement could not be established (48): *ni*-wh items carry [uNEG] features which *niti* cannot check, as it does not carry a matching [iNEG] feature. NPIs of the *i*-series are licensed (49) since there is no competition with *ni*-wh neg-words.

- (48) *Niti¬ je nikoga_[uNEG] slušao, niti¬ je ništa_[uNEG]
 niti AUX-3SG ni-who.ACC listen.PART-SG.M niti AUX-3SG ni-what.ACC
 shvatio.
 understand.PART-SG.M
 '(?) Neither did he listen to anybody, nor did he understand anything.'
- (49) Niti¬ je ikoga slušao, niti¬ je išta
 niti AUX-3SG i-who.ACC listen.PART-SG.M niti AUX-3SG i-what.ACC
 shvatio.
 understand.PART-SG.M
 '(?) Neither did he listen to anybody, nor did he understand anything.'

Double negation can be triggered because *niti* contributes one ¬ operator, but there also must be a second, silent *Op*¬. The latter is necessary in order to check the [uNEG] feature of the verbal marker and, if need be, neg-word(s).

- (50) ?#Niti¬ *Op*¬_[iNEG] ni_[uNEG]-je nikoga_[uNEG] slušao, niti¬ *Op*¬_[iNEG]
 niti NEG-AUX.3SG ni-who.ACC listen.PART-SG.M niti
 ni_[uNEG]-je ništa_[uNEG] shvatio.
 NEG-AUX.3SG ni-what.ACC understand.PART-SG.M
 '(?) Neither did he listen to nobody, nor did he understand nothing.'

Niti would thus be an element which does not participate in Negative Concord, and the only so far attested inherently negative element in Serbo-Croatian. It is possible that such peculiar behavior results from the fact that we are dealing with negative coordination here, as such constructions and the markers which participate in them tend to be outliers and difficult to account for in the established system of a language (González 2015; González & Demirdache 2014; Szabolcsi 2018a, *inter alia*). However, things are not always what they seem at first glance.

4.2. Problems

There are (at least) three problems for the analysis of *niti* as an inherently negative coordination marker.

4.2.1. Problem 1

Negative Concord readings are attested when a marker of negation is outside of the *niti*-constituent, as shown in the examples below.

- (51) Niko/Marko nije (?niti) slušao niti pisao.
ni-who/Marko.NOM NEG-AUX.3SG niti listen.PART-SG.M niti write.PART-SG.M
'Nobody listened or wrote. / Marko neither listened nor wrote'
- (52) (Lea) (nikad) nije (?niti) letela avionom niti plovila
Lea.NOM ni-when NEG-AUX.3SG niti fly.PART-SG.F plane.INST niti sail.PART-SG.F
brodom.
boat.INST
'Lea has neither (ever) flown by plane nor (ever) sailed on a boat.'
- (53) Nije rekao niti da če doći niti da može zvati.
NEG-AUX.3SG say.PART-SG.M niti that will.3SG come.INF niti that can.3SG call.INF
'He didn't say that he'd come or that he can call.'

When *niti*-coordination is below a negated auxiliary (51, 52), or below a negated matrix verb (53), the structures are somewhat degraded, but no double negation arises.⁴ Neg-words can be present in addition (51, 52), without affecting the single negation reading. Whereas support provided by examples in (51, 52) and the like is weakened by the degradedness of multiple *niti* on VP-coordination, the example in (53) brings crucial evidence. Namely, in (53) *niti* is coordinating embedded declarative clauses, attaching above the complementizer *da*, and the matrix verb *say* is negated. Yet, the result is a reading with negation only in the matrix clause: 'it is not the case that he said that he would come or that he can call'. This is incompatible with the idea that *niti* realizes the negative operator, since then we would expect a reading such as the following: 'It is not the case that he said that he would not come or that he cannot call'. Yet, the observation that *niti...niti* combines with negative elements outside of the coordination and yields single negation readings is only the first crack in the picture.

4.2.2. Problem 2

A bit of background is needed again. Serbo-Croatian existential quantifiers behave like Positive Polarity Items (PPIs). Namely, if they co-occur with clausemate negation, they cannot be interpreted in its scope, as shown in (54).

- (54) a. Nije slušao nekoga.
NEG-AUX.3SG listen.PART-SG.M some-who.ACC
'There is somebody he didn't listen to.'

$\exists > \neg$

⁴In the case of coordinated VPs, *niti* should be attached only to the final member of the coordination. If it is repeated on each member, it yields some degradedness.

- b. Nije shvatio nešto.
 NEG-AUX.3SG understand.PART-SG.M some-what.ACC
 ‘There is something he didn’t understand.’ $\exists > \neg$

When these PPIs are in a sentence which is embedded under a negative matrix clause, they can be interpreted in the scope of negation (55).

- (55) a. Nije rekao da je slušao nekoga.
 NEG-AUX.3SG say.PART-SG.M that AUX.3SG listen.PART-SG.M some-who.ACC
 ‘He didn’t say that he listened to somebody.’ $\neg > \exists$
- b. Nije rekao da je shvatio
 NEG-AUX.3SG say.PART-SG.M that AUX.3SG understand.PART-SG.M
 nešto.
 some-what.ACC
 ‘He didn’t say that he understood something.’ $\neg > \exists$

Now, when such existential PPIs are inserted into *niti*-introduced clauses, they are interpreted in the scope of negation. This is exemplified in (56).

- (56) Niti je nekoga slušao, niti je nešto
 niti AUX.3SG some-who.ACC listen.PART-SG.M niti AUX.3SG some-what.ACC
 shvatio.
 understand.PART-SG.M
Lit. ‘(?)Neither did he listen to somebody, nor did he understand something.’
 = ‘(?)Neither did he listen to anybody, nor did he understand anything.’ $\neg > \exists$

The second crack in the picture thus represents the observation that *niti* cannot be a negative operator which is local to elements in the constituent it introduces, or else it would cause anti-licensing of PPIs (Szabolcsi 2004; Homer t.a.). *Niti*, therefore, either does not instantiate semantic negation, or it is not in the same clausal domain as the PPI, or there is an intervening element, or some combination of these factors is at work.

4.2.3. Problem 3

Finally, if we are talking about ‘negative coordination’, where is the coordination part? So far I have only discussed whether *niti* markers are inherently negative or not, but I have not touched upon the question of how exactly the two constituents are coordinated and what the logical nature of the connective is. In other words, is *niti*-coordination underlyingly a conjunction or a disjunction?

- (57) [Niti_[NEG] Sofija priča španski] {AND/OR} [niti_[NEG] Lea zna za Goju]
 niti Sofija speaks Spanish niti Lea knows for Goya
 ‘(?)Neither does Sofija speak Spanish, nor does Lea know of Goya.’

If two parameters are taken into account – whether (i) *niti* is semantically negative or not and (ii) whether the coordination is a logical conjunction or a disjunction – four possibilities surface. For the example in (57), the combinatorics yield four different Logical Forms (58).

- (58) a. Sofija does not speak Spanish or Lea does not know of Goya $[\neg p] \vee [\neg q]$

- b. It is not the case that Sofija speaks Spanish and that Lea knows of Goya $\neg[p \wedge q]$
 - c. Sofija does not speak Spanish and Lea does not know of Goya $\neg p \wedge \neg q$
 - d. It is not the case that Sofija speaks Spanish or that Lea knows of Goya $\neg[p \vee q]$

The first two configurations (58a, 58b), which constitute one of the de Morgan's equivalences (59), can be excluded because such interpretations are not attested for negative coordination more generally, *niti*-coordination included. The configurations (58c) and (58d) constitute the other de Morgan's equivalence (60), and they are valid possibilities, since they correspond to the truth conditions of sentences with negative coordination and, in this particular case, both (58c) and (58d) can represent the meaning of (57). It is important to point out that both options are on the table because one of the de Morgan's equivalences states that a conjunction which takes scope above negation is equivalent to a disjunction in the scope of negation.

$$(59) \quad [\neg p] \vee [\neg q] \Leftrightarrow \neg[p \wedge q]$$

$$(60) \quad \neg[p \vee q] \Leftrightarrow [\neg p] \wedge [\neg q]$$

The choice then seems to depend on the realization of negation – a structure with a disjunction is appropriate for cases when there is a single negative operator which can outscope the whole coordination, whereas a structure with a conjunction is suitable if all instances of coordination markers actually contribute semantic negation. So, can determining the logical nature of the connective shed light on its status inside the system of Negative Concord?

I will use one diagnostic to test whether *niti*-coordination is a conjunction and another one to test whether it is a disjunction. The first one consists in inserting a quantificational adverb into a sentence with *niti...niti*. This diagnostic is inspired by Shimoyama (2011), where adverbs like *usually*, *often*, and *mostly* were used to demonstrate that Japanese indeterminate NPIs are universals which take scope above negation. The adverb *obično* is the closest equivalent to English *usually*, and it obligatorily scopes above negation. Due to two different scopal possibilities with respect to negative coordination, or, rather, the logical operators inside it, when decomposed, we are presented with two possibilities, both of which seem attested as interpretations in Serbo-Croatian, at first glance.

- (61) Lea obično niti kuva niti čisti.
 LeaNOM usually niti cooks niti cleans
 'Lea usually neither cooks nor cleans.'

 - a. It is usually not the case that Lea cooks and it is usually not the case that she cleans
 $[Q_{adv}\neg p] \wedge [Q_{adv}\neg q]$
 - b. It is usually not the case that Lea cooks or cleans $Q_{adv}\neg[p\vee q]$
= It is usually the case that Lea does not cook and that she does not clean
 $Q_{adv}[[\neg p]\wedge[\neg q]]$

In (61a), conjunction takes the widest scope and the Q-adverb intervenes between it and negation. This interpretation is relevant because it requires negative coordination to be conjunction-based and it cannot be transformed into any other scopal order. In (61b), the adverb takes the highest scope, whereas negative coordination can be represented either as a conjunction or as a disjunction. This interpretation would not allow us to resolve the dilemma. Moreover, there is an entailment relation between these options: (61b) entails (61a). A scenario such as (62) disambiguates between (61a) and (61b), since it is compatible with the former, but not with the latter. Crucially, native speakers do not accept the sentence in (61) in such a context.

	Mon	Tue	Wed	Thu	Fri	Sat
(62)	cooked	yes	no	no	no	yes
	cleaned	no	no	yes	yes	no

The above shows that there is no evidence for *niti* being conjunction-based, since the reading where it can only be interpreted as a logical conjunction (61a) is not available on its own, i.e. independently from the other interpretation (61b).

To check whether *niti...niti* is disjunction-based, I will construct an example with a necessity modal which scopes below negation. This test is modeled after Penka (2011) and similar diagnostics which show that negative quantifiers in Germanic languages are underlyingly existentials in the scope of negation. In Serbo-Croatian, I use the modal *morati*, a rough equivalent of English *has to*. The example with *niti*-coordination looks like (63).

- (63) Lea ne mora niti da kuva niti da čisti.

Lea.NOM NEG has niti to cook niti to clean

‘Lea doesn’t have to cook or to clean.’

- (64) a. It is not necessary for Lea to cook or to clean.

$\neg\Box[p \vee q]$

- b. It is not necessary for Lea to cook and it is not necessary for Lea to clean.

$[\neg\Box p] \wedge [\neg\Box q]$

= It is not the case that it is necessary for Lea to cook or that it is necessary for Lea to clean.

$\neg[\Box p \vee \Box q]$

Now, the sentence in (63) is acceptable only with an interpretation in (64a). A situation in which there is an obligation for Lea to help with the chores, consisting of cooking and cleaning, but neither of the tasks is singled out as a particular obligation for her – i.e. she has to help, but she can pick her activity – enforces the reading in (64b), while the reading in (64a) is incompatible with it. In such a context, native speakers find (63) unacceptable. This offers evidence for a disjunctive analysis of *niti*-coordination, as the configuration in (64a) cannot be transformed into one that would be conjunction-based.

Finally, another piece of evidence comes from binding phenomena. In (65), the NPI *iko* in the first member of *niti*-coordination binds a pronoun in the second member. As Wurmbrand (2008) argues, this could be most easily explained if the whole coordination was a logical disjunction in the scope of a negative operator. A conjunction-based structure would require LF-movement of the NPI to a position outside the coordination from which it could bind into the second conjunct. However, such movement would bring the NPI outside the scope of negation where it would not be licensed. But the example in (65) is fine with the given indexing.

- (65) Niti je uvredila ikoga_i iz komisije, niti mu_i
niti aux-3sg insult.PART-SG.F i-wh.ACC from committee.GEN niti CL-DAT.3SG.M
je udelila kompliment.
AUX-3SG give.PART-SG.F compliment.ACC
‘? Neither did she insult anyone_i from the committee, nor did she give him_i a compliment.’

The above facts – scope intervention with Q-adverbs, scope intervention with necessity modals, and binding – show that a conjunction-based analysis of *niti*-coordination is untenable.

4.3. *Niti as a non-negative disjunction*

A disjunction-based analysis is incompatible with inherent negativity of *niti* markers, as it would predict interpretations which are not attested, such as (67a) for (66).

- (66) [Niti \neg Sofija priča španski] \vee [niti \neg Lea zna za Goju]
 niti Sofija speaks Spanish OR niti Lea knows for Goya
- (67) a. # Sofija does not speak Spanish or Lea does not know of Goya $[\neg p] \vee [\neg q]$
 b. It is not the case that Sofija speaks Spanish or that Lea knows of Goya $\neg[p \vee q]$

On the other hand, (67b) is the correct reading for (66), and there is no variation among speakers with respect to this. Now that we have established that *niti*-coordination should be disjunction-based and that the *niti* markers cannot be overt instantiations of negative operators, what should the account for *niti...niti* look like?

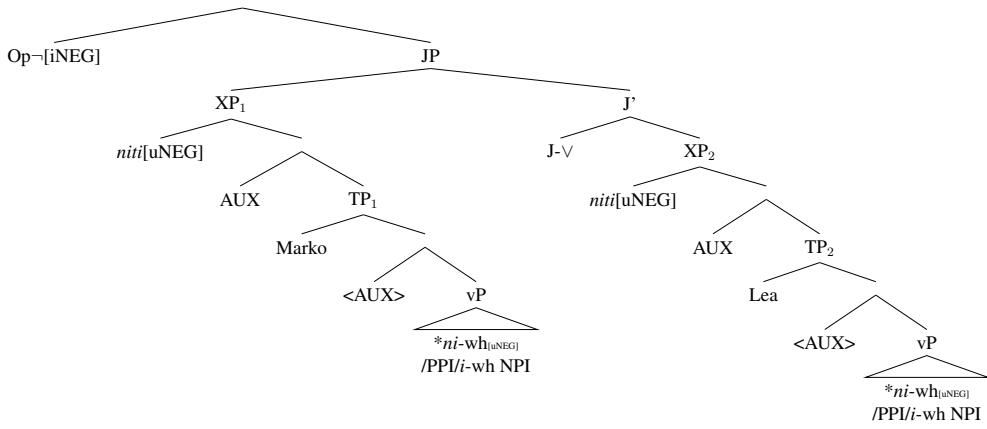
5. *Proposal*

Niti-coordination is underlyingly disjunctive. *Niti* markers carry only formal negative features, which are uninterpretable ([uNEG]). Such [uNEG] features have to be checked by a c-commanding negative operator (*Op* \neg). But this makes *niti* a participant in Negative Concord and it means that *niti* fits the pattern which other neg-words exhibit. Namely, in Gajić (2016a) I show that *wh*-based neg-words in Serbo-Croatian are best analyzed as existentials in the scope of negation. We can thus conclude that both quantificational neg-words and negative coordination are underlyingly weak scalar elements, which have to remain in the scope of a negative operator.

I propose that *niti* is a Negative Concord element at the clausal level. It is merged in a layer of the structure above TP and possibly even above CP, if there is one (cf. embedding facts). The projection in which it sits pertains either to focus or to speech acts. Clitic-like auxiliaries are subject to obligatory second position placement, so they immediately follow *niti* (68).

- (68) Niti je Marko ikoga slušao, niti će Lea
 niti AUX-3SG Marko.NOM i-who.ACC listen.PART-SG.M niti will.3SG Lea.NOM
 išta shvatiti.
 i-what.ACC understand.INF
- ‘(?) Neither did Marko listen to anybody, nor will Lea understand anything.’

The disjunctive connector itself is null. This is an assumption we have to make for compositionality’s sake, given that we are dealing with structures where two (or more) members of a coordination are each introduced by a *niti*-marker, so not every instance of it should represent a binary connective. The projection in which the disjunctive connector sits can be imagined as a Junction head, in line with Den Dikken (2006); Mitrović & Sauerland (2014). A sketch of the proposed structure for *niti...niti* coordination is given below.



Such a structure can accommodate the effects previously observed for *niti*-coordination in Serbo-Croatian. As shown in the tree above, the [uNEG] features on neg-words cannot be checked because the [iNEG] of the silent negative operator is too high. Nonetheless, this allows insertion of *i*-wh NPIs, elements which are compatible with extraclausal negation, as they are now not blocked by the presence of a local (clausemate) negative operator. The same reasoning should cover the absence of anti-licensing of existential quantifier PPIs, which are interpreted in the scope of negation in this case. If a negative verbal marker is present inside a *niti*-introduced clause, as well as neg-words, another silent negative operator (*Op¬*) must be inserted below the TP, in order to check their [uNEG] features. The presence of two negative operators yields double negation readings. When morpho-syntactically negative elements, such as the verbal marker or neg-words, are present outside of the *niti*-clause, the *Op¬*, whose presence they invoke for purpose of feature-checking, also checks the [uNEG] features on *niti*-markers.

All of the above means that sentential negation is not induced by *niti* itself, but comes from outside of the clause it introduces. It also means that TP/CP layer is a boundary for agreement – whatever element with matching interpretable features is higher than this layer cannot check uninterpretable features down below across this boundary.

6. Some further issues

6.1. Problems

The major focus of the present paper has been *niti...niti*-coordination in Serbo-Croatian. Although I discussed the properties of *niti* as a coordination marker, all of the conclusions reached in reality pertain to structures where every member of coordination is introduced by a *niti*-marker. But this is not the only possibility for using *niti*. A widespread construction is one with an initial negative clause/sentence followed by a clause introduced by *niti* (70).

- (70) Sofija *(ni)je pojela sendvič, niti je Lea
 Sofija.NOM NEG-AUX.3SG eat.PART-SG.F sandwich.ACC niti AUX-3SG Lea.nom
 popila jogurt.
 drink.PART-SG.F yogurt.ACC

- (71) a. ‘Sofija didn’t eat a/the sandwich, nor did Lea drink (the) yogurt.’
 b. # ‘It is not the case that Sofija didn’t eat a/the sandwich or that Lea drank (the) yoghurt.’

Such examples are problematic in that negation in the first clause should be contributed by a silent negative operator which is TP-internal. But then the negative operator from the first clause would be in a position from which it does not c-command *niti* of the second clause. Since the whole construction is grammatical, this would presuppose insertion of an additional negative operator above the whole coordination (higher than both clauses), to check the [uNEG] of *niti*. The trouble is that this would predict a double-negation reading in the first member of coordination which is not attested for (70).

A way out of this problem is dissociating multiple-*niti* constructions from single-*niti* constructions, as has usually been proposed for *ni* in French (deSwart 2001; Doetjes 2005; González 2015). Moreover, the whole construction does not have to be understood as an actual coordination, but *niti* could be analyzed as an additive focus particle instead. Its negative antecedent would then immediately precede it, and the pause between them can be written down either as a comma or as a full stop. For a unified analysis of Serbo-Croatian *ni* as coordination marker and a focus particle see Gajić (2018).

It is also important to point out that many of the highly degraded structures with *niti*-coordination of nominals, adjuncts and VPs become fine when only the final *niti* marker is realized. This is not always possible – for example, with subject nominals. It is conceivable that an analysis along the lines of the one for focus particles also covers these cases.

6.2. Variation

There is inter-speaker variation, which is partly regional. Namely, some speakers accept *niti*-coordination of non-clausal constituents, such as nominals, more easily.

- (72) %Niti Sofija niti Lea nisu uradile domaći.
 niti Sofija.NOM niti Lea.NOM NEG-AUX.3PL do.part-pl.f homework.ACC
 ‘Neither Sofija nor Lea did (the) homework.’

The interpretation which most of the speakers who accept such examples attribute to (72) is with a scalar flavor. This would amount to inserting a silent *even* in both, or at least the final member of coordination, demanding a context in which Sofija and Lea, or at least the latter, was the most likely to do her homework.

- (73) %Niti /ČAK?/ Sofija niti /ČAK/ Lea nisu uradile
 niti /EVEN/ Sofija.NOM niti /EVEN/ Lea.NOM NEG-AUX.3PL do.part-pl.f
 domaći.
 homework.ACC
 ‘Neither /EVEN?/ Sofija nor /EVEN/ Lea did (the) homework’

This effect could be explained through the competition with *ni...ni*, which is fully acceptable with subject nominals. When speakers say or hear sentences such as (72), they try to rescue them by adding an additional meaning flavor, the one which is absent with the competitor.

7. Conclusions

Serbo-Croatian has two negative coordination constructions, *ni...ni* and *niti...niti*, which are in near complementary distribution. The *niti* marker does not look like a well-behaved Negative

Concord element, at first glance, but closer scrutiny reveals that it should be treated as such. The coordination is to be analyzed as disjunction-based, with a c-commanding silent negative operator outside of it. This accounts for a number of phenomena, such as the absence of verbal markers of negation inside clauses introduced by *niti*, but compatibility with them when they are outside the coordination, the absence of neg-word licensing inside *niti*-clauses, double negation readings which can be attested when morpho-syntactically negative elements are inserted inside them, licensing of weak NPIs, as well as the absence of anti-licensing of PPIs.

Current proposal covers only *niti*-coordination with multiple realizations of the marker, i.e. cases when it is attached to every member of coordination. Structures where only the final *niti* is realized merit a closer inspection and an appropriate adjustment of the account, which could potentially extend to them.

Further motivation for how exactly *niti*-markers trigger insertion of a silent negative operator in the extra-clausal space above the coordination needs to be found, in order to avoid overgeneration and restrict the use such feature-checking mechanism to only those cases where its effects can be empirically proven.

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Abbreviations

SG	singular
PL	plural
F	feminine
M	masculine
NOM	nominative
ACC	accusative
DAT	dative
INST	instrumental
FOC	focus
PART	participle
AUX	auxiliary verb
NEG	NC element

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A morphosyntactic account of verbal number in Mupun

Irene Amato

In this paper, I argue that *verbal number* is *Agree* with either a DP (resulting in participant number reading) or an Adverbial Phrase (giving rise to an event number interpretation). Several facts support this claim: mismatches between the number features on the verb and on its argument, the role of the external argument for verbal number distinctions, the ambiguity between the two functions (participant plurality/event plurality) and the morphological productivity of the category. The analysis considers data from two Chadic languages, Mupun and Mwaghavul, and is couched in Minimalist Syntax and Distributed Morphology.

1. Introduction

Verbal number (Corbett 2000:243-264) is a grammatical category that quantifies the effects of an action, rather than enumerating entities as nominal number does. Verbal number can refer either to participant plurality, to event plurality or to both (see Mattiola (2017) for a recent overview on this phenomenon). When it expresses event number, it largely overlaps with various functions of aspect, such as iteration, distributivity, intensification.

Many previous analyses account for verbal number as a semantic characteristic of certain verbs, which are born with a plural number feature, in the same ways as the English verb *to massacre* means multiple killing events of multiple people. However, some examples of mismatches between the number on the verb and the number on its internal argument suggest a different analysis of this phenomenon. I aim to provide a morphosyntactic account of verbal number in the West-Chadic languages Mupun and Mwaghavul, couched in Minimalist Syntax and Distributed Morphology. This analysis can explain problematic issues for previous approaches and gives a unified picture of the two functions of verbal number, namely participant number and event number.

This paper is structured as follows. Section 2 presents the data from Mupun. In section 3, I highlight the problems of previous analyses. In section 4, I introduce the theoretical framework that I will use. Section 5 contains the main proposal of the paper, with the necessary assumptions

and the claims that I make. In section 6, I go through the derivation of some of the data presented in section 2. Then, in section 7, I extend the proposal to another Chadic language, Mwaghavul. The last section contains the summary of the paper.

2. Verbal number in Mupun

Mupun is an Afro-Asiatic, West Chadic language from Nigeria. Traditional analyses (Frajzyngier 1993) claim that verbal agreement is not available for this language: the verb agrees neither with the subject nor with the object. Moreover, the verb does not inflect for tense or aspect: this information is encoded instead by markers that appear at the beginning of the sentence. In contrast, verbal number is a productive category in Mupun. Although the set of verbs with number distinctions is not large, ‘the formation of plural stem is the only morphological change that may affect the verb stem’ (Frajzyngier 1993:54).

- (1) a. infix *-a-*:
pīn ‘crack’ - *piān* ‘crack (many things)’
pūt ‘go out’ - *púát* ‘(many people) go out’
- b. infix *-r-*:
tēp ‘break’ - *trēp, tráp* ‘break (many things)’
gáp ‘cut a piece’ - *gráp* ‘cut pieces’
séet ‘buy/sell’ - *srép* ‘buy/sell (many things)’
- c. suffix *-é*:
tù ‘kill’ - *tué* ‘kill (many people)’
sù ‘run away’ - *sué* ‘(many people) run away’
- d. suffix *-ep*:
mìut ‘die’ - *mùrép* ‘(many people) die’
pét ‘call’ - *prép* ‘call (many people)’
séet ‘buy/sell’ - *srép* ‘buy/sell (many things)’
- e. suffix *-wat*:
siāŋ ‘abort’ - *sìwnát* ‘(many people) abort’
- f. infix *-k-* or suffix *-k:*
yà ‘catch’ - *yak* ‘catch (many things)’
lóom ‘be lost’ - *lihàm* ‘(many people) be lost’
- g. suppletion:
dēn ‘put’ - *lé* ‘put (many things)’
tá ‘fall down’ - *dóŋ* ‘(many people) fall down’

As (1) shows, several verbal roots exhibit alternations between a singular and a plural allomorph. The meaning of the plural form indicates that the action is performed either multiple times or on multiple objects. This pluractionality can be realized through different morphological devices: infixation (1-a), (1-b), (1-f), suffixation (1-c), (1-d), (1-e), (1-f) or suppletion (1-g).

Here are some examples of the pattern (Frajzyngier 1993:59-62). Example (2) involves the suppletive root $\sqrt{\text{BEAT}}$: *cít* beat.SG ~ *nás* beat.PL.

- (2) a. *Wu nas mo.*
 3M.SG hit.PST.PL 3PL
 ‘He hit them.’
- b. **Wu cit mo.*
 3M.SG hit.PST.SG 3PL
 ‘He hit them.’
- c. *Wu cit wur.*
 3M.SG hit.PST.SG 3M.SG
 ‘He hit him.’
- d. *Wu nas wur.*
 3M.SG hit.PST.PL 3M.SG
 ‘He hit him many times.’

As (2-a) and (2-b) show, a plural object requires a plural verb, in the same way as a singular object asks for a singular verb (2-b). However, a plural verb can also cooccur with a singular object, giving rise to a plural event reading (2-d). The opposite pattern (plural object and singular verb) is not grammatical under any reading (2-b).

In examples (3)-(4), verbal number is realized by the suffixes *-e* (3-b) and *-k* (4-b). (3-a)-(3-b) show that the pattern is not sensitive to the person feature of the subject, which is 1st person. In examples (4-a)-(4-b), we can see that verbal number is also independent of the number feature on the subject, here plural: it is the number on the object that determines the number on the verb.

- (3) a. *N-tu joos.*
 1SG-kill.PST.SG rat.SG
 ‘I killed a rat.’
- b. *N-tu-e joos.*
 1SG-kill.PST-PL rat.SG
 ‘I killed rats.’
- (4) a. *Mo ya joos.*
 3PL catch.PST.SG rat.SG
 ‘They caught a rat.’
- b. *Mo ya-k joos mo.*
 3PL catch.PST.PL rat.SG PL
 ‘They caught a rat.’

Note that the plural morpheme on the noun (*mo*) is optional (3-b)-(4-b). The marker of plurality *mo*, derived from the 3rd person pronoun (Frajzyngier 1993:46-47), either can be attached to nouns when they are the last constituent of the phrase, or can occur at the end of the noun phrase, or can be dropped. When nouns do not inflect for number, then number on the verb is the only morphological sign of the plurality of the argument (3-b). Thus, the optionality of the plural marker in the nominal domain increases the ambiguity between the two functions of verbal number.

Unaccusative verbs exhibit verbal number differences too. In this case, it is the surface subject (underlyingly the internal argument), which governs the number value on the verb (5).

- (5) a. *Wu taa yil.*
 3M.SG fall.PST.SG down
 ‘He fell down.’
 b. *Mo don yil.*
 3PL fall.PST.PL down
 ‘They fell down.’

Unergative verbs may show verbal number too. Here, the number on the verb depends on the number of the external argument (6).

- (6) a. *Wu su seet.*
 3M.SG run.PST.SG away
 ‘He ran away.’
 b. *Mo su-e seet.*
 3PL run.PST-PL away
 ‘They ran away.’

As is the case for transitive verbs, I predict mismatches between a plural verb and a singular argument to be possible with a plural event reading, as in (2-d). Therefore, I expect an example such as *wu su-e seet* ‘3M.SG run.PST.PL away’ to be grammatical with the pluriactional meaning ‘he ran away many times’. Unfortunately, the grammar of Mupun (Frajzyngier 1993) does not provide enough data.¹

The example in (7) shows that for some verbs, such as *to cut*, the plural form pluralize the action rather than the objects (‘cut a piece’/‘cut into pieces’). (7-c) is an instance of a plural verb without an overt argument; moreover, it shows that verbal number is preserved in non-finite clauses.

- (7) a. *Wu gap pak lua lusim.*
 3M.SG cut.PST.SG some meat.SG leopard.SG
 ‘He cut a piece of leopard meat.’
 b. *Wu grap pak lua lusim.*
 3M.SG cut.PST.PL some meat.SG leopard.SG
 ‘He cut leopard meat into pieces.’
 c. *Da a sat mo grap.*
 go 2M.SG tell 3PL cut.PL
 ‘Go and tell them to cut it into pieces.’

In (8), the habitual prefix *kò* requires the use of the plural form.

- (8) a. **Wu kò-cit war.*
 3M.SG HABIT-beat.SG 3F.SG
 ‘He beats her continuously.’
 b. *Wu kò-nas war.*
 3M.SG HABIT-beat.PL 3F.SG
 ‘He beats her continuously.’

¹This remark should be repeated for every prediction I make. All data at disposal that are relevant are reported here.

We can now turn to the empirical generalizations. A plural feature on one argument requires a plural feature on the verb (2-a)-(2-b): * $V_{\text{sg}} \text{ DP}_{\text{pl}}$. This seems to suggest that both the verb and its argument should always carry the same number feature. However, the example (2-d) shows that a singular object can be merged with a plural verb too: $V_{\text{pl}} \text{ DP}_{\text{sg}}$. In this case, the verb does not express the plurality of the participants, but rather the plurality of events. The same plural form can be used for this two different functions. The constituent that governs verbal number is the internal argument of transitive verbs, whereas for intransitive verbs two cases must be distinguished. As far as unaccusative verbs are concerned (5), it is still the number of the internal argument that patterns with the one on the verb. For unergatives (6), the external argument, which is the sole DP to be merged with the verb, determines the number feature on the verb.²

Let me highlight this latter point. The role of the external argument in verbal number distinction for unergative roots is not expected under traditional accounts of verbal number (Durie 1986), (Mithun 1988). In particular, it has been claimed that the distinction between verbal number and ϕ agreement (of a verb with its arguments) lies in the property called *ergativity* (Corbett 2000): only the internal argument can determine verbal number, whereas agreement can express various grammatical relations. The example in (6) shows that this distinction is not always true. Other languages exhibit cases of verbal number depending on the external argument, as for example Hopi (Kalectaca 1978) (9).

- (9) a. *Pam wari.*
 3SG run.SG
 'S/he ran.'
- b. *Puma yuutu.*
 3PL run.PL
 'They run.'

3. Problems for previous analyses

All previous accounts treat verbal number as a selectional phenomenon. Durie (1986) considers the number specification on the verb and its arguments as matter of *selection*, Mithun (1988) talks about *semantic co-occurrence*, Tuite (1998) considers it as a phenomenon of *feature coincidence*. All these accounts have problems in explaining the following issues: (i) number mismatches, (ii) meaning mismatches, (iii) non suppletive cases, (iv) unergative verbs showing verbal number.

Let me repeat example (2).

²Note that I am assuming that the root $\sqrt{\text{RUN}}$ (among other roots: $\sqrt{\text{GO OUT}}$, $\sqrt{\text{ABORT...}}$) in Mupun is unergative. This is an argument for analyzing verbal number as Agree, as we will see in section 3. I cannot test for the status of these intransitive verbs at the moment, but even if they turn out not to be unergative, there are still other reasons to think of verbal number as agreement (cf. section 3).

- (10) a. *Wu nas mo.*
 3M.SG hit.PST.PL 3PL
 ‘He hit them.’
- b. **Wu cit mo.*
 3M.SG hit.PST.SG 3PL
 ‘He hit them.’
- c. *Wu cit wur.*
 3M.SG hit.PST.SG 3M.SG
 ‘He hit him.’
- d. *Wu nas wur.*
 3M.SG hit.PST.PL 3M.SG
 ‘He hit him many times.’

By adopting a selectional account, there are two possibilities to explain these data. Under the first option, the same number value is always expected both on the verb and on the object, but this is not what (10-d) shows. Under the second possibility, two different meanings (punctual/iterative) must be assigned to the two allomorphs *cit* ~ *nas*, but this seems not to be the case (10-a)-(10-d), since *nas* does not always mean ‘to hit many times’. Thus, selectional approaches can neither explain why (10-b) is ruled out and (10-d) is grammatical, nor why the same form *nas* is used once with the function of participant number (10-a), once as event number (10-d).

Moreover, verbal number is often expressed through morphology and not only through suppletion. The selectional approach has nothing to say about verbal number encoded by morphemes. If it could seem reasonable to store the meaning of suppletive allomorphs in the lexicon, this strategy is not ideal for the various pluractional morphemes in (1). In addition, in some languages verbal number is so productive (or obligatory, for example in the Chadic language Goemai (Hellwig 2017)) that it would be better to consider it being part of the grammar rather than stored in the lexicon, as the selectional account claims instead. Lastly, unergative verbs pose a problem as well, since verbal number is always expected to be conditioned only by the internal argument, i.e. the one that is locally selected by the verb.

4. Theoretical background

The analysis I am proposing is couched in the frameworks of *Minimalist Syntax* (Chomsky 1993, Radford 1997, Adger 2003) and *Distributed Morphology* (DM) (Halle & Marantz 1993, Harley & Noyer 1999). DM adopts a modular architecture of grammar and implements this division of labor between its components as follows. Syntax is a separate module that manipulates abstract morpho-syntactic features through two operations: *Merge* and *Agree*. The output of syntax is cyclically sent to Spell-out. At this point, morphology can operate on the chunks of syntactic structure before Vocabulary Insertion happens. After morphological operations have applied, the phonological exponent of a vocabulary item is inserted into a syntactic terminal node according to the Subset Principle (Halle 1999).

As far as agreement is concerned, I adopt the **interaction model of Agree** proposed by Deal (2015). In this system, Agree consists of two parts:

- *Interaction*: the probe P interacts with feature F by copying F;
- *Satisfaction*: the probe P is satisfied by G if copying G makes P stop probing.

Therefore, the probe P is specified as follows: INT-[F], SAT[G]. The probe P copies the feature F from every potential goal that it encounters while probing, until it finds the feature G, which represents its satisfaction condition and has the power to stop the Agree operation. After Agree is carried out, the probe P will have copied the feature G and eventually one or multiple instances of the feature F. This model is based on the *feature-geometry* approach to ϕ features (Béjar & Rezac 2009; Harley & Ritter 2002; McGinnis 2005; Preminger 2014; Kalin 2017). According to this proposal, feature values are organized in a structure that encodes implicational relations between them. The structure of the feature set allows for probes to look for a specific feature. Coming back to Agree, goals are *snippets of the feature geometry*, i.e. specific chunks of hierarchically organized features. Probes are placeholders for these feature structures and are *relativized* for that specific part of feature geometry that they are looking for. They are also *omnivorous*: they can agree with multiple goals and skip targets which do not bear the right featural specification. The valuation of a probe consists in copying an appropriate sub-part of the feature geometry from the goal onto the probe. Under this view, Agree is subject to cyclic expansion (Béjar & Rezac 2009) until its satisfaction condition is met or its domain is exhausted. Agree may fail if the probe it is not satisfied into its search domain (Preminger 2014).

5. *Proposal*

5.1. *The probe*

I propose that verbal number is the morpho-syntactic result of an Agree relation between *v* and either a DP or a covert AdvP. I claim that the probe *v* has the following structure (11).

- (11) *Feature specification of Mupun v*
 INT-[#], SAT[ϕ]

This probe is satisfied when it encounters a full ϕ projection (i.e. a DP); then it stops probing.³ However, it interacts with every # feature that it encounters during the valuation. As long as the probe finds a # feature, it will copy it, without any regards for its source. I treat singular as the absence of number (Puškar 2018; Nevins 2011). A singular DP is unmarked for number and does not bear a # feature. Therefore, it cannot be a suitable goal for a probe that looks for a # feature and it is skipped by Agree. I place the probe on *v*, rather than on T, because verbal number is preserved in non-finite clauses (cf. (7-c)).

The probe that I am proposing relies on the interaction model of Agree (cf. section 4), which considers both interaction and satisfaction features. At this point, the reader may wonder: why should the probe be articulated into two different conditions of interaction and satisfaction? How would Agree work with a simple probe that looks for a certain feature, such as *v* looking for #? The main challenge to such an analysis is the following. The data shows us that cyclic upwards

³Note that another possible satisfaction feature is the categorical feature D: INT-[#], SAT[D]. This could be an option in the case of DPs that do not carry ϕ features (for example, under the assumption that 3rd person is underspecified for person feature). Such a probe has been proposed by Deal (2017) for Swahili and Chichewa, where *v* does not agree with the subject when the object does not contain [ϕ].

expansion happens for unergative verbs (6-b), whereas in transitive verbs this is excluded (4-a). The INT/SAT model gives exactly this result: it allows Agree to stop when a specific condition is met, namely the presence of an internal argument, which is independent on the features that the probe is looking for, namely number.⁴ I repeat example (4), since the pattern $\text{Subj}_{\text{pl}} \text{ V}_{\text{sg}} \text{ Obj}_{\text{sg}}$ (and, presumably, $*\text{Subj}_{\text{pl}} \text{ V}_{\text{pl}} \text{ Obj}_{\text{sg}}$) constitutes the main argument for the INT-SAT model.

- (12) a. *Mo ya joos.*
 3PL catch.PST.SG rat.SG
 ‘They caught a rat.’
- b. *Mo ya-k joos mo.*
 3PL catch.PST.PL rat.SG PL
 ‘They caught a rat.’

As far as Multiple Agreement is concerned, it may seem a superfluous mechanism for the data in question. The reasons for adopting it are both theoretical and empirical. Firstly, even though it does not make a difference for the Mupun data, the possibility of Multiple Agreement is intrinsically present in the INT-SAT model. Secondly, the closely related language Mwaghavul, whose data are presented in section 7, shows evidence for adopting Multiple Agree. In particular, Mwaghavul has triplet of pluriactional verbs whose morphological features can be distinguished through different specification on the probe ([pl]/[pl, pl]).

5.2. *The adverb*

Coming now to the second point of the proposal, I claim that AdvP may bear a # feature that refers to event number, whereas in the nominal domain the # feature refers to participant number. Adverbials can be a goal for Agree, although the probe is not satisfied by the snippet of feature geometry that they can bear (namely, only #). Thus, the difference between adverbs and nominals is the absence of ϕ features in the AdvP, whereas both can contain a # feature. Interestingly, this difference is mirrored by the outcome of Agree. A DP has a full ϕ features geometry, therefore it can satisfy the probe.⁵ An AdvP has a small subset of ϕ features, namely only the # feature, lacking the whole ϕ features structure. Therefore, an AdvP can interact with the probe, which copies its # feature, but cannot satisfy it, since it does not carry a snippet of features that is complex enough to include the satisfaction features ϕ .

Adverbs can be either underspecified for number, as is often the case (cf. temporal, local adverbial phrases), or can be marked as plural, especially when they have nominal source. Mupun presents some hints of plural number on adverbials. For example, reduplication is used both to inflect adjectives as plural and to derive adverbs from adjectives (Frajzyngier 1993:75):

⁴There are of course possible alternative analyses. For example, we could use a simple probe for # on v. However, this idea requires two joint assumptions: (i) *singular* is a value for # feature and (ii) there are two number values for nominal (singular and plural) and only one for adverbials (just plural). This last assumption is needed because a singular DP is a suitable goal for Agree, whereas a singular AdvP is not. However, it seems to me that a homogeneous treatment of number is a desiderata. Another possible analysis could consider the subjects of unergative verbs to be generated lower down in the structure. I have not taken this option into account, since other languages may have verbal number with unergative verbs. Moreover, the lack of data for Mupun makes this assumption impossible to test at the moment.

⁵Note that I am assuming that 3rd person is specified for person features (Nevins 2007). Alternatively, it is possible to use [D] as a satisfaction feature, as I have already mentioned.

kén ‘fast’ [Adj] ~ *kéñkén* ‘fast’ [AdvP]. In particular, the reduplicated forms of nouns, verbs or adjectives in sentence final position have the function of manner adverbials.

AdvP is merged as an adjunct to VP when the intended meaning to be expressed is (*x times*)(VP). This AdvP is generally covert, similar to a silent operator. However, it can be overt too. For instance, here we have an example with an overt manner adverbial, low in the structure, derived from the verb *sù* ‘run’ (Frajzyngier 1993:274): the verb is plural even though both the subject and the object are singular (13).

- (13) a. *Wu grep suep kaa fin səsu.*
 3M.SG cut.PST.PL hair head 3POSS.M.SG running
 ‘He cut his hair in a hurry.’

5.3. *The Agreement*

Recall that in Mupun the verb does not agree with the ϕ features present on either the subject or the object. The only Agree operation available is verbal number, which is different from verb-object Agree. Firstly, it can depend on the number on the subject, as is the case with unergative verbs. Secondly, the number on the object can be different from the number on the verb: when the DP_{obj} is singular, the verb can still be plural.

Verbal number is independent from other types of agreement as well, which may involve features on T. When a language presents different agreement possibilities, then T is generally responsible for verb-subject Agree, *v* for verbal number and/or for verb-object Agree. An example can be seen in Huichol (Comrie 1982) (14).

- (14) a. *Wan Maria ma-ti me-neci-mieci.*
 Juan Maria and-SUBJ 3PL.SUBJ-1SG.OBJ-kill.SG
 ‘Juan and Maria are killing me.’
 b. *Nee Wan Maria maa-me ne-wa-quini.*
 1SG Juan Maria and.OBJ 1SG.SUBJ-3PL.OBJ-kill.PL
 ‘I am killing Juan and Maria.’

In Huichol, the verbal root $\sqrt{\text{KILL}}$ has two allomorphs, which are distinct for number. The singular form *mieci* is inserted when the object is singular, as the object marker for 1SG.OBJ *neci* shows in (14-a). Moreover, the verb agrees with the subject, as the morpheme *me* for 3PL.SUBJ indicates. In example (14-b), the internal argument is plural, therefore the verbal root that is used is the plural *quini*. In addition, the agreement markers indicates that the object is plural and the subject singular. Example (14) shows that verbal number and agreement of the verb with its arguments can be syntactically and morphologically distinct operations.

5.4. *The semantics*

My proposal leads to the unification of the two functions of verbal number (event number and participant number). Under this account, the two meanings are not due to two different semantic interpretations of *v*. Instead, the different goals for the probe *v* are responsible for these two interpretations.

Another consequence of my claim is that number can be an underspecified feature. In fact, v looks for a # feature that refers to *many x*, x being either an event or a participant. There is only one type of # features, namely the ones that are part of the complete ϕ features set. However, they are independent from other features (π , γ) and can show up in isolation as a smaller snippet of features, which can be hosted by different constituents. # features are not tied to the nominal domain, but may be hosted by other categories and simply indicate that the constituent they scope over has the semantic property [+many]. When the syntactic structure is sent to Spell-out, the position of the adverbial higher than the VP allows the # feature to scope over the entire VP in the LF module. In contrast, the # in the DP domain scopes over the noun and it is interpreted inside the DP.⁶

6. Analysis

6.1. *Transitive verbs*

6.1.1. Plural verb + plural argument

I now propose the derivation of some of the data presented in section 2. The first analysis illustrates why a transitive verb must be plural if its internal argument is plural (15).

- (15) a. *Wu nas mo.*
 3M.SG hit.PST.PL 3PL
 ‘He hit them.’

b. **Wu cit mo.*
 3M.SG hit.PST.SG 3PL
 ‘He hit them.’

Firstly (step 1), the syntactic structure is built. When the probe v is merged, it starts probing downwards inside its domain. After each cycle of derivation, upwards Agree is possible if the probe has not yet found its satisfaction feature.

Step 1: (a) building the structure, (b) probing

- (16)

```

graph TD
    vP[vP] --> v[v]
    vP --> VP[VP]
    v --> #:["#:"]
    VP --> V[V]
    VP --> DP[DP]
    DP --> #:pl["#:pl, π:3, γ:m"]
    style #: fill:#ffffcc,stroke:#000,stroke-width:1px
    style #:pl fill:#ffffcc,stroke:#000,stroke-width:1px
    #: --> #:pl
    
```

INT + SAT

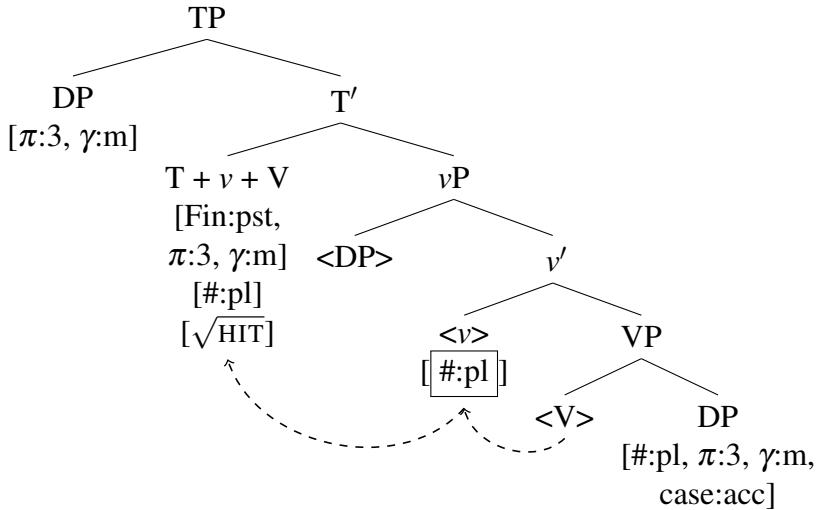
The probe v looks for a snippet of ϕ features that contains number, person and gender (ϕ satisfaction features). It is also a placeholder for number features: it collects all instances of $\#$ while looking for the other ϕ features ($\#$ interaction feature). v finds the internal DP as a potential goal, since it contains both $\#$ and other ϕ features. Therefore, v interacts with $\#$ on the

⁶This discussion aims at giving just an idea about the interpretation at LF after the syntactic derivation. The semantic implementation is beyond the scope of this paper and needs further research.

DP by copying it (step 2a). Moreover, it is satisfied by the ϕ features on the DP: π and γ cause Agree to stop. As a result, the probe has copied the value for # from the DP, as it can be seen in (17).

Step 2: (a) copying features, (b) moving heads

(17)



After Agree has stopped, head movement creates the complex head $T + v + V$ (step 2b). When this is spelled out (step 3), the lexical entry to be inserted is the one that matches the highest number of features in the terminal node, according to the Subset Principle. Thus, if the probe hosts a # feature and the lexicon contains a lexical entry that is specified for that snippet of features, this vocabulary item will be inserted.

Step 3: Vocabulary Insertion

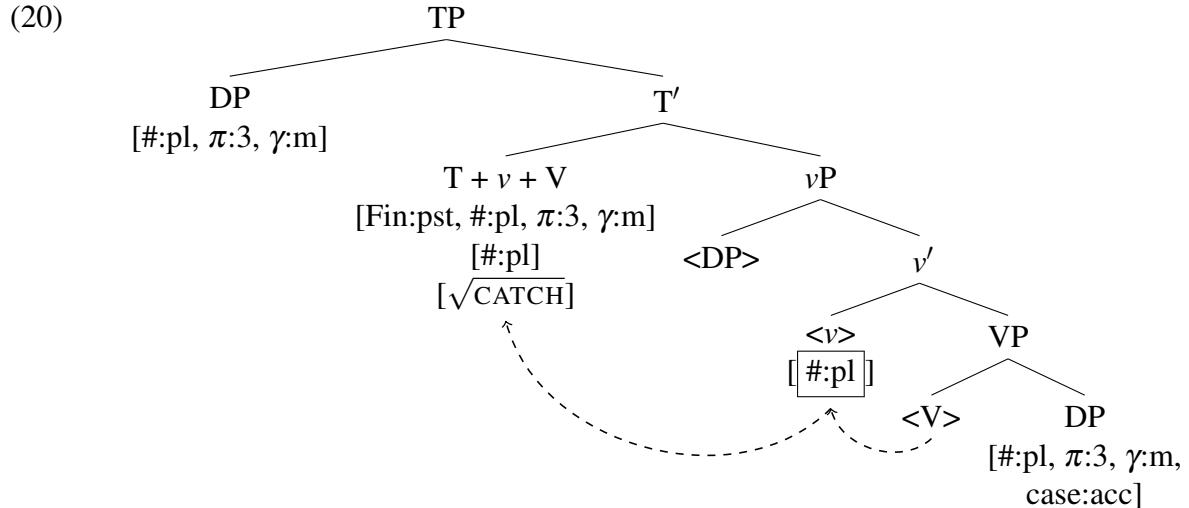
- (18)
- a. $\sqrt{\text{HIT}} \leftrightarrow /nas/ / v[\text{pl}] _$
 - b. $\sqrt{\text{HIT}} \leftrightarrow /cit/$
 - c. $v \leftrightarrow \emptyset$
 - d. $T \leftrightarrow \emptyset$
 - e. $[3, m] \leftrightarrow /wu/$
 - f. $[3, m, \text{pl}] \leftrightarrow /mo/$

I assume the lexical entries in (18). In this case (17), the exponent /nas/ (18-a) is inserted because it realizes a subset of the features in the terminal node (in particular, it realizes both the lexical meaning $\sqrt{\text{HIT}}$ and the plural on v) and it is more specific than the other allomorph /cit/ (18-b). A derivation with V_{sg} and DP_{pl} (15-b) is ruled out because the feature on v becomes specified for the value [pl] through the Agree relation with the DP. Consequently, the more specific allomorph that is compatible with the context has to be inserted (hence, (18-a) /nas/).

In the case of suppletive roots, there is a single lexical entry for the bundle of features on the complex head $T + v + V$. In contrast, in case of infixation or suffixation (1), a separate morpheme spells out the v head. In the following example, v is spelled out by the suffix /k/.

- (19) *Mo yak joos mo.*
 3PL catch.PST.SG rat.SG PL
 ‘They caught rats.’

Step 1 and 2 are the same as for example (15), giving rise to the following structure.



Step 3: Vocabulary Insertion

- (21) a. $\sqrt{\text{CATCH}} \leftrightarrow /ya/$
 b. $v[\text{pl}] \leftrightarrow /k/ / \sqrt{\text{CATCH}}$
 c. $[3, m, \text{pl}] \leftrightarrow /mo/$
 d. $\sqrt{\text{RAT}} \leftrightarrow /joos/$
 e. $[\text{pl}, \text{D}] \leftrightarrow /mo/$

The syntactic structure is the same as for the previous example. According to the lexical entries in (21), the Mupun root $\sqrt{\text{CATCH}}$ is not specified with a # feature, but it is compatible with the exponent of $v /k/$ that realizes the value [pl]. Therefore, the complex head $T + v + V$ is spelled out by two exponents: /ya/ for V and /k/ for v . The morphology and the phonology make the difference, both language-internally and cross-linguistically.

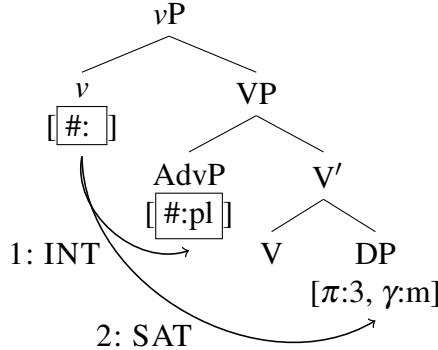
6.1.2. Plural verb + singular argument

I now propose the derivation for a transitive verb with a singular argument. This morphosyntactic structure is grammatical only with a pluractional interpretation. Thus, if a plural verb is merged with a singular object, the meaning of the verb must contain a plural event interpretation, as in (22).

- (22) *wu nas wur.*
 3M.SG hit.PST.PL 3M.SG
 ‘He hit him many times.’

Step 1: (a) building the structure, (b) probing

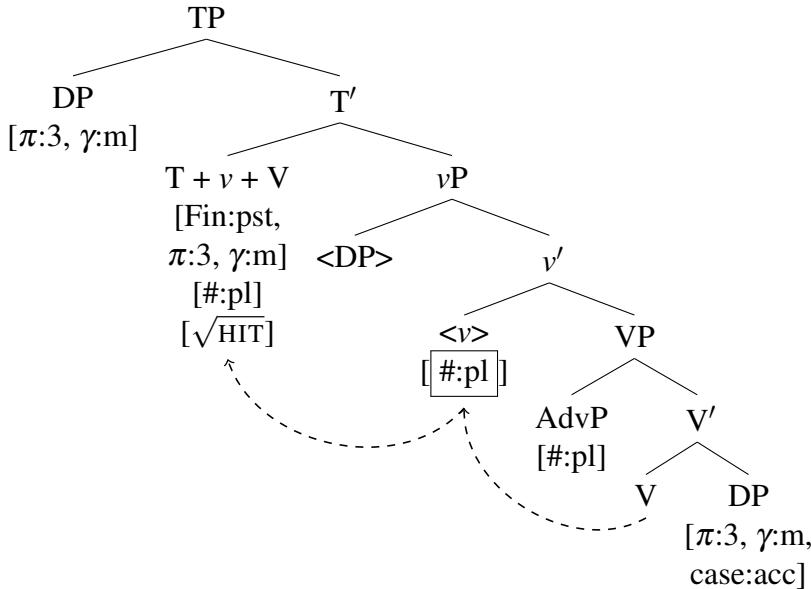
- (23)



In this syntactic structure, an AdvP is merged as an adjunct to the verb to achieve the intended pluractional meaning. The probe *v* interacts with # on the AdvP, but it is not satisfied by it, since it does not contain the whole ϕ projection. The valuation goes further until the probe is satisfied by the DP. Agree stops and the probe has copied the value for # from the AdvP. If the DP is also plural, *v* copies the # feature twice.

Step 2: (a) copying features, (b) moving heads

- (24)



Step 3: Vocabulary Insertion

In addition to the vocabulary items in (18), I add the following vocabulary items.

- (25) a. [Adv, pl] $\leftrightarrow \emptyset$
 b. [3, m, acc] $\leftrightarrow /wur/$

The feature on v gets specified for the value [pl] through the Agree relation with the AdvP. Consequently, the more specific allomorph that is compatible with the context has to be inserted (hence, (18-a) /nas/). This result is independent from the number on the DP in the structure.

Every time an AdvP[pl] is adjoined to the VP, the probe will copy the # feature that the AdvP carries. Then, the available lexical entry specified for [pl] will be inserted, regardless of the presence or absence of a # on the internal DP. If the AdvP[pl] is not merged with the VP, the plural event reading is not available and *v* only interacts with the # feature of the internal DP. Consequently, the verb is spelled out as singular if the DP is singular, as plural if the DP is plural (but without a plural event interpretation).

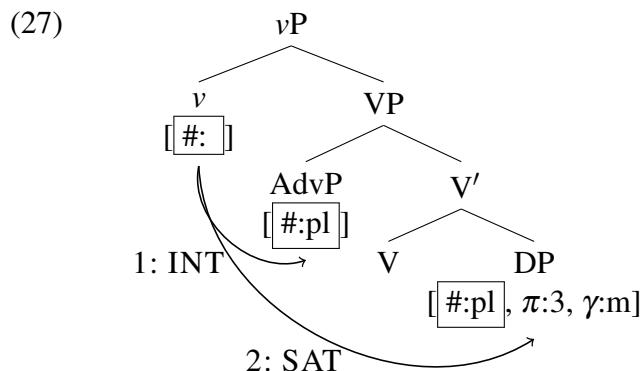
Note that an adverb that is unmarked for a # feature would have been skipped by this Agree operation: the only intervener between *v* and the internal DP can be a constituent that bears a # feature. This is an argument for Relativized Minimality (Rizzi 1990): a constituent is an intervener for X and Y if it is located between X and Y and if it matches the value of the morphosyntactic features of X.

6.1.3. Plural verb + plural event + plural argument

We can now look at the combination of a plural transitive verb with a plural internal argument, with plural event interpretation.

- (26) *Wu nas mo.*
 3M.SG hit.PST.PL 3PL
 ‘He hit them many times.’

Step 1: (a) building the structure, (b) probing

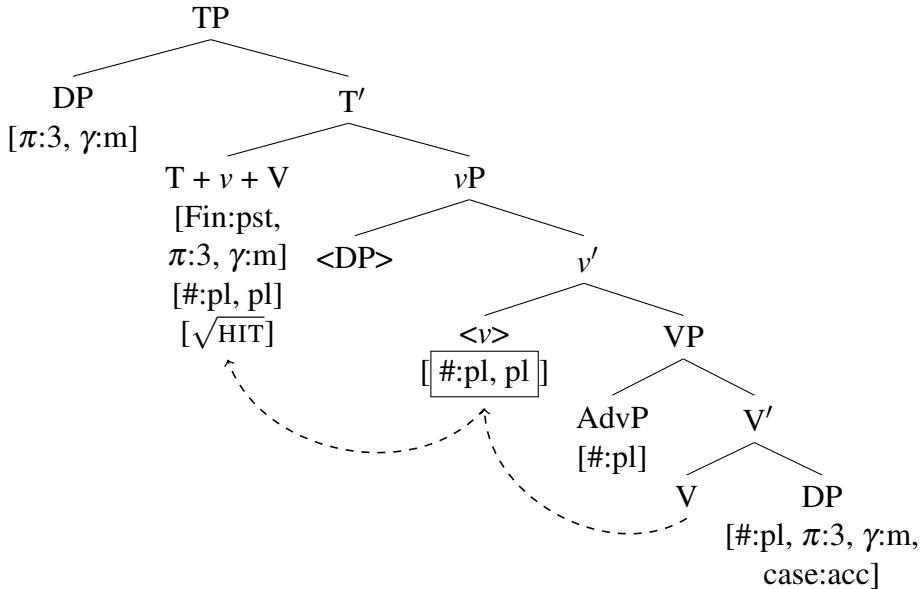


The probe *v* interacts with # on the AdvP, but it is not satisfied by it, since it does not contain the ϕ projection. The valuation goes further until the probe is satisfied by the # feature on the DP. Agree stops and the probe has copied the value for # from the AdvP and from the DP: *v* contains the # feature twice. This is a case of Multiple Agreement. However, this is not visible on the surface, since Mupun does not have lexical entries that are specified as *v*[pl, pl], as the lexical entries in (18) show.⁷

⁷ As I have already mentioned, Mwaghavul provides evidence for adopting Multiple Agreement in general.

Step 2: (a) copying features, (b) moving heads

(28)



Step 3: Vocabulary Insertion

Given the lexical entries in (18) and (25), the allomorph /nas/ is selected, since it realizes the highest number of features in the terminal node that contains the complex head $T + v + V$.

Mupun seems not to have a dedicated linguistic item to express plural participant number in the same time as plural event number (as the meaning in (26)). In fact, I did not find such a case in the grammar (for an example, cf. Mwaghavul examples (40-c), (41-c) in the next section). Therefore, the strings (15-a) and (26) *wu nas mo* ‘3M.SG hit.PST.PL 3PL’ are ambiguous on the surface because Mupun does not have lexical entries that are enough specific to distinguish between these two structures. Nevertheless, the cumulative reading of (26) is realized at LF, where the plural features are computed both on the DP and on the AdvP. Even though the adverb is a covert constituent, it is present in the syntactic structure and it is interpreted at LF. Since the AdvP is spelled out by a null exponent, I expect the sentence in (15-a) and (26) to be disambiguated by the context. Instead, if an overt AdvP[pl] is merged with the VP, then the # features are visible both on the AdvP and on the DP and, consequently, the meaning of the sentence expresses unambiguously both plural participant number and plural event number. In other words, there is nothing special about v that permits to distinguish between the two interpretations in (15-a) and (26), but it is the distribution of the features in the structure that gives rise to one meaning or to the other one ([pl] on AdvP: plural event, [pl] on DP: plural participant, [pl] on AdvP and [pl] on DP: plural event and plural participant).

More generally, under this account the morphological realization of Agree (at PF) is independent from its semantic interpretation (at LF). In fact, the semantics does not give a direct interpretation of the # features on the probe, but rather it considers the # features on either the AdvP or the DP or both. In this respect, Agree behaves as a postsyntactic operation, since its result is considered just at PF at the time of Vocabulary Insertion and not at LF.

6.2. Intransitive verbs

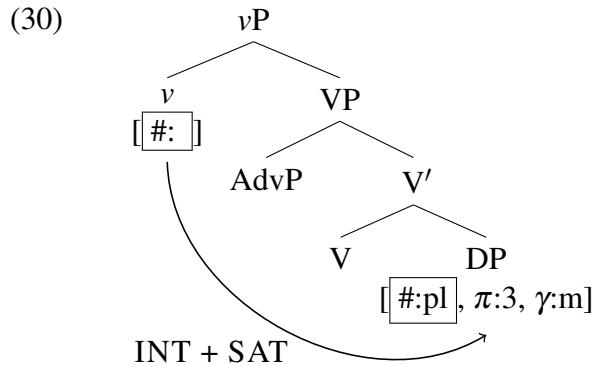
6.2.1. Unaccusative verbs

Unaccusative verbs pattern exactly as transitive verbs. The surface subject is generated as the internal argument and it determines the value of # on the verb. A plural subject must be merged with a plural verb, as in example (29).

- (29) *Mo do yil.*
 3PL fall.PST.PL down
 ‘They fell down.’

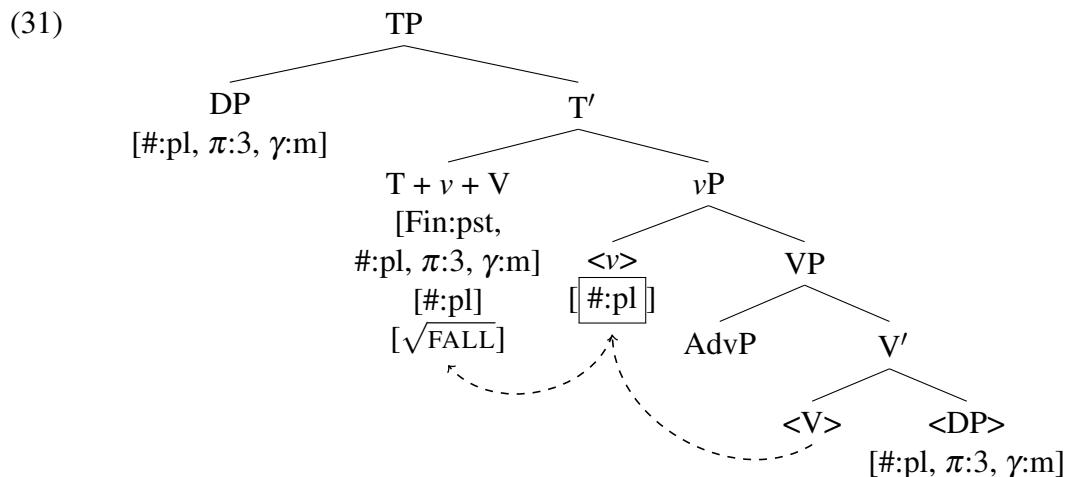
In contrast, a singular subject can be merged either with a singular verb or with a plural verb with plural event reading. Note that the sentence *wu doj yil* ‘3SG fall.PST.PL down’ is not attested, but I expect it to be grammatical and to mean ‘he fell down many times’, in the same way as in example (22).

Step 1: (a) building the structure, (b) probing



The probe *v* interacts with # on the DP and it is satisfied by the ϕ features of the DP. Agree stops and the probe has copied the value for # from the DP.

Step 2: (a) valuing features, (b) moving heads



Step 3: Vocabulary Insertion

For this analysis, I assume the following lexical entries, in addition to the previous ones.

- (32) a. $\sqrt{\text{FALL}} \leftrightarrow /d\text{on}/ /v[\text{pl}] _$
 b. $\sqrt{\text{FALL}} \leftrightarrow /t\text{aa}/$
 c. $[\text{AdvP}, \sqrt{\text{DOWN}}] \leftrightarrow /y\text{il}/$

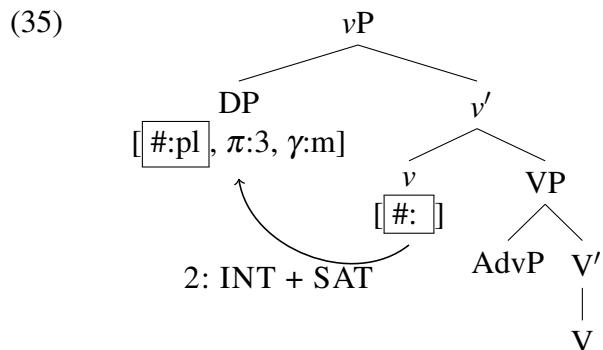
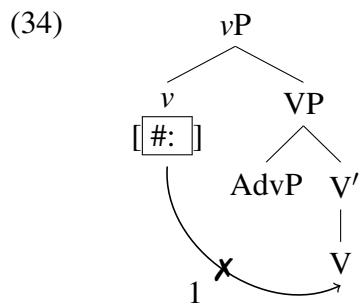
The allomorph */don/* is inserted, since it matches the highest amount of morpho-syntactic features in the terminal node. The *Elsewhere* form */taa/* is excluded by the Subset Principle.

6.2.2. Unergative verbs

Unergative verbs merge only with an external argument introduced by *v*, which is the goal for verbal number agreement. The example in (33) shows that the number on the subject determines the # value on the verb.

- (33) *Mo sue seet.*
 3PL run.PST.PL away
 ‘They ran away.’

Step 1: (a) building the structure, (b) probing

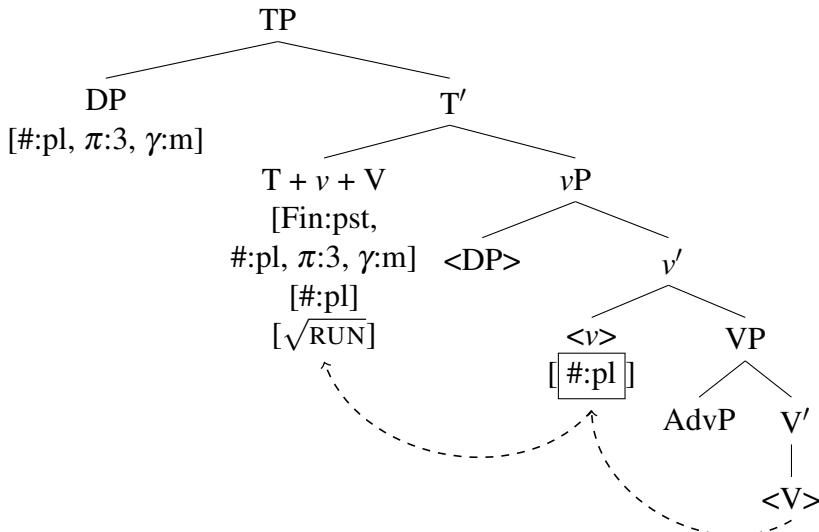


After the probe *v* has been merged in the structure, it starts its search for a goal downwards (34). However, it does not find any appropriate snippets of feature geometry, since there is no DP lower than *v* that could be a goal for Agree. Thus, the probe does not copy any feature after this first step of Agree. The derivation proceeds and now the external argument has been merged in Spec,*vP* (35). A new cycle of Agree can start through cyclic expansion (Béjar & Rezac 2009): the syntactic derivation has now enlarged the probing domain. Since the probe is not satisfied

yet, it can now look upwards and consider the external argument as a goal for Agree. v interacts with $\#$ on the external DP and it is satisfied by it. Agree stops and the probe has copied the value for $\#$ from the external argument.

Step 2: valuing features, moving heads

- (36)



Step 3: Vocabulary Insertion

For this analysis, I assume the following lexical entries, in addition to the previous ones.

- (37) a. $\sqrt{\text{RUN}} \leftrightarrow /su/$
 b. $v[\text{pl}] \leftrightarrow /e/ \sqrt{\text{RUN}}$
 c. $[\text{AdvP}, \sqrt{\text{AWAY}}] \leftrightarrow /seet/$

Unergative verbs are different from other types of verbs because they do not introduce any internal argument. Therefore, downwards there is no matching goal. There could still be a constituent with the interaction feature #, such as a plural AdvP, but there is no constituent that bears the satisfaction feature. Since the probe is not satisfied yet, as soon as the derivation proceeds and new syntactic structure is built, cyclic expansion can apply. Now the probing domain is expanded to the new derivation and a new cycle of upwards Agree can start. The DP in the subject position is a proper goal, thus v copies its # feature and is satisfied by its *phi* features. As is the case for transitive verbs, I expect that if an AdvP[pl] is merged in the structure with an unergative verb, the number on the verb will then be [pl], independently on the number on the DP_{subj} (for an example, cf. (6) and the unattested sentence *wu sue seet* ‘3SG run.PST.PL away’). In this case, the probe will copy the # feature from the AdvP during the first cycle of Agree. Then, it will look at the DP_{subj}, since it is not satisfied yet. If the DP_{subj} does not bear a # feature, the probe will still contain it because of the previous interaction with the adverbial phrase. Unfortunately, I do not have data either supporting or rejecting this prediction.

6.2.3. Summary

I have shown that the verbal number distinctions in Mupun can be derived through Agree. The probe on *v* keeps track of all the # features that it encounters while it is looking for a

whole ϕ projection. Then, if the lexical entries are sensitive to a # feature, the result of Agree will be expressed at the point of Vocabulary Insertion. The presence of a (covert) pluractional adverbial phrase in the structure gives the plural event reading. The possibility of # on different constituents (namely DP and AdvP) gives rise to ambiguity on the surface.

For transitive verbs, the verb will be plural either if the DP_{obj} is plural and/or if there is a plural adverb, in the latter case with no difference depending on the number of the DP_{obj} . The DP_{subj} is never reached by the probe. This result is achieved through the interaction-satisfaction model of Agree. In fact, a singular adverbial is skipped by the probe because it does not bear a #, whereas a singular DP is considered because of the whole ϕ projection.⁸ The same scenario arises for unaccusative verbs, the only difference being that there is only one DP in the structure, namely the internal argument (transitive DP_{obj} = intransitive DP_{subj}). In other words, there will always be an internal argument that, being a DP with ϕ features, will satisfy the probe.

In contrast, for unergative verbs, the derivation proceeds in cyclic steps. When v is merged in the structure, there is no DP downwards. Therefore, the probe cannot be satisfied. Later in the derivation, the external argument is merged. Now Agree can start a new cycle upwards and the probe is satisfied by the ϕ on the DP. Thus, the number on the verb is dependent on the number on the DP_{subj} . This pattern is problematic for theories that rely on the property of ergativity (i.e. only the internal argument can trigger verbal number).

7. Extending the proposal to other Chadic languages

7.1. Verbal number in Mwaghavul

Mwaghavul is a West Chadic language, spoken in Central Nigeria (Blench 2011). It is so close to Mupun, that the latter is sometimes considered as a variety of Mwaghavul. The system for verbal number in Mwaghavul is quite developed. A plural verb can refer both to event or to participant number. Additional nominal number markers can disambiguate the interpretation of the plural verb (as in (38-b)). Note that this is not normally the case in Mupun, where plural markers are generally dropped (cf. (3)).

In the example (38-b) (Blench 2011:63), the plural verb *pyan* instantiates a case of participant number, as the plural marker *mo* on the noun indicates.⁹

- (38) a. *Wán kin piin tughul àm ni.*
1SG have break.SG pot.SG water.SG 3SG
'I have broken the pot of water.'
- b. *Doghon jépmo teer pyan tughul fina ni mo.*
yesterday child.PL during.the.night break.PL pot.SG POSS.1SG 3PL PL
'Children broke my pots last night.'

Example (39-b) (Blench 2011:62) illustrates a case of plural event number. Multiple people (plural events) are acting on a single object; thus, the verb is plural and the translation implies pluriactuality.

⁸Note that there is no morphological reflex of this Agree, since the lexical entries of the Mupun verbs are only sensitive to the # feature.

⁹All Mwaghavul examples come from Blench (2011), where either only the glosses are provided, or only the translations. I tried to complete the examples in the appropriate way.

- (39) a. *Shààrlek fina wuri at an.*
 enemy.SG poss.1SG 3SG beat.PST.SG 1SG
 ‘My enemy bit me.’
- b. *Nfùtmo teer irap an.*
 mosquito.PL during.the.night beat.PST.PL 1SG
 ‘Mosquitos bit me many times during the night.’

Moreover, allomorphs for verbal number may be organized in triplets of roots, with two plural forms linked to a singular one, as the following table shows.

lexical meaning	singular	I plural	II plural
‘to drink plenty of water’	<i>shwaa</i>	<i>mis</i>	<i>myas</i>
‘to throw away’	<i>vwèt</i>	<i>fwo</i>	<i>car</i>
‘to break, to snap’	<i>tep</i>	<i>tirep</i>	<i>roghop</i>
‘to beat’	<i>nu</i>	<i>niram</i>	<i>siram</i>

Table 1: Verbal number distinctions in Mwaghavul (Blench 2011:61).

In the case of triplets, a verb in the singular form is used to refer to a single event. If the action involves either multiple events or multiple participants, the first plural form is used. When the event concerns multiple event and multiple participants, the second plural form is selected (Blench 2011:63-64).

(40) shows the alternations of the root $\sqrt{\text{THROW}}$: *vwèt* ~ *fwo* ~ *car*. The first pluriactional (40-b) is used with a plural object, whereas the second one (40-c) is used for plurality of objects and events.

- (40) a. *Wurí tàà vwèt kwàghàzàk firi.*
 3SG.M on.the.way throw.PST.SG shoe.SG poss.3SG.M
 ‘He discarded his shoe on the way’
- b. *Wùrá tàà fwo léé fira a ár mwaan.*
 3SG.F on.the.way throw.PST.IPL cloth.PL poss.3SG.F on road go
 ‘She discarded her clothes on the way going on the road.’
- c. *Mo nkaa car shak.*
 3PL at discard.IIPL reciprocal
 ‘They are throwing things at one another.’

A similar pattern can be observed in example (41). Here, the first plural allomorph (41-b) is used with a pluriactional interpretation (meaning intensity); the second one (41-c) is used with plural objects and plural events.

- (41) a. *Jépmo ki tep kam-dàghàr fina mi.*
 child.PL have break.PST.SG walking-stick.SG poss.1SG 3SG
 ‘The children have broken in two my walking-stick’
- b. *Wátmo doghon tirep pò lù fna mi.*
 thief.PL yesterday break.PST.IPL door.SG house.SG poss.1SG 3SG
 ‘Yesterday, thieves broke down the door of my house.’

- c. *Mo teer roghop shwáá an nwát.*
 3PL during.the.night break.PST.IIPL maize.PL poss.1SG steal
 ‘They broke off and stole many of my maize-cobs during the night.’

7.2. Analysis

7.2.1. The proposal

In the interaction model of Agree that I am using, all the probes are omnivorous, since they can interact with multiple goals. I claim that Mwaghavul has the same probe as Mupun, the only difference being in the morpho-phonology that contains a different inventory of lexical entries. The probe *v* can be valued again even if it has already copied the interaction feature.

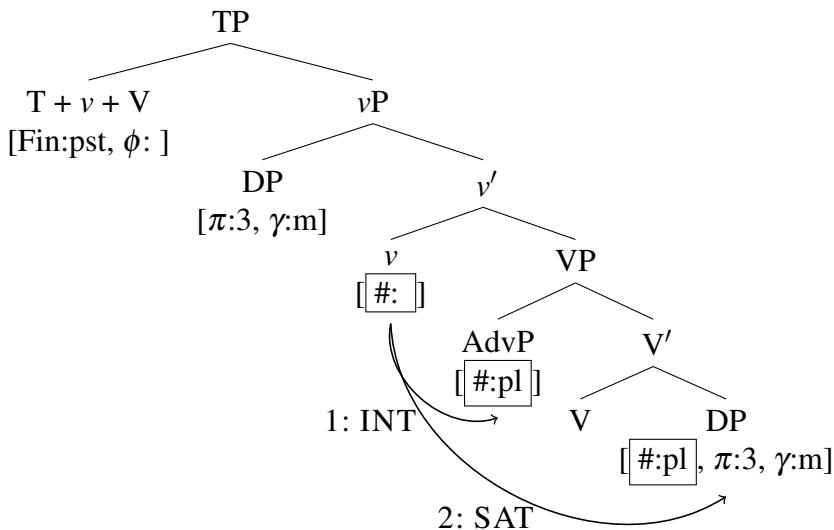
This is a case of Multiple Agree, i.e. Agreement between one probe and multiple goals. Cases of Multiple Agree are found in many languages (Bjorkman & Zeijlstra 2014), for instance in Japanese (Hiraiwa 2001:76) (42).

- (42) *Ohn-ga yosouijouni nihonjin-ga eigo-ga hidoku kanji-ta.*
 John-NOM than.expected the.Japanese-NOM English-NOM bad.INF think.PST
 ‘It seemed to John that the Japanesees are worse at speaking English than he had expected.’

7.2.2. The derivation

Mwaghavul can express at the same time plural participant number and plural event number. When a verbal root has only a plural form, both functions are simultaneously realized through the plural verb plus a plural marker on the DP (38-b). When two plural forms are available (40)-(41), the first one expresses one function, the second one both. The following is the derivation for (41-c).

(43)



The probe *v* interacts with # on the AdvP, but it is not satisfied by it, since it does not contain the whole *φ* projection. The valuation goes further until the probe is satisfied by the DP. Agree

stops and the probe has copied the value for # both from the AdvP and from the DP: *v* contains two # features. The vocabulary items list includes a lexical entry (/car/) (44-b) that is specified for *v[pl, pl]*. Since this realizes a proper subset of the morphosyntactic features in the syntactic structure and it is more specific than its competitors, the allomorph /car/ can be inserted.

The relevant lexical entries for example (41-c) are as follows.

- (44) a. $\sqrt{\text{DRINK}} \leftrightarrow /fwo/ / v[\text{pl}] _$
 b. $\sqrt{\text{DRINK}} \leftrightarrow /car/ / v[\text{pl}, \text{pl}] _$
 c. $\sqrt{\text{DRINK}} \leftrightarrow /vwèt/$
 d. $v \leftrightarrow \emptyset$

We saw that in Mupun the morphological realization of Multiple Agree is not visible on the surface, since there are no lexical entries that distinguish between *v[pl]* and *v[pl, pl]*. In contrast, the lexical inventory of Mwaghavul contains phonological exponents that are specified for different morpho-syntactic features on the probe. The two allomorphs /car/ and /vwèt/ realize the root $\sqrt{\text{DRINK}}$ in the context of *v[pl]* and *v[pl, pl]*, respectively. Therefore, the outcome of Multiple Agree is made visible at Vocabulary Insertion.

8. Concluding remarks

I have proposed a morphosyntactic account of verbal number in Mupun (and in other Chadic languages, such as Mwaghavul). To the best of my knowledge, there is no other syntactic approach to verbal number to date. This analysis allows to derive the patterns that are attested in Mupun and to rule out the ungrammatical sentences. It can also naturally account for problematic issues for previous approaches: (i) the realization of verbal number through morphology, (ii) the difference between event number and participant number, (iii) the external argument of unergative verbs as a goal for verbal number. The feature on *v* is the same for both participant number and event number; the difference between these two functions is due to the syntactic structure. The # feature is independent from other ϕ features and underspecified: *many x, x* being either a participant or an event.

I make some predictions that are left as a testing ground for the theory. Firstly, I expect that plural adverbial phrases influence the number on intransitive verbs, in the same way as it happens for transitive verbs. This fact follows directly from my analysis, but it has still to be confirmed by data. I expect these cases to be grammatical with the plural event reading. Secondly, adverbials that are underspecified for number or that have a singular meaning (such as ‘once’) should be skipped by Agree, since they do not carry the relevant feature. In these cases, the number on the DP would determine the number on the verb. Thirdly, if the indirect object of a ditransitive verb is higher in the structure than the direct object, then I expect the indirect object to be the goal for the probe. In other words, a sentence such as ‘he gave the books to his mum’ should have the plural verb, whereas ‘he gave the book to the children’ should have the singular verb. The same picture is expected with other DPs that are introduced by voice morphology (causative, applicative etc.). Depending on its position in the structure, if a DP intervenes between *v* and the internal argument, it should be a suitable goal for Agree and should determine the number on the verb. Further research aims at clarifying all these points.

Acknowledgments

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Abbreviations

F	feminine
HABIT	habitual
INF	infinite
M	masculine
NOM	nominative
OBJ	object
PL	plural
POSS	possessive
PST	past
SG	singular
SUBJ	subject

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Locality Constraint $\sqrt{\text{GIVE}}$ an Insight into Suppletion

Hyunjung Lee and Irene Amato

This paper deals with the locality constraints on optional morphological alternations in the grammar, whose architecture is local and serial in nature. We investigate the allomorphy of the root $\sqrt{\text{GIVE}}$ in Korean. These data provide a *prima facie* counter-example, which poses a problem to the locality condition on suppletion. However, we show that suppletive allomorphy does conform to a stringent locality constraint. We also address the challenging issue of optional alternations in morphology. We resolve these two puzzles by reconciling the local domain, rather than the lexical entries, through morphological operations. We claim that these data further suggest that morphosyntax interacts with phonology, both locally and serially.

1. Introduction

This paper deals with the locality constraints on optional morphological alternations in the grammar, whose architecture is local and serial in nature. In such alternations, two suppletive exponences of a single element X , α and β , may both occur in the same morphosyntactic context. The empirical data we will provide in this paper poses two challenges: (i) the locality constraint that conditions suppletion seems to be violated by an allomorph, and (ii) the competition between exponents seems not to obey the Subset Principle.

In general, suppletion receives much attention, since it is subject to a locality constraint. The trigger of allomorphy must be either structurally or linearly adjacent to its target. Intervention effects may arise when a constituent interrupts this adjacency relation. So far many previous studies (Bobaljik 2012; Embick 2010; Gribanova & Harizanov 2016; Marantz 2013; Merchant 2015; Moskal & Smith 2016) have addressed the question about the locality condition, attempting to argue that allomorphy is always subject to some constraints of this sort. Although the different studies propose different architectures of the grammar, the ultimate assessment of questions about locality among competing theories is empirical.

We focus on a three-way set of data from Korean allomorphy of the root $\sqrt{\text{GIVE}}$ that constitutes a *prima facie* counter-example to a strong hypothesis of adjacency restrictions.¹ One exponent is conditioned by a long-distance factor, which casts doubt on limited local domains as suggested in Bobaljik (2012). Our research question is to figure out which relevant grammatical restriction is acting upon the suppletive allomorphy. We will discuss to what extent the locality condition holds, showing that these data in fact do conform to a stringent locality constraint.

The data are also intriguing in that two contextual allomorphs alternate as free variants in certain contexts. This morphological optionality directly gives rise to a question about the Subset Principle, which only allows a single winner in each competition. Therefore, this problem contributes to a better understanding on how grammar operates. We argue for the model of grammatical organization proposed by Distributed Morphology (Halle & Marantz (1993, 1994); Harley & Noyer (1999) among others), where phonological computations apply after syntactic structures are spelled out cyclically and processed morphologically. Here, morphological operations are responsible for allomorphy. It is the local domain, rather than the lexical entries, that must be relativized serially through morphological operations in order to derive the optional morphological alternation.

The remainder of this paper is organized as follows. Section 2 presents the suppletive pattern of the root $\sqrt{\text{GIVE}}$ in Korean. In Section 3, we address two problematic issues: the question of locality and the puzzle of optionality in Morphology. In section 4, we argue for a model of grammar in which morphology may adjust the syntactic structure in a restricted way that obeys the cyclic and local nature of syntax. This architecture of grammar enables to derive the free variation of allomorphs in phonology. Section 5 shows how the alternation of the allomorphs can be derived without posing any problem for locality. Section 6 summarizes the main claims of this paper.

2. Data

In Korean, the root $\sqrt{\text{GIVE}}$ shows three allomorphs, depending on the following contexts:

1. /tuli/: used in cases of honorific datives;
2. /tal/: used in certain **imperative** contexts;
3. /cwu/: *Elsewhere* form.

In the following sections, we provide some examples for each allomorph.

2.1. $\sqrt{\text{GIVE}}$ and Honorific

Let us start with the alternation between /cwu/ ~ /tuli/. In a declarative sentence such as (i-a), we observe that the verbal root $\sqrt{\text{GIVE}}$ is realized as /cwu/, which is the default form. When the subject DP is honorific (1-a), the honorification is marked with a suffix *-si* onto the verb, which

¹As a precedent, Chung (2009) has accounted for the interaction between negation and honorification in Korean, discussing defective intervention. Kim & Chung (2017) argue that long-distance conditioned ‘tal’ suppletion is actually limited within the local domain of words.

is still realized as /cwu/. In contrast, when the indirect object of the sentence bears a honorific feature (1-b), the *Elsewhere* form /cwu/ is blocked and the allomorph /tuli/ shows up.²

- (1) a. **Sensayngnim-kkeyse** na-ekey satang-ul **cwu-si-ess-ta.**
teacher.HON.NOM I-DAT candy-ACC give-HON-PST-DECL
'The teacher gave me a candy.'
- b. Nay-ka **sensayngnim-kkey** satang-ul **tuli-ess-ta.**
I-NOM teacher-DAT.HON candy-ACC give-PST-DECL
'I gave the teacher a candy'

Given this observation, we can straightforwardly predict that the allomorph /tuli/ is subject to a locality restriction. With respect to Relativized Minimality (Rizzi 1990) the indirect object is much closer to V than the external argument is. Therefore, when this local configuration between V and an indirect object bearing a [HON] feature is met, the *Elsewhere* form /cwu/ is blocked by /tuli/.

2.2. $\sqrt{\text{GIVE}}$ and Imperatives

Take the third suppletive exponent /tal/. As shown in (2), this allomorph of the root $\sqrt{\text{GIVE}}$ can be inserted only when two contexts are met: (i) the clause has imperative mood and (ii) the dative argument is co-referential with the speaker of the utterance (i.e., first person, singular/plural).

- (2) (Ne) na-ekey satang-ul **cwu/tal-la.**
you-NOM I-DAT candy-ACC give-IMP
'Give me a candy.'

However, /tal/ is blocked when the verb is negated (3-a), or if the addressee of the imperative utterance bears a [HON] feature (3-b).³

²An anonymous reviewer wonders if the [HON] feature could condition the suppletive allomorph of the root in other ways too. However, the honorific suppletive form /tuli/ is triggered only when the dative-marked indirect object bears the [HON] feature. As shown in (i), even if the direct object *caki pwumo-nim-ul* has the [HON] feature (i-a), it does not condition the suppletion on the verb. In contrast, (i-b) shows that we can get the form /tuli/ if the indirect object is honorific, as in (1-b).

- (i) a. Nay chinkwu-ka na-eykey caki pwumo-nim-ul **cwu/*tuli-ess-ta.**
My friend-NOM I-DAT self parent-HON-ACC give-PST-DECL
'My friend gave her/his parents to me.'
- b. Nay chinkwu-ka caki pwumo-nim-kkey na-lul ***cwu/tuli-ess-ta.**
My friend-NOM self parent-HON-DAT I-ACC give-PST-DECL
'My friend gave me to her/his parents.'

If both direct and indirect objects bear the [HON] feature, we always get the suppletive form /tuli/, as expected.

³A reviewer asked us about the role of other tense and aspect features in Korean. Unlike declarative or interrogative, we could not test the grammaticality with other tense and/or aspect values, since jussive structures, including the imperative, are deficient with respect to temporality. The speech act types of ordering, commanding, or requesting express unanchored propositions, meaning that they bring the propositions in the future and unrealis orientation (Schwager 2011).

- (3) a. (Ne) na-ekey satang-ul **cwu/*tal**-ci-ma-la.
 you-NOM I-DAT candy-ACC give-CI-NEG-IMP
 ‘Do not give me a candy.’
- b. Sensayngnim, ce-ekey satang-ul **cwu/*tal**-si-la.
 Teacher.HON I.NONHON-DAT candy-ACC give-HON-IMP
 ‘Teacher, give me a candy (please).’ *To honorific addressee*

Crucially, /tal/ insertion is problematic for the locality constraint, as this allomorph is triggered by the feature [IMPERATIVE] on the JUSS head. Concerning the possible extended verbal projection, as sketched in (4), the JUSS head is not close enough to condition the form of the exponent to be inserted on the V node, as the T head is always part of the syntactic structure and intervenes between the V and the JUSS head.

- (4) $\sqrt{\text{VERB}}$ - (NEG) - (HON) - T- Mod- JUSS - SA

Note that the feature [IMP] on JUSS head (for a detailed discussion, see Zanuttini et al. (2012)) triggers suppletion on the V node when the tense head is zero-marked. This local configuration is essential for suppletion, since Negation and Honorification intervene between the two nodes and bleed /tal/ insertion. Moreover, the *Elsewhere* form /cwy/ can appear as a free variant in the context where /tal/ should be required, as shown in (2). Given the specific conditions of /tal/ insertion, /cwy/ is not expected to occur in the context for /tal/ insertion.

In Korean, the imperative mood can also be embedded when the matrix clause merges with a speech verb (see (5-a)-(5-b)). Note that Korean has a phenomenon called *indexical shift*.⁴ The availability of this process of indexicality led us to inspect if the environment of /tal/ holds consistently in embedded clauses. More precisely, it has been argued that in some languages speech (report) verbs can have shifted readings of indexicals: an argument in a clause that is embedded by a speech verb is interpreted as the actual speaker in that context.

- (5) a. Swumi-ka (na-ekey) [Yusu-ekey kihoy-lul **cwy/*tal**-la-ko] malhayssta.
 Swumi-NOM (I-DAT) [Yusu-DAT chance-ACC give-IMP-COMP] told
 ‘Swumi told (to me) to give Yusu a chance.’
- b. Cini_i-ka Yusu-ekey [caki_i-ekey kihoy-lul **cwy/tal**-la-ko] malhayssta.
 Cini-NOM Yusu-DAT [self-DAT chance-ACC give-IMP-COMP] told
 ‘Cini_i told Yusu to give her_i a chance.’

In (5-a), the actual speaker of the embedded utterance is *Swumi*, and the recipient of the action of *giving* (i.e., the dative in the embedded clause) is *Yusu*. Here, the speaker is not coreferential with the dative marked DP, so the environment for /tal/ insertion is not met. Instead, the unmarked form /cwy/ is inserted. However, if the reflexive pronoun *caki* is coreferential with the subject of the matrix clause *Cini* as in (5-b), /tal/ may be chosen as the root-allomorph.

To recap, in order for /tal/ to appear, (i) the clause has imperative mood, and (ii) a coreferentiality relation must hold between the recipient of the action *giving* and the actual speaker of the utterance, who is the agent of the event *telling*. In simple clauses, the speaker is always the first person, whereas in embedded clauses the actual speaker is the subject of the

⁴Kaplan (1989) first points out that natural languages have *indexicals*, expressions whose meanings are dependent on the context of utterance. He conjectures that indexicals refer to the actual context of utterance and proposes a context-shifting operator, *monster*. The monster plays a role in determining the actual speaker relative to the context.

matrix clause, which is projected by the speech report verb.

The following example supports this generalization for /tal/ insertion. The pronoun *kunye* ‘she’ can either refer to a third part which is different from the matrix subject, as in (6-a), or be coreferential with the matrix subject, as in (6-b). In the former sentence, /cwu/ is the only choice, as the contexts for other allomorphs are not met, whereas /tal/ may be inserted for the root of verb in the latter case (with the same pattern of optionality as in (2), (5-b)).

- (6) a. Swumi_i-ka Yusu-ekey [kunye_j-ekey kihoy-lul **cwu/*tal-la-ko**] malhayssta.
 Swumi-NOM Yusu-DAT [she-DAT chance-ACC give-IMP-COMP] told
 ‘Swumi_i told Yusu to give her_j a chance.’
- b. Swumi_i-ka Yusu-ekey [kunye_i-ekey kihoy-lul **cwu/tal-la-ko**] malhayssta.
 Swimi-NOM Yusu-DAT [she-DAT chance-ACC give-IMP-COMP] told
 ‘Swumi_i told Yusu to give her_i a chance.’

Considering that Korean is a *pro*-drop language, we can hypothesize two scenarios when one argument is marked as dative. In example (7), all the sentences have the same surface structure, but they differ for the syntactic position of the *pro*. As shown in (7-a), the dative marked DP *Swumi* is the recipient of the action of *giving* in the embedded clauses, and the *pro* is the addressee of the sentence (you). In contrast, the dative marked DP *Swumi* can be the addressee of the event *telling* in the matrix clause and the recipient of the action of *giving* can be dropped, as illustrated in (7-b) and (7-c). Here, *pro* can bear two different indices and, thereby gives raise to two different allomorph realizations.

- (7) a. Cini_i-ka pro_j [Swumi-ekey kihoy-lul **cwu/*tal-la-ko**] malhayssta.
 Cini-NOM *pro* [Swumi-DAT chance-ACC give-IMP-COMP] told
 ‘Cini_i told (you_j) to give Swumi a chance.’
- b. Cini_i-ka Swumi-ekey [pro_i kihoy-lul **cwu/tal-la-ko**] malhayssta.
 Cini-NOM Swumi-DAT [*pro* chance-ACC give-IMP-COMP] told
 ‘Cini_i told Swumi to give her_i a chance.’
- c. Cini_i-ka Swumi-ekey [pro_j kihoy-lul **cwu/*tal-la-ko**] malhayssta.
 Cini-NOM Swumi-DAT [*pro* chance-ACC give-IMP-COMP] told
 ‘Cini_i told Swumi to give her_j a chance.’

These examples above show that the coreferential relation is essential for /tal/ to appear. This condition holds consistently regardless of the actual form of the DP (full DPs (5-b), pronouns (6-b), *pro* (7-b)). It is also worthwhile noting that the free variation between /cwu/ and /tal/ is observed in both simple and embedded clauses.

3. Challenges

3.1. The problem of locality

The Minimalist Program proposed by Chomsky (1993) and subsequent works has been the framework for theories where syntactic relations are inherently local. In this approach, emphasis is placed on the idea that the derivation is serial. Given each step in a derivation, every computational operation spells out a local domain, and the output structure of each step is ordered serially. This kind of computation enforces the program to access only the restricted

information that is available at any particular stage of the derivation. In the derivational approach, locality and being serial are demanded by nature.⁵

In the previous section we have seen that the appearance of the allomorph /tal/ for the root V is conditioned by a seemingly long-distant factor, the JUSS head bearing the imperative mood. In this configuration, the T node is realized as \emptyset . Given these data, a question arises about how the derivation can successfully proceed without a violation of the locality conditions. Let us point out a strong hypothesis defended in Embick (2010), claiming that the trigger and the target of allomorphy must be linearly adjacent to each other, as stated in (8).

(8) *Node Adjacency Hypothesis*

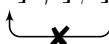
The appearance of a particular allomorph μ in a cyclic domain can be conditioned only by morphosyntactic features of a node that is linearly adjacent to μ .

Locality conditions can be computed both structurally and linearly. The former strategy of computation considers the maximal projection as the syntactic domain for allomorphy dependencies; the latter takes into account adjacency relations after linearization and before Spell-out. The *Node Adjacency Hypothesis* specifies two restrictions on conditioning allomorphy: (i) cyclic domain, and (ii) linear adjacency.

- (9) a. (H1) Head X can be allomorphically sensitive to a head Y only if X and Y are in the same cyclic domain, where only category-defining heads n, v are cyclic heads.
 b. (H2) Contextual allomorphy is possible only with elements that are concatenated by \frown in linearization. (Embick 2010:35-36)

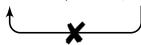
(10) *Structure*

- a. $[[\alpha] \beta]$

- b. $[[[\alpha] \gamma] \beta]$


(11) *Linearization*

- a. $\alpha \frown \beta$

- b. $\alpha \frown \gamma \frown \beta$


The restriction on cyclicity determines that functional heads like tense, number, aspect and other projections fall into non-cyclic heads, so that extended verbal projections are considered as a cyclic domain. In addition, the linearity restriction hypothesizes that a node can be sensitive to another node by virtue of being concatenated with it. According to (8), α can condition β if they are adjacent to each other, as in (11-a), but α can not condition β if they stand in the configuration (11-b) with an intervening γ . As the possible configuration in (11-b) shows, the two nodes V and JUSS can never be adjacent to each other, since there is at least T head that intervenes.⁶

Given that the T head is spelled out as a null exponent in the context of the imperative ($T \Leftrightarrow \emptyset$), the reader may wonder whether a weak locality constraint could account for these data. In fact, under a locality principle that computes only heads with overt exponence, a terminal

⁵We are grateful to an anonymous reviewer for the helpful discussion regarding these points.

⁶Note that the issue cannot be resolved through Head movement, since the respective order of the heads after movement will be V-T-JUSS, with the same pattern of intervention.

node that is spelled out by a null exponent does not intervene or block the structural adjacency relation between two other syntactic heads. However, under this weak interpretation of locality, /cwu/ should never appear in imperative clauses, since, if the locality issue is solved, then only /tal/ is expected to occur.⁷ This is a mirror image: under a strong interpretation of locality, /tal/ can never occur and the *Elsewhere* form /cwu/ is always expected, whereas by adopting a weak interpretation of the locality constraint /tal/ is always expected and /cwu/ can never appear (see (2), (5-b), (6-b), and (7-b)).

3.2. The problem of Competition

Optionality is challenging for the current frameworks that rely on the Subset Principle, which allows a single winner among competitors. The concept of *competition* is initiated in the research on blocking effects by Aronoff (1976).⁸ The grammar can provide more than one item for a particular linguistic element, but the competition must be resolved in the way of determining a unique winner. The Subset Principle allows output forms to be well-formed throughout the competition in the way that the more specific exponent for the node X wins. The Subset Principle (Halle 2000; Hale & Reiss 2003) is stated as follows.

'The phonological exponent of a Vocabulary Item is inserted into a morpheme [...] if the item matches all or a subset of the grammatical features specified in the terminal morpheme. Insertion does not take place if the Vocabulary Item (i.e. relation between a phonological piece and information about where that piece may be inserted) contains features not present in the morpheme. Where several Vocabulary Items meet the conditions for insertion, the item matching the greatest number of features specified in the terminal morpheme must be chosen' (Halle 2000:128).

In short, only one allomorph is expected to win the competition, in particular the one that matches the highest amount of morphosyntactic features with the morpheme in the terminal node in question.

The optionality shown in (2), where the two allomorphs /tal/ and /cwu/ are in free variation in a specific environment, highlights a new question on competition among allomorphs. Optional morphological alternations have been recently pointed out by Driemel (2018) in German coordinations. This pattern of optionality arises because in the syntactic structure there are two feature values A and B, 2nd and 3rd person in the example (12).

- (12) Du und dein Freund **seid/sind** eingeladen.
 you.2 and your friend3 are.2PL/3PL invited
 'You and your friend are invited.' Driemel (2018)

This type of optionality can be quite straightforwardly derived by making the choice optional of which person feature the verb agrees with (see Driemel (2018) for a detailed analysis on person feature resolution in coordination structures). The verb can choose to agree either with

⁷Even if we assume that the T head is not projected when C head is supposed to bear the [IMPERATIVE] mood, then /cwu/ in (2) can never be derived.

⁸For example, a word such as *gloriosity* does not exist because the existence of the word *glory* blocks it; this gap is not due to the inability of the derivative rules in the grammar.

one member or with the other one of the conjunct phrase. Both options are equally specific and equally expected, given the Subset Principle. This is the only case where the Subset Principle can tolerate two optimal candidates for insertion, namely when the competition is between two equally specific allomorphs that realize different features in the same context.

Let us exemplify this point in (13)-(14). In the derivation of (13), the terminal node W bears the feature $[+x]$. According to the lexical entries in (15), the morpheme Z can be substituted with the allomorph α , since α realizes Z in the context of $[+x]$. However, if in the morphosyntactic structure the feature $[+y]$ is present, instead of $[+x]$, the allomorph β must be inserted. This morphological alternation for the element Z is determined by Syntax before Spell-out. Morphology does not encounter a problem of competition, as the contexts for the two candidates are different.

(13)	(14)	(15) List of Vocabulary Item for the Z head
<pre> graph TD W[W'] --- Wx[W[+x]] W[W'] --- ZP[ZP] ZP --- Za["Z->\u03b1"] ZP --- YP[YP] </pre>	<pre> graph TD W[W'] --- Wy[W[+y]] W[W'] --- ZP[ZP] ZP --- Zb["Z->\u03b2"] ZP --- YP[YP] </pre>	a. $Z \Leftrightarrow \alpha / _ _ W_{[+x]}$ b. $Z \Leftrightarrow \beta / _ _ W_{[+y]}$

Let us come back to the Korean data in (2) (repeated here again for convenience).

- (16) (Ne) na-ekey satang-ul **cwu/tal-la**.
 you-NOM I-DAT candy-ACC give/give-IMP
 ‘Give me a candy.’

What we see here is a challenging pattern of optionality. The terminal node Z is specified for the feature $[+x]$ (in this case, the joint conditions of $DP_{DAT}^{[\pi:\text{Speaker}]}$ and $[\text{IMP}]$), as in (13). When the local domain containing the element Z is spelled out, there are two exponents in competition. α realizes Z under the context with the feature $[+x]$ on W , whereas β is underspecified and realizes Z as an *Elsewhere* form. The abstract lexical entries of (16) are shown in (17). The comparison between (17) and (15) illustrates the particular type of optionality of these data.

- (17) List of Vocabulary Item for allomorphs of Z
- a. $Z \Leftrightarrow \alpha / _ _ W_{[+x]}$
 - b. $\Leftrightarrow \beta / Elsewhere$

Given the Subset Principle, β is blocked by the existence of the more specific form α that realizes the element Z in the context of the feature $[+x]$. Hence, only α is expected to appear. The Subset Principle cannot explain why the *Elsewhere* form β (here, /cwu/) is also compatible in the specific context A of α (here, /tal/).

4. Toward the Local and Serial Organization of Grammar

So far, we have seen that the suppletion in imperatives violates the strong hypothesis of adjacency conditions between the trigger and the target of allomorphy. In contrast, the weak version of such a constraint can explain the long-distance factor that triggers root-allomorphy

in Korean, but fails to derive the optionality with the *Elsewhere* form. Let us highlight another deep concern: if adjacency plays less of a role in restricting allomorphy, then it becomes difficult to understand why root-allomorphy only occurs in the absence of overt tense marking, given the obvious blocking effect of negation and honorification. Moreover, regardless of which locality constraint is adopted, the following puzzle has still remained unsolved: the *Elsewhere* form can be optionally inserted in a morphosyntactic environment that is the appropriate context of a more specific form.

The fundamental question in this paper concerns which part of the grammar is responsible for deriving the properties of optional morphological alternations and how this is accommodated under a derivational system that locally computes the phonological forms of allomorphy. In details, this is the question of how morphology in principle interacts with the phonological computation. In what follows, we first flesh out a proposal along the lines of Embick (2010) and then argue for the serial and local nature of the organization of grammar. The challenges that are posed to both locality and competition are accommodated under this derivational approach where morphology interacts with phonology in a limited way, so that it may adjust the local domain at a particular stage of computation. Specifically, the mechanism of the resolution that we adopt is *post-syntactic*.

4.1. Structure Removal: Pruning

According to Embick (2010), certain nodes with null exponents \emptyset are transparent for linear relations. This can be explicitly provided by positing a morphological rule called PRUNING that eliminate nodes from concatenation statements. This rule is specified in (18).

$$(18) \quad \text{PRUNING (optional): } \sqrt{\text{Root}} \frown [x, \emptyset], [x, \emptyset] \frown Y \rightarrow \sqrt{\text{Root}} \frown Y$$

The pruning rule cyclically eliminates nodes with zero exponents, from inside out, so that both structurally and linearly non-adjacent nodes can also interact, if all the intervening nodes have zero exponents.⁹ Therefore, competition between allomorphs can be conditioned by a local environment at the point when each cyclic head is inserted. Crucially, we claim that this morphological operation is available in Korean, but it is optional.¹⁰

4.2. Outstretching the Structure: Node-sprouting

With Choi & Harley (2016), we propose that a sprouted agreement morpheme HON⁰ is adjoined to a v^0 node, when the v^0 node is c-commanded by an honorific nominative DP in *post-syntax*.

$$(19) \quad \text{HON}^0\text{-sprouting rule: } v^0 \rightarrow [v^0 \text{ HON}^0] / \text{DP [+HON]} [\dots v^0 \dots]$$

⁹This operation is proposed to address opacity of conditioning allomorphy, where outer cyclic nodes y can trigger root-allomorphy across inner cyclic nodes, as stated in the structure like $\dots \sqrt{\text{root}} [x] y$. The PRUNING readjusts the concatenation statement of the structure above by eliminating the intervening cyclic node x , so that the root and the outer node y are linearly adjacent to each other when vocabulary insertion occurs at y .

¹⁰Embick (2010:42) points out the PRUNING rule is not obligatorily applied for every node with zero exponents. If all nodes with null exponents are assumed to be pruned obligatorily, it predicts wrongly the agreement endings in the Latin perfect tense.

The Node-sprouting rule adjoins a ‘dissociated’ Agr^0 node to a head and copies features of the controlling DP into it. According to the schema in (19), the v head is sprouted into a complex Head [v^0 , HON⁰] with [+HON] feature, when the addressee in SAP which c-commands the verb bears an [+HON] feature.

5. Analysis

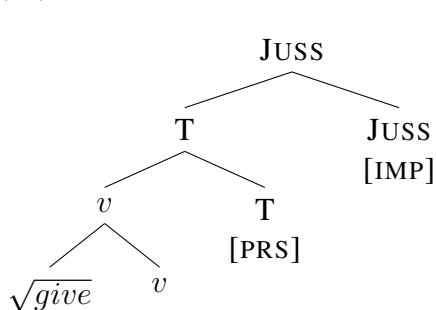
Our analysis provides an account for deriving optional realizations of the allomorphs, either of which violates the locality condition. We argue that the phonological form is computed in a way that is directly related to the derivative process responsible for allomorphy, and that morphosyntax and phonology interact in a limited way that reflects that *local* and *serial* nature of the grammar.

5.1. Scenario I: the Suppletive Allomorph /tal/

- (20) (Ne) na-ekey satang-ul **tal-la.**
 you-NOM I-DAT candy-ACC give-IMP
 ‘Give me a candy.’

After Spell-Out, the verbal complex has the structure in (21). The v and T nodes intervene between the $\sqrt{\text{Root}}$ and the JUSS head, as shown in (22). When Vocabulary Insertion (VI) takes cyclically for each head, Pruning eliminates the $[v, \emptyset]$ node and in a serial manner from the concatenation statements in (24-c) and (24-e). Due to the effects of Pruning, the root and the C head become part of the same local domain in terms of concatenation statements.

(21) Structure



- (22) Concatenation Statement
 $\sqrt{\text{give}} \frown v \frown \text{T[PRS]} \frown \text{JUSS[IMP]}$
- (23) Vocabulary Items
- a. $\sqrt{\text{GIVE}} \Leftrightarrow /tal/ / _ _ _ [\text{IMP}]$
 - b. $\sqrt{\text{GIVE}} \Leftrightarrow /cwu/$
 - c. $[\text{PRS}] \Leftrightarrow \emptyset$
 - d. $[\text{IMP}] \Leftrightarrow /la/$

(24) Derivation of the form /tal/

- a. Linearization: $\sqrt{\text{give}} \frown v, v \frown \text{T[PRS]}, \text{T[PRS]} \frown \text{JUSS[IMP]}$
- b. VI at v : $\sqrt{\text{give}} \frown [v, \emptyset], [v, \emptyset] \frown \text{T[PRS]}, \text{T[PRS]} \frown \text{JUSS[IMP]}$
- c. Pruning at v : $\sqrt{\text{give}} \frown \text{T[PRS]} \frown \text{JUSS[IMP]}$
- d. VI at T: $\sqrt{\text{give}} \frown [\text{T[PRS]}, \emptyset], [\text{T[PRS]}, \emptyset] \frown \text{JUSS[IMP]}$
- e. Pruning at T: $\sqrt{\text{give}} \frown \text{JUSS[IMP]}$

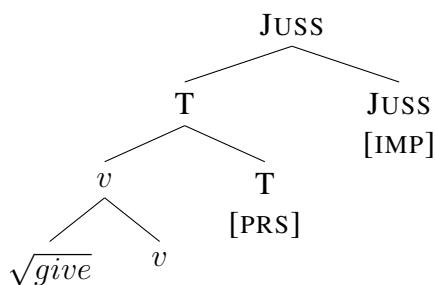
In the last step, VI at JUSS[IMP] takes place when JUSS[IMP] is concatenated with the root $\sqrt{\text{give}}$, allowing the root-allomorph /tal/ possible.

5.2. Scenario II: How Elsewhere form arises?

Recalling that PRUNING is optional and may fail to apply, the locality domain is relatively less restricted than the former scenario.

- (25) (Ne) na-ekey satang-ul **cwu**-la.
 you-NOM I-DAT candy-ACC give-IMP
 ‘Give me a candy.’

(26)



- (27) Concatenation Statement
 $\sqrt{give} \frown v \frown T[\text{PRS}] \frown \text{JUSS}[\text{IMP}]$
- (28) Vocabulary Items
- a. $\sqrt{\text{GIVE}} \Leftrightarrow /tal/ / ___ [\text{IMP}]$
 - b. $\sqrt{\text{GIVE}} \Leftrightarrow /cwu/$
 - c. $[\text{PRS}] \Leftrightarrow \emptyset$
 - d. $[\text{IMP}] \Leftrightarrow /la/$

- (29) Derivation of the form /cwu/

- a. Linearization: $\sqrt{give} \frown v, v \frown T[\text{PRS}], T[\text{PRS}] \frown \text{JUSS}[\text{IMP}]$
- b. VI at v: $\sqrt{give} \frown [v, \emptyset], [v, \emptyset] \frown T[\text{PRS}], T[\text{PRS}] \frown \text{JUSS}[\text{IMP}]$
- c. Pruning at v: $\sqrt{give} \frown T[\text{PRS}] \frown \text{JUSS}[\text{IMP}]$
- d. VI at T: $\sqrt{give} \frown [T[\text{PRS}], \emptyset], [T[\text{PRS}], \emptyset] \frown \text{JUSS}[\text{IMP}]$
- e. Pruning at T is skipped: $\sqrt{give} \frown \emptyset \frown \text{JUSS}[\text{IMP}]$

When Pruning is optionally skipped, T head intervenes between the root and JUSS head in the concatenation statement.¹¹ Consequently, the form /tal/ cannot be inserted, as the configuration does not meet the context for it. Rather, the *Elsewhere* /cwu/ is realized based on the Subset Principle. In other words, the variation in allomorphy can be achieved by relativizing the locality domain, rather than the lexical entries.

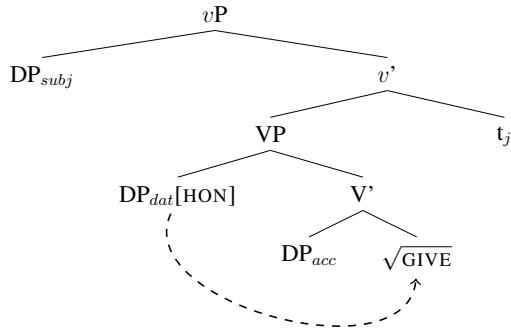
5.3. Scenario III: Recipient-driven suppletion

- (30) **Sensayngnim-kkey** satang-ul **tuli/*cwu/*tal**-la.
 teacher-DAT.HON candy-ACC give/give/give-IMP
 ‘Give the teacher a candy’

¹¹Unlike the T head, pruning rules are assumed to apply to the v heads without any optionality. The root-allomorphy in Korean data apparently exhibits the case in which the outer cyclic node JUSS conditions the suppletive form /tal/ of the root \sqrt{give} across the verbalizer v. The overt material is expected to block the linear adjacency between the trigger and the target of allomorphy in terms of the concatenation statement. If v fails to pruned, then we could have wrong prediction of other cases of root-allomorphy which do not show any optional competition. Putting the optionality on pruning the T head allows us to keep with the more general observation on the correlation between presence of root-allomorphy and the overtness of verbalizer. Christopoulos & Petrosino (2018) also state the empirical generalization, which is based on the fact that all the root-allomorphy occur with an null verbalizer (See Calabrese (2015a,b) for Italian and Calabrese (in press) for Latin and Sanskrit).

As shown in (30), when the dative argument possesses a [HON] feature, it triggers the insertion of the suppletive allomorph /tuli/. The specific context of insertion for /tuli/ is met, without taking into consideration T head. Therefore, given the Subset Principle, /tuli/ is inserted.¹²

- (31) Dative argument has a [+HON] feature



- (32) Vocabulary Items

- a. $\sqrt{\text{GIVE}} \Leftrightarrow /tuli/ / ___ \text{DP[HON]}$
- b. $\sqrt{\text{GIVE}} \Leftrightarrow /cwu/$
- c. [PRS] $\Leftrightarrow \emptyset$
- d. [IMP] $\Leftrightarrow /la/$

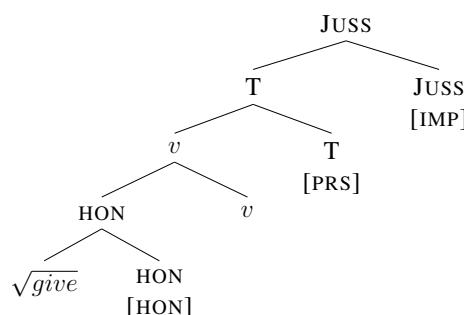
This is a case of competition, rather than an instance of blocking, since the context for /tal/ insertion is not met (the dative argument is not coreferential with the speaker).

5.4. Blocking Effect I: Honorific Addressee

When the Addressee bears the [HON] feature, it also blocks the insertion of the forms /cwu/ and /tal/. The presence of [+HON] feature in c-commanding relation with *v* triggers *v*⁰ to be sprouted into [*v*⁰ HON⁰], as illustrated in (34).

- (33) Sensayngnim, ce-ekey satang-ul **cwu/*tal-si-la.**
Teacher-HON.NOM I.NON.HON-DAT candy-ACC give-HON-IMP
'Teacher, give me a candy (please).'

- (34) Structure after Node-Sprouting



- (35)

Concatenation Statement

$$\sqrt{\text{give}} \frown [\text{HON}] \frown v \frown \text{T}[\text{PRS}] \frown \text{JUSS}[\text{IMP}]$$

- (36)

Vocabulary Items

- a. $\sqrt{\text{GIVE}} \Leftrightarrow /tal/ / ___ [\text{IMP}]$
- b. $\sqrt{\text{GIVE}} \Leftrightarrow /cwu/$
- c. [HON] $\Leftrightarrow /si/$
- d. [PRS] $\Leftrightarrow \emptyset$
- e. [IMP] $\Leftrightarrow /la/$

The sprouted HON head which is realized as an overt morpheme /si/, interrupts the adjacent relation between the root and the JUSS head, even after pruning all the possible heads with the null exponents.

¹²The dative-driven allomorphy still poses an interesting question to structural locality. This brings the Bobaljik (2012)'s original proposal, which can account for recipient-driven suppletion (see Weisser (2018) for Malayalam), since the local domain is defined as a maximal projection XP, not under sisterhood.

- (37) Derivation of the form /cwu-si/

- Linearizaion: $\sqrt{\text{give}} \sim \text{HON}$, $\text{HON} \sim v$, $v \sim \text{T[PRS]}$, $\text{T[PRS]} \sim \text{JUSS[IMP]}$
- VI at HON: $\sqrt{\text{give}} \sim [\text{HON}, /si/], [\text{HON}, /si/] \sim v$, $v \sim \text{T[PRS]} \dots$
- VI at v: $\sqrt{\text{give}} \sim /si/ \sim [v, \emptyset]$, $[v, \emptyset] \sim \text{T[PRS]}$, $\text{T[PRS]} \sim \text{JUSS[IMP]}$

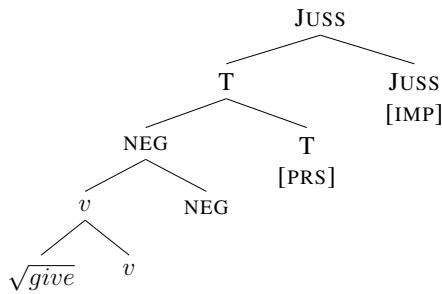
Thus, the only possible vocabulary item to be inserted into the root is *Elsewhere* form.

5.5. Blocking Effect II: Negation

The fact that NEG head has an overt exponent, we can straightforwardly predict that only *Elsewhere* form is licit to replace the root node.

- (38) (Ne) na-ekey satang-ul **cwu/*tal-ci-ma-la.**
you-NOM I-DAT candy-ACC give-CI-NEG-IMP
'Do not give me a candy.'

- (39) Structure



- (40) Concatenation Statement

$$\sqrt{\text{give}} \sim [\text{NEG}] \sim v \sim \text{T[PRS]} \sim \text{JUSS[IMP]}$$

- (41) Vocabulary Items

- $\sqrt{\text{GIVE}} \Leftrightarrow /tal/ / ___ [IMP]$
- $\sqrt{\text{GIVE}} \Leftrightarrow /cwu/$
- $[\text{NEG}] \Leftrightarrow /ma/ / ___ [IMP]$
- $[\text{PRS}] \Leftrightarrow \emptyset$
- $[\text{IMP}] \Leftrightarrow /la/$

- (42) Derivation of the negation form

- Linearizaion: $\sqrt{\text{give}} \sim v$, $v \sim \text{NEG}$, $\text{NEG} \sim \text{T[PRS]}$, $\text{T[PRS]} \sim \text{JUSS[IMP]}$
- VI at v: $\sqrt{\text{give}} \sim [v, \emptyset]$, $[v, \emptyset] \sim \text{NEG}$, $\text{NEG} \sim \text{T[PRS]}$, $\text{T[PRS]} \sim \text{JUSS[IMP]}$
- Pruning at v: $\sqrt{\text{give}} \sim \text{NEG}$, $\text{NEG} \sim \text{T[PRS]}$, $\text{T[PRS]} \sim \text{JUSS[IMP]}$
- VI at NEG: $\sqrt{\text{give}} \sim [\text{NEG}, /ma/], [\text{NEG}, /ma/] \sim \text{T[PRS]}$, $\text{T[PRS]} \sim \text{JUSS[IMP]}$

Regardless of whether the Pruning operates or not, it cannot affect the conditions for the allomorph /tal/, as the negation head is an intervener and blocks the linear adjacency between the root and JUSS heads, as shown in the concatenation statement (40).

6. Concluding Remarks

In this paper, we focused on a set of data from Korean root-allomorphy that poses two challenges to the morphological theories that rely on locality and on the Subset Principle. Within the framework of Distributed Morphology, we have proposed an analysis of these complex pattern of suppletion and provided further evidence that a stringent locality constraint should hold for suppletion, even for the prima-facie counterexamples. We have adopted Embick (2010)'s *Node Adjacency Hypothesis*, which essentially eliminates adjacency as a locality condition for allomorphy. The (optional) free variation can be explained with the optional application of the

morphological operation Pruning, rather than by unifying the condition of insertion of the two exponents.¹³ It gives insight into our conceptual consideration, namely whether the modular components of Grammar, phonology and morphology, operate in the same system at the same time or are rather independent. Our analysis contributes to the discussion about the *local* and *serial* nature of the grammar, where the morphological and phonological computations interact in a limited way.

Acknowledgements

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¹³Although the optional morphological operation resolves the paradoxical problem of free variation, the question of to what extent Pruning applies remains to be investigated. Morphological operations may be subject to probabilistic application akin to Nevins & Parrott (2010). The rule is a variable rule that applies with the probability P_a , where $0 < P_a < 1$. P_a is induced as a reflex of ongoing neutralization of the competition between two allomorphs. In other words, the failure of categorical application of PRUNING disrupts the context of insertion of the more marked form. The non-categorical rule application enacts the preservation of the more marked form only probabilistically, rather than deterministically. If P_a converges to 0, a new grammar with the neutralization in favor of the elsewhere form would emerge. This failure of competition within a grammar hints at a dynamic aspects of rule application.

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The preposition stranding generalisation: Challenging evidence from Cypriot Greek

Kornilia Theodorou

This study aims at experimentally investigating the observation that Cypriot Greek challenges Merchant's (1999:92) Preposition Stranding Generalisation according to which '[a] language L will allow P-stranding under sluicing iff L allows P-stranding under regular *wh*-movement.' Indeed, an oral production data elicitation task revealed that, 81% of utterances native Cypriot-Greek speakers produced exhibited P-stranding within sluicing. In a subsequent acceptability judgment task, however, participants judged 50% of the utterances with preposition pied piping (the alternative option to P-stranding) to be more acceptable than P-stranding, whereas only 24% preferred P-stranding over P-pied-piping, and 24% deemed them to be equally acceptable.

1. Introduction

The purpose of this study is to provide empirical evidence from Cypriot Greek (CG) which challenges Merchant's (1999:92) Preposition Stranding Generalisation (henceforth PSG): '[a] language L will allow P-stranding under sluicing iff L allows P-stranding under regular *wh*-movement.'

Unlike English (1a), CG does not allow P-stranding (henceforth PS) in simple clauses with regular *wh*-movement and needs to pied-pipe prepositions instead, as in English (1b). However, and contrary to the PSG, CG seems to allow PS within sluicing. That is, within sluicing, not only does CG exhibit preposition pied-piping (henceforth PPP) as in English (2a), but also the option of PS, as in English (2b). Other languages which seem to violate the PSG have been found not to exhibit genuine sluicing but a similar property called pseudosluicing (cf. Merchant 1999, among others).

- | | |
|---|---------|
| (1) a. [DP Who] _i was Mary talking [PP to t_i]? | [CG: *] |
| b. [PP To who] _i was Mary talking t_i ? | [CG: ✓] |
| | |
| (2) Mary was talking to someone, but I don't know ... | |
| a. ... [CP [PP to who] _i C^0 [PP Mary was talking t_i]]]. | [CG: ✓] |
| b. ... [CP who _i C^0 [PP Mary was talking [<pp <math="" to="">t_i]]]].</pp> | [CG: ✓] |

After theoretically verifying that CG exhibits genuine sluicing and not pseudosluicing, using Merchant's (1999) diagnostics, native speakers were recruited to experimentally attest to the PS-within-sluicing observation in CG. They first participated in an oral production elicitation task with pre-recorded utterances containing PS within sluicing (i.e. CG equivalents of (2b)). However, the embedded *wh*-element deliberately contained a case or number mismatch from the co-referent matrix R-expression (as in (11) in Section 3); participants were asked to repeat the utterance and correct appropriately. One question was whether upon providing the correct utterance participants would spontaneously add the sluiced preposition that regular *wh*-movement demands. An acceptability judgement task followed, which employed pairs of almost identical pre-recorded utterances, with the difference being that the first utterance of each pair exhibited PPP (i.e. CG equivalents of (2a)), whereas the second one exhibited PS (as in (2b)). The hypothesis was that participants would deem PS as acceptable as the frequency with which they had produced it in the previous task.

The oral production data elicitation task revealed that, across the different prepositions examined (e.g., /me/ ‘with’, /ja/ ‘for’, /se/ ‘in’), 81% of utterances participants produced exhibited PS within sluicing. The results from the acceptability judgment task, however, indicated that participants judged 50% of the utterances with PPP to be more acceptable than PS, whereas only 24% preferred PS over PPP, and 24% deemed them to be equally acceptable. In both tasks, identity between the phonetic form of the preposition and the last syllable of the preceding verb affected the PS production frequency and its acceptability rates.

In terms of syntactic theory, the question why certain languages violate the PSG remains open, since accounts such as the distinction between sluicing and pseudosluicing do not seem to provide a sufficient explanation for the violation of PSG (also e.g. Almeida & Yoshida 2007, Sato 2008, Vicente to appear).

2. Theoretical background

2.1. Preposition stranding vs. preposition pied piping

According to Denison (1998:220), PS can be defined as the syntactic phenomenon ‘whereby a preposition is left in a deferred, stranded position at or near the end of a clause without any immediately following object’. This definition, however, only refers to the surface structure and does not consider the deep syntactic structure of a sentence. Therefore, considering the syntactic processes underlying syntactic structures, Carnie (2012:472) defines PS as the syntactic phenomenon according to which under *wh*-movement ‘prepositions do not move with the *wh*-phrase’ and are, therefore, left stranded at the end of the clause without their complement being overtly realised. Furthermore, as indicated in example (3) below, although from a prescriptive perspective it is recommended that a sentence should not end in a preposition, PS is widely used by both native and non-native speakers of English, especially in oral speech (Radford et al. 2012).

(3) [CP [_P Who_i] C⁰ [IP was [_{vP} Mary talking [_{PP} to t_i]]]]?

As Merchant (2003:3) argues, only a few Germanic languages – English, Frisian, Norwegian, and Danish – license PS. However, as Abels (2003) points out, in order for these languages to exhibit PS, the prerequisite is to also license the ‘standard’ option of treating the prepositions which all languages studied so far seem to exhibit, namely preposition pied-piping (henceforth PPP). In PPP, the preposition moves to the front (i.e. to the specifier position of

the CP construction), together with the *wh*-phrase, resulting in such constructions as the one in (4).

- (4) [CP [PP To who]; C⁰ [IP was [VP Mary talking t_i]]]?

Furthermore, for the languages which only license PPP and not PS, PS deems a sentence ungrammatical, as indicated in (3a) – an example from Standard Modern Greek; therefore, for the construction to be grammatical, the preposition needs to be pied-piped and moved to the specifier position of the CP construction, together with the *wh*-phrase as in example (3b).

- (5) a. *Ποιον μιλούσε η Μαρία σε;
 who.ACC talk.PAST.3SG.PROG the.NOM Maria.NOM to
 ‘Who was Maria talking to?’
- b. Σε ποιον μιλούσε η Μαρία;
 to who.ACC talk.PAST.3SG.PROG the.NOM Maria.NOM
 ‘To who was Maria talking?’

Chomsky (1972, in Sato 2008:275) has offered an explanation which accounts for the reason why some languages only license PPP, whereas the four aforementioned languages also license PS. As Chomsky argues it all boils down to whether in this language the [+wh] feature of the DP obligatorily percolates onto the dominating PP, or not.

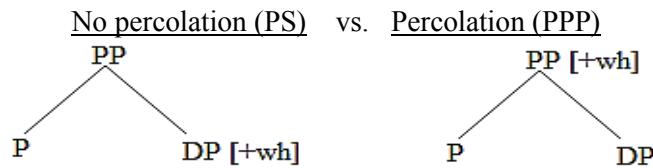


Figure 1: Percolation of the [+wh] feature

As illustrated in Figure 1 above, when the [+wh] feature of the DP need not obligatorily percolate onto PP, then the *wh*-movement only attracts the DP to the specifier of the CP, leaving the P stranded. On the contrary, when the [+wh] feature of the DP either obligatorily (for the languages which only license PPP) or optionally (for the languages which allow both PPP and PS) percolates onto the PP, the [+wh] feature attracts the whole PP to the specifier of the CP, yielding the PPP option.

2.2. Preposition stranding within sluicing: The Preposition Stranding Generalisation

As Merchant (2003, after Ross 1969) observes, the pattern of whether PS is allowed in a language or not is not restricted to simple clauses: rather, it gets replicated within sluicing. Sluicing is a grammatical phenomenon first investigated and named by Ross (1969). It has ‘the effect of deleting everything but the preposed constituent of the embedded question, under the condition that the remainder of the question is identical to some other part of the sentence, or preceding sentence’ (Ross 1969:252). Consequently, as Merchant (2003:2) indicates, sluicing is ‘[s]ituated in the intersection of two of the best studied and most intriguing areas of generative research, namely ellipsis and *wh*-movement.’ Merchant (2003:1) also provides a definition of sluicing: ‘Sluicing is the ellipsis phenomenon ... in which the sentential portion [IP] of a constituent question is elided, leaving only a *wh*-phrase

remnant.' Given the above, example (6) indicates sluicing English, which optionally allows PS.

- (6) Mary was talking to someone, but I do not know (to) whom.

The non-sluiced equivalent provided in (7) below, together with the percolation analysis offered at the end of the previous section (Figure 1), illustrate how PS behaves within sluicing.

- (7) Mary was talking to someone, but I don't know [CP whom_i C⁰ {_{IP} Mary was talking [_{PP} to _{t_i}]}].

In contrast, when the [+wh] feature percolates onto the dominating PP, resulting in PPP, the equivalent non-sluiced structure is the one provided in (8).

- (8) Mary was talking to someone, but I don't know [CP [PP to whom_i] C⁰ {_{IP} Mary was talking _{t_i}}].

As languages are expected to behave consistently despite the complexity of a structure, Merchant (2003:3) argues that, in the same way that PS languages, such as English, allow PS to be optionally preserved within sluicing (as an alternative to PPP), languages which disallow PS and only license P-pied-piping in simple clauses should, accordingly, only allow PPP within sluicing, and not PS. Drawing this conclusion from the observation of the aforementioned pattern as manifested across a total of at least 24 languages, Merchant (*ibid.*) proposes the following generalisation:

- (9) Preposition Stranding Generalization (PSG):

A language *L* will allow PS under sluicing iff *L* allows PS under regular *wh*-movement.

Consequently, according to Merchant's PSG, Standard Modern Greek, just like all non-PS languages, should disallow PS within sluicing (illustrated in (10a)), and should merely allow the *wh*-phrase to be pied-piped together with the preposition, just like the normal *wh*-movement indicated in (5b):

- (10) H Μαρία μιλούσε σε κάποιον αλλά δεν ξέρω ...
 the.NOM Maria.NOM talk.PAST.3SG.PROG to someone.ACC but not know.RPES.1SG
 'Maria was talking to someone, but I do not know ...'

a. ... * ποιον.
 who.ACC
 '... who.'

b. ... σε ποιον.
 to who.ACC
 '... to who.'

2.3. Cross-linguistic evidence against the Preposition Stranding Generalisation

Despite Merchant's useful Generalisation, there exists a growing body of evidence in the literature that there are languages that, on one hand, seem not to allow PS under regular *wh*-movement, whereas, on the other hand, they do seem to allow it under sluicing (though the judgments for some languages are still debatable since they are not always widely acceptable).

The languages that seem to contradict Merchant's PSG are numerous. First, according to Vlachos (2011:301), Nykiel & Sag (2009; 2010) and Nykiel (2010) have shown that Polish, a non-PS language, allows the omission of prepositions under sluicing, though PS 'exhibits signs of gradient linguistic knowledge ... [and] depends on the ease with which a sluice's correlate may be recovered from the preceding antecedent.' Second, as illustrated by Almeida & Yoshida (2006), Brazilian Portuguese is another language in which the ungrammatical under regular *wh*-movement PS option becomes grammatical under sluicing. Third, contrary to Merchant's (2003) indications discussed in previous sections, Vlachos (2011:277) argues that all 15 native speakers of Standard Modern Greek who participated in his acceptability judgment tasks consider PS under sluicing to be acceptable, though 'all of them showed a preference for the presence of preposition.' Spanish also exhibits contradictory evidence since Rodriguez, Nevins, and Vicente (2009) and Gonzalez (2010) suggest that it allows PS under sluicing, whereas Vicente (2014) deems it as marginally acceptable (marked with '?'). As Vicente (2014) further indicates, research on Finnish, Indonesian, and Serbo-Croatian, which are also non-PS languages, shows that, nevertheless, they do allow PS under sluicing.

It is important to mention that, as Sato (2008) argues, out of the many languages reported to contradict the PSG (i.e. Brazilian Portuguese, Polish, German, Mandarin Chinese, Malagasy, Serbo-Croatian, and Indonesian), the only genuine counterexample comes from Indonesian. As Sato further claims, the rest of the languages simply possess some properties that make them look as if they contradict the PSG, but, in reality, they do not since they 'have been shown to have alternative sources for sluicing, such as clefting, resumption, and P-omission at PF' (p. 271).

There seems to be much disagreement, then, in terms of what constitutes sluicing and what not. In order to understand the various arguments, one should start from the very basic disagreement on whether sluicing is the result of *wh*-movement, as Ross had argued since he first described and named the phenomenon, or whether there is no movement involved – an approach which has gained ground since Chomsky first argued about the Minimalist Program (1995).

Another interesting account towards discovering why non-PS languages license PS under sluicing, is the one offered by Sato (2008), who argues that Bahasa Indonesia is perhaps the only language which can serve as a genuine challenge to the PSG, whereas other languages cannot. In order to make his case, Sato compares Bahasa Indonesia with English and French and provides the table below.

Parameters Languages	[+wh] feature percolation from the D to PP	D-to-P incorporation in the syntax
English	OPTIONAL	NO
BI	OBLIGATORY	NO
French	OBLIGATORY	YES

Table 1. 'The parametric theory of PS at the S-P interface' (Sato 2008:277)

According to the table provided above, unlike English, for which percolation of the [+wh] feature from D to PP is only optional, thus optionally licensing PPP and optionally licensing PS, Bahasa Indonesia (appearing as ‘BI’ on the table) obligatorily percolates the [+wh] feature from D to PP, just like French. However, as he observes, this does not explain why Bahasa Indonesia licenses PS within sluicing, whereas French behaves consistently and does not license sluicing neither in matrix clauses nor in sluicing. Sato attributes this puzzle to a property of the French language: D-to-P incorporation. D-to-P incorporation is the phenomenon according to which certain prepositions blend with certain articles when the two are next to each other. Particularly, as Sato observes, when the preposition *de* (equivalent meaning: ‘from/of’) takes as its complement the articles *le* (masculine, singular) or *les* (masculine or feminine, plural), the preposition and the article merge together and yield *du* and *des* respectively. The same goes for the preposition *à* (equivalent meaning: ‘to’): when it takes as its complements the articles *le* and *les*, the coalescence of the two yields *au* and *aux*, respectively. The coalescence of the two elements is illustrated in Figure 1 below.

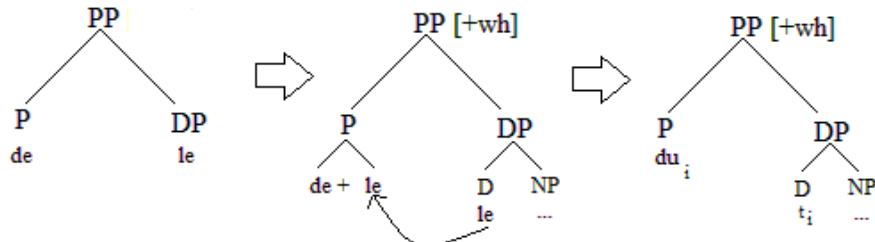


Figure 1. D-to-P incorporation in French

Consequently, whether the [+wh] feature is originally located on the article, the preposition itself, or the whole PP, is not really an issue under this account, since, after the merger and the coalescence of the article and the preposition, the [+wh] feature is either under P and/or on the whole PP: any of the three alternatives will, thus, yield the same result, namely licensing PPP alone and not PS.

However, making such a generalization by drawing evidence from only three languages is not only inadequate but also risky. This seems to be the case with the account Sato provides. First, in his effort to prove his account as valid, he mentions that:

... there are cases (e.g. *de la* in French) where D-P coalescence does not occur, but it is not likely that general syntactic operations such as incorporation should be constrained by this type of unpredictable morpholexical gap. Rather, a more plausible analysis would be one in which D-to-P incorporation occurs across the board in French, whether or not its effects are morphophonologically realized in the form of D-P coalescence. (p. 276)

Assuming that Sato does not ignore the *de la* case for convenience, and agreeing that D-to-P incorporation could indeed occur for all prepositions and articles in French despite not manifesting itself on a surface level (or PF) – besides, under Minimalism and its concern with economy, it would be more economical if French behaved in a consistent way at least structurally – the D-to-P incorporation still seems to be an account which does not hold cross-linguistically. Particularly, the coalescence phenomenon of prepositions and articles does not only appear in French: in a similar way, Spanish coalesces the preposition *a* (equivalent meaning: ‘to’) and the article *el* (masculine, singular) and yields *al*, and in a similar way it

coalesces the preposition *de* (equivalent meaning: ‘from/of’) and the article *el* (masculine, singular) and yields *del*. According to Sato’s account, Spanish should not, then, allow PS under sluicing just like it does not allow it under regular *wh*-movement. However, according to Rodriguez, Nevins, & Vicente (2009) and Gonzalez (2010), Spanish seems to allow PS under sluicing. Assuming the non-uniformity that the results from Spanish yield, due to Vicente’s (2014) study whose findings deem PS under sluicing as marginally acceptable, more languages should be investigated.

Standard Modern Greek (henceforth SMG) would be a good candidate because it also seems to have at least one instance of coalescence: the preposition *σε* (meaning ‘to/into’) seems to coalesce with all definite articles (all three grammatical genders and both numbers). No other overt coalescence evidence exists, since the rest of the prepositions do not behave so. Remembering the long quote by Sato, though, this is not an issue. The real issue is the fact that the evidence from SMG is, once again, contradictory as, on the one hand, Merchant (2003) argues that SMG does not allow PS within sluicing, just like it does not license it under regular *wh*-movement; on the other hand, Vlachos (2011:277) argues that all 15 native speakers of SMG who participated in his acceptability judgment tasks consider preposition stranding under sluicing to be acceptable, though ‘all of them showed a preference for the presence of preposition.’ Therefore, evidence from more languages seems to be needed.

3. Examining the Preposition Stranding Generalisation violation in Cypriot Greek

The evidence sought for could be provided by Cypriot Greek (henceforth CG). Just like SMG, CG does not allow PS under regular *wh*-movement and exhibits the exact same instance of coalescence of a P and D. A pilot study conducted in 2015 has already provided evidence which contradicts the PSG. The methodology of the study incorporated structures such as the one in (11) which exhibits an ungrammatical gender mismatch option between the *wh*-word and the antecedent it refers to.

- (11) Ipen pos emilisen me mjan pu tes θco tes ...
 say.PAST.3SG that speak.PAST.3SG with one.FEM.ACC of the.FEM.ACC two CL.FEM.ACC
 ‘S/he did say that she spoke with one of your two ...’

- ... daskales su alla en θimume pcan/*pcon.
 teachers.FEM.ACC your but not remember.PAST.3SG which.FEM/*MASC
 ‘... teachers, but I don’t remember which.’

This was purposely designed so since the participants were asked to spot any mistakes in the ungrammatical sentence that was uttered to them, and correct them. Upon providing the corrected utterances, it was expected that the participants who would later on judge the pied-piped option as more acceptable than the PS one (and have a strong preference towards the former option) would, intuitively, add the preposition upon providing the gender correction. This was, indeed, the case. The study generally revealed that, for the 3 prepositions tested, the preference of the 20 participants between stranding and pied-piping the preposition varied according to its nature: whereas for most speakers either option was equally acceptable for the prepositions *με* (/me/ ‘with’) and *για* (/ja/ ‘for’), almost half of the speakers showed a (strong) preference against stranding the preposition *σε* (/se/ ‘in’).

The purpose of the current study is to intend a more refined research, touching upon certain limitations of the pilot study. The study involved a larger number of participants ($n=32$) with more inter-subject homogeneity (only students from the University of Cyprus participated in this study to control for such factors as age and the level of education which may affect the judgments of the speakers) and to test more prepositions than the 3 examined in the pilot study (i.e. adding 4 more: $\omega\varsigma$ - /os/ ‘until’, $\chi\omega\rho\varsigma$ - /xoris/ ‘without’, πov - /pu/ ‘from’, $\pi\rho o\varsigma$ - /pros/ ‘towards’), to examine the effect of phonological environments in which the preposition’s phonological realisation coincides with the previously uttered syllable (the prepositions /me/ and /se/, which coincide phonetically with verb endings: active voice, present tense, 1st person plural for /me/ and middle/passive voice, present tense, 2nd person singular for /se/), and to use pre-recorded utterances so as to keep intonation and other prosodic features stable for each participant (written tasks were excluded as CG is an oral variety with unofficial status in the Republic of Cyprus, since the official variety of Greek taught at schools, used in the media, etc. is SMG). The general methodological design was the same as for the pilot study, involving the same oral production data elicitation task and the same acceptability judgment task as in the pilot study.

The oral production task’s results revealed that, indeed, PS seems to be performed by speakers of CG, with an overall frequency of 81%. Furthermore, the results show that in the two cases where the verb can end in the same phonological form as the preposition (as in (11) the verb ending /me/ is pronounced in the same way as the omitted preposition /me/ ‘with’), an increase in the PS frequencies is observed (9% for $\sigma\varepsilon$ - /se/ ‘to’ and 13% for $\mu\varepsilon$ - /me/ ‘with’), which suggests that the participants pay less attention to the stranded preposition when the phonological environment coincides with the preposition’s.

Figure 2 shows the particular percentages of PS and PPP frequencies, as well as another alternative which has been observed and has been counted separately: in certain occasions, instead of spontaneously producing the preposition that already existed in the preceding clause, some participants produced a different preposition (which is not completely irrelevant, though, as CG could have used those prepositions in lieu of the ones targeted). Particularly, as *Figure 3* demonstrates, instead of the preposition $\sigma\varepsilon$ ‘se’ (meaning *in/at/to*), 3% of the participants (1 participant out of 32) used the preposition $\mu\varepsilon$ ‘me’ (meaning *with*) in the example with the homophonous phonological environment, whereas many of the remaining prepositions were substituted with the preposition $\sigma\varepsilon$ ‘se’ ($\mu\varepsilon$ - /me/ ‘with’ at 6%, $\omega\varsigma$ - /os/ ‘until’ at 6%, $\pi\rho o\varsigma$ - /pros/ ‘towards’ at 9%, πov - /pu/ ‘where’ at 9%, $\mu\varepsilon$ - /me/ ‘with’ at 3%). However, the effect is found only in the cases where the preposition $\sigma\varepsilon$ ‘se’ could have been interchangeably used with the preceding preposition. Besides, the task involved some memory load and distracted the participants through the usage of a wrongly inflected *wh*-phrase which they had to correct. Using the $\sigma\varepsilon$ ‘se’ preposition, then, in lieu of other affiliated-in-terms-of-meaning prepositions seems to be in line with the arguments that the elided element in sluicing may not be exactly identical with the preceding structure, but can only have a ‘sloppy identity’ with the antecedent IP (Ross 1969).

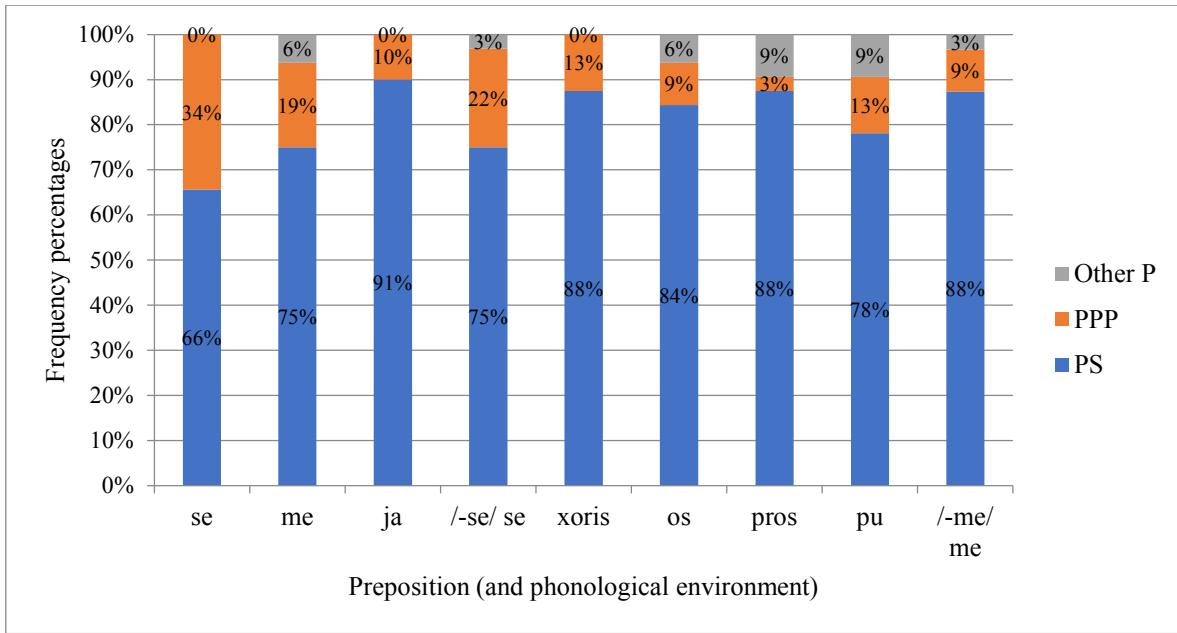


Figure 2. Oral production data elicitation task – Results

Figure 3 indicates how acceptable the participants found PS to be. In particular, the participants were asked to judge which of the two pre-recorded utterances for each tester sentence sounded better: the one with the PPP or the one with the PS option. Overall, PPP was deemed as more acceptable than PS (50% vs. 24% respectively, whereas 26% could not decide). PS was found to be more acceptable with such prepositions as *χωρίς* - /xoris/ ‘without’, *ως* - /os/ ‘until’, and *προς* - /pros/ ‘towards’, which also seem to be more elaborate, and, probably, less frequent in CG speech. The preposition *σε* ‘se’ had the highest preference for PPP, in the same way that it was most frequent in the oral production task. It should also be noted that the aforementioned preposition, together with the preposition *πον* - /pu/ ‘from’, are the ones for which PS seems to be least acceptable.

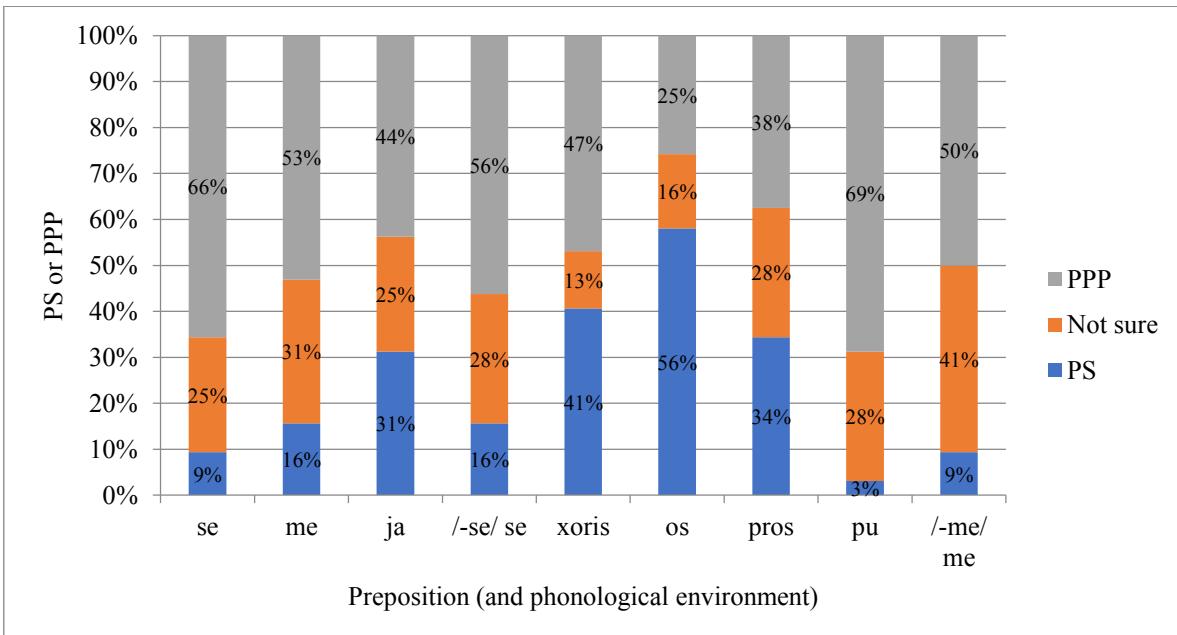


Figure 3. Acceptability judgment task – Results

Consequently, the nature of the preposition seems to play a role in whether the preposition can be stranded within sluicing, or not. In fact, and drawing conclusions from Figure 2, too, this may be an in-progress change in CG, presumably moving from PPP – which is the standard option in all languages, and which is the only option allowed under regular *wh*-movement in CG – to (also) allowing PS. However, it could also be the case that the oral production task also functioned as a priming task; therefore, the high percentage (81%) of PS in the first task could have been lower if PPP utterances were also used.

The puzzle, however, remains: what property of CG allows PS within sluicing? The following section explores the possibility of CG exhibiting non-genuine sluicing structures, but pseudosluicing, which may be the solution to the riddle.

4. Sluicing vs. Pseudosluicing: Solving the riddle?

After comparing sluicing in Japanese with that in English, Merchant (1998) concludes that, Japanese, a *wh-in-situ* language, does not really exhibit genuine sluicing, but an elliptical cleft construction which is hard to distinguish on a surface level, and which should not be reduced to a single syntactic phenomenon (Merchant, 1999). The difference between genuine sluicing and pseudosluicing is indicated below.

- (12) a. Mary was talking to someone, but I don't remember who, Mary was talking to t_i.
- b. Mary was talking to someone, but I don't remember who, it was t_i that Mary was
talking to t_i.

In his doctoral dissertation, Merchant (1999) argues that English exhibits both sluicing and pseudosluicing and he uses 10 diagnostics through which sluicing can be distinguished from pseudosluicing, and which suggest that sluicing cannot be reduced to pseudosluicing. Merchant's diagnostics have been used quite reliably for other languages, too (e.g. Almeida & Yoshida 2007 for Brazilian Portuguese) in order to examine whether these languages exhibit sluicing or pseudosluicing. A similar examination should be attempted for Cypriot Greek (henceforth CG), to check whether the evidence of PS presented above serve indeed as a contradiction of the PSG, or if the structures are, after all, instances of pseudosluicing. In either case, however, PS will be proven to occur. CG is a pro-drop language, just like Standard Modern Greek (henceforth SMG). However, as indicated in the literature (e.g. Grohmann 2007; Leivada et al. 2016) unlike SMG, CG exhibits clefting – probably because of its contact with other clefting languages throughout the island's history – which is not felicitous in SMG, since it is 'not found in the performance of a monolingual speaker of SMG' (Leivada et al. 2016:2).

Therefore, although Merchant (1999:170) provides an example of clefting in SMG for the exact purposes of his diagnostics (see Diagnostic 9, p. 30), assuming that the acceptability judgment was provided by a single individual who was probably highly proficient in English at the time of the judgment, and, hence, probably influenced by the relevant structure in English, the Diagnostic should be considered as at least problematic. Therefore, the structure Merchant presents is rather a focus construction rather than a cleft construction. What should be further noted is that CG clefting sometimes utilises the marker 'embu' for present tense and sometimes the equivalent to the English type cleft ('It is/was XP that ...#), which is

‘En/Itan XP pu’ (Leivada et al. 2016). The following examples capture the basic manifestations of clefting in Cypriot Greek with examples (13a-b) illustrating how clefts work with subjects and examples (13c-d) illustrating how clefts work with objects.

- (13) a. i. Pcos embu efie?
 who.NOM is-(it)-that leave.PAST.3SG
 ‘Who is it that left?’
- ii. Pcos itan pu efie?
 who.NOM was-(it) that leave.PAST.3SG
 ‘Who was it that left?’
- b. i. En i Maria pu efie.
 (it)-is the.NOM Maria.NOM that leave.PAST.3SG
 ‘It is Maria that left.’
- ii. Itan i Maria pu efie.
 (it)-was the.NOM Maria.NOM that leave.PAST.3SG
 ‘It was Maria that left.’
- c. i. Pcon embu iðes?
 who.ACC is-(it)-that see.PAST.2SG
 ‘Who is it that you saw?’
- ii. Pcon itan pu iðes?
 who.ACC was-(it) that see.PAST.2SG
 ‘Who was it that you saw?’
- d. i. En tin Maria pu iða.
 (it)-is the.ACC Maria.ACC that see.PAST.1SG
 ‘It is Maria that I saw.’
- ii. Itan tin Maria pu iða.
 (it)-was the.ACC Maria.ACC that see.PAST.1SG
 ‘It was Maria that I saw.’

Merchant’s (1999:160-171) diagnostics are explained below.

4.1. Adjuncts and implicit arguments

As Merchant argues, sluicing is grammatical in structures with adjuncts like (14a-c) and in structures with implicit arguments such as (15a-c), whereas structures with adjuncts and implicit arguments sound degraded when they are the pivots of bare clefts in English. Merchant provides English equivalent examples to those in (14a-c) and (15a-c). However, as indicated in (14a-c) and (15a-c), the CG equivalent cleft examples are not clearly ungrammatical and they may be acceptable.

- (14) a. Esasen to aftokinito al:a en-iksero pos (* embu itan)
fix.PAST.3SG the.ACC.SG car.ACC.SG but not-know.PRES.1SG how (it)-is-that (it)-was
‘He fixed the car, but I don’t know how (*it was).’
- b. Esasen to aftokinito al:a eniksero pote (? embu itan)
fix.PAST.3SG the.ACC.SG car.ACC.SG but not-know.PRES.1SG when (it)-is-that (it)-was
‘He fixed the car, but I don’t know when (*it was).’
- c. Esasen to aftokinito al:a eniksero jati (* embu itan)
fix.PAST.3SG the.ACC.SG car.ACC.SG but not-know.PRES.1SG why (it)-is-that (it)-was
‘He fixed the car, but I don’t know why (*it was).’
- (15) a. Eserviran tus kalesmenu al:a eniksero ti (* embu itan)
serve.PAST.3PL the.ACC.PL guests.ACC.PL but not-know.PRES.1SG what (it)-is-that (it)-was
‘They served the guests, but I don’t know what (*it was).’
- b. Ipen oti efasin iði al:a eniksero ti (* embu itan)
say.PAST.3SG that eat.PAST.PL already but not-know.PRES.1SG what (it)-is-that (it)-was
‘He said that they had already eaten, but I don’t know what (*it was).’
- c. Etsak:on:unta(si)n al:a eniksero ja ti (? embu itan)
argue.PAST.PROG.3PL but not-know.PRES.1SG about what (it)-is-that (it)-was
‘They were arguing, but I don’t know about what (*it was).’

4.2. Prosody

Merchant observes that ‘standard cases of sluicing (in English) require that the greatest pitch accent fall on the *wh*-phrase’ (p. 161), whereas in *wh*-pivot clefts the pitch accent must fall on the copula. As indicated below, this exact pattern is not necessarily observed in CG, since the greatest pitch accent falls on the *wh*-word in sluicing (16a), just like in English, whereas, in *wh*-pivot clefts, the *wh*-word and the copular may alternatively exhibit a rise in their intonational contour as indicated in (16b-c), though the example in (16b) is the one most frequently used and the one whose pitch accent is really prevalent (unlike the examples (16c-d) whose prevalent pitch accent is not that prevalent overall).

- (16) a. Kapcos mu edwke fcora al:a eniksero **PCOS.**
someone.NOM me give.PAST.3SG flowers but not-know.PRES.1SG who
‘Someone gave me flowers, but I don’t know WHO.’
- b. Kapcos mu edwke fcora al:a eniksero **PCOS**
someone.NOM me give.PAST.3SG flowers but not-know.PRES.1SG who ...
*‘Someone gave me flowers, but I don’t know who ...’
- ... embu-tan
(it)-is-that-(it)-was
‘... it WAS.’

- c. Kapcos mu edwke fcora al:a eniksero pcos embU-tan
 someone.NOM me give.PAST.3SG flowers but not-know.PRES.1SG who (it)-is-that-(it)-was
 ‘Someone gave me flowers, but I don’t know who it WAS.’

Given the above examples, one could assume that this diagnostic does not work as well in CG as it does for English, probably because of the special cleft marker ‘embu’, which, in fact demands the contraction of the following verb’s initial vowel – had that vowel not been contracted, it would sound a bit unnatural, and it would only allow the pitch accent to fall on the *wh*-word as in example (16d).

- (16) d. Kapcos mu edwke fcora al:a eniksero **PCOS** embu
 someone.NOM me give.PAST.3SG flowers but not-know.PRES.1SG who (it)-is-that
 *‘Someone gave me flowers, but I don’t know WHO it’
 ... itan.
 (it)-was
 ‘... was.’

Besides, English is a stress-timed language whereas CG, just like all the Romance languages, is a syllable-timed language; therefore, prosody does not necessarily behave alike in the two languages and the diagnostic may not be as valid as expected.

4.3. Aggressively non-D-linked wh-phrases

Non-D-linked *wh*-phrases include such expressions as ‘who on earth’, ‘who the hell’, etc. As Merchant shows, these cannot occur in sluicing, whereas they can in clefts. Examples (17a-c) indicate that CG exhibits the same pattern as English.

- (17) Kapcos extare to aftokinito mu epses ...
 someone.NOM scratch.PAST.3SG the car my last-night
 ‘Someone scratched my car last night ...’

- a. Makari na ksera pcos!
 Hopefully to know.PAST.CONT.1SG who.NOM
 ‘If only I knew who!’
- b. Makari na eksara pcos θcaolos (embu) itan!
 Hopefully to know.PAST.CONT.1SG who.NOM devil ((it)-is-that) (it)-was
 ‘If only I knew who the hell it was!’
- c. * Makari na eksara pcos θcaolos!
 Hopefully to know.PAST.CONT.1SG who.NOM devil
 *‘If only I knew who the hell!’

However, in line with the observations for the second diagnostic, unlike English, emphasising the ‘θcaolos’ element would sound a bit unnatural in CG, whereas the most natural emphasis would fall on the *wh*-word. This is illustrated in example (18) below.

- (18) PCOS θcaolos nomizis oti ise?
 Who devil think.PRES.2SG that be.PRES.2SG
 *‘WHO the hell do you think you are?’

4.4. ‘Mention-some’ modification

As Merchant notes, since *wh*-pivots in English entail an exhaustive (‘mention-all’) interpretation (Kiss 1998, in Merchant, 1999), the *wh*-pivots will be ‘incompatible with modifiers like *for example*, which explicitly require the ““mention-some” interpretation’. In contrast, sluicing allows such an interpretation. Leivada et al. (2016) show that whether clefts in CG allow an exhaustive interpretation or not is currently undergoing the process of a change-in-progress as there seems to be much inter- and intra-speaker variation. In particular, the exhaustive interpretation seems to be shifting towards the non-exhaustive interpretation. However, as indicated in (19), CG seems to pattern well with the English example Merchant provides.

- (19) – A: Enna prepi na milisis me kapcon pu ti ðiikisi ja tuto.
 will have to talk.SUBJ.2SG with someone from the administration about this
 ‘You should talk with someone in the administration (office) about this.’
- B1: Mboris na mu pis me pcon (*embu ine), ...
 can.PRES.2SG to me tell.PRES.SUBJ.2SG with who.ACC (it)-is-that (it)-is, ...
 ‘Can you tell me who (*it is), ...’
- ...ja paraðiyma?
 for example
 ‘... for example?’
- B2: Me pcon (*embu ine), ja paraðiyma?
 with who.ACC (it)-is-that (it)-is, for example
 ‘(With) who (*is it), for example?’

4.5. ‘Mention-all’ modification

As Merchant argues, when exhaustivity enforces the *wh*-modifier ‘all’ as in *Who all was at the party?*, this modification renders some examples of sluicing as unacceptable, whereas it renders cleft examples as acceptable. Morphologically rich languages such as CG always inflect plural number and do not need such modification as ‘who-all’. However, as example (20) indicates, this modification *is* met in CG, though potentially as a kind of an echo/clarification question to the a previously uttered ‘we all’ phrase.

- (20) – A: Kserume to ul:i mas pos o Petros en pseftis.

know.PRES.1PL it.CL all us that the Peter be.PRES.3SG liar
 ‘We all know that Peter is a liar.’

- B: Pci ul:i mas embu to kserume?
 Who.NOM.PL all us (it)-is-that it.CL know.PRES.1PL?
 ‘Who all (of us) know it?’

As illustrated in (21), this diagnostic seems to work in CG (note that Almeida & Yoshida (2006) argue that it does not work in Brazilian Portuguese, which is another inflectionally rich language).

- (21) Eðiaðilon:e mja omaða fititon tfe i astinomia prospaθi na
 protest.PAST.PROG.3SG one group student.GEN.PL and the police.SG try.PRES.3SG to
 ‘One group of students was protesting and the police are trying to ...’
 ... anakalipsi pci *(embu itan) ul:i tus.
 discover.PRES.SUBJ.2SG who (it)-is-that they-were all them
 ‘... find out who all (*it was).’

4.6. ‘Else’ modification

In line with the previous diagnostic and the exhaustive interpretation of clefts, the modifier *else* can be applied to English sluicing, but not English clefting. For CG, the equivalent example which Merchant offers for English is ambiguously unacceptable probably because of the copula *be* in combination with the fact that CG allows null subjects and, therefore, one cannot be certain whether the second ‘itan’ in the example (22) below represents a cleft or the verb of the antecedent clause. Nevertheless, implementing the diagnostic by using another verb indicates that the pattern English exhibits is replicated in CG, too, as shown in (23).

- (22) Itan ðame o Petros al:a eniksero pcos al:os (?embu itan.)
 was here the Peter but not-know.PRES.1SG who else (it)-is-that (it)-was
 ‘Peter was here, but I don’t know who else (* it was).’

- (23) Eperase o Petros pu ðame alla enikserw pcos al:os (*embu itan)
 pass.PAST.3SG the Peter from here but not-know.PRES.1SG who else (it)-is-that (it)-was
 ‘Peter passed from here, but I don’t know who else (* it was).’

4.7. Wh-preposition inversion [swiping]

As Merchant observes, some *wh*-words in English can be inverted with a selected preposition under sluicing. In a more recent paper, Merchant (2002) coins the term *swiping* for this phenomenon, which is, in fact, the acronym standing for *Sluiced Wh-word Inversion with Prepositions In Northern Germanic*, since this phenomenon is only observed in these languages. Judging from the very definition, then, swiping cannot hold for CG since it is not a Germanic language. English allows swiping in general, but neither in sluicing, as in (24), nor clefts, as in (25).

- (24) * Egorase ena ðoro alla mono o θeos kserei pcon ja.
buy.PAST.3SG a gift but only the God know.PRES.3SG who.ACC for
‘She bought a gift, but only God knows who for.’

- (25) * Pcon ja embu egorase ena ðoro?
Who.ACC for is-(it) buy.PAST.3SG a gift?
‘Who for is it that she bought a gift?’

4.8. Languages with limited or no cleft strategy

As Merchant observes, there are languages such as Romanian and Hungarian which do not exhibit cleft structures (although Hungarian, just like SMG, can focalise an element by changing the regular word order), but do, nevertheless, exhibit sluicing. Therefore, he argues that clefting and sluicing cannot really be reduced to one single thing. As already indicated, CG exhibits both clefting and sluicing; therefore, this diagnostic is not valid for CG.

4.9. Languages with pivots of clefts in the nominative

Merchant argues that languages such as SMG which exhibit both clefts and sluicing (see Section 5 for relevant criticism), offer a genuine example of how clefts and sluicing differ, since the case of a sluiced *wh*-phrase must match the case of its correlate, whereas *wh*-pivots, such as the ones below may take nominative case, instead of the accusative case the correlate exhibits. This is indicated in examples (26a-b).

- (26) I astinomia anekrine enan pu tus Kipreus prota, alla eniksero ...
the police interrogate.PAST.3SG one from the Cypriots first, but not-know.PRES.1SG
‘The police interrogated one of the Cypriots first, but I don’t know ...’
- a. ... *pcos / pcon
who.NOM / who.ACC
‘... who / who(m)’
- b. ... pcos embu itan / * pcon embu itan
who.NOM (it)-is-that (it)-was / who.ACC (it)-is-that (it)-was
‘... who it was’ / ‘*who(m) it was’

4.10. Left branch sluices

Merchant indicates that sluices can violate the left branch constraint as illustrated in (27), whereas, as illustrated in (28), clefts cannot.

- (27) Epandreftike mjan jeneka plusia – en fantazese poso plusia!
marry.PAST.3SG one woman rich not imagine.PRES.2SG how rich
‘He married a rich woman – you cannot imagine how rich!’

- (28) *Poso plusia_i embu epandreftike mja jeneka t_i?
 how rich (it)-is-that marry.PAST.3SG one woman t_i
 ‘How rich is it that he married a ___ woman?’

To sum up, the 10 diagnostics which Merchant offers to distinguish sluicing from cleft questions with *wh*-pivots in English, defy the possibility that all sluicing structures, are, in fact, instances of pseudosluicing. As demonstrated above, CG passes only 6 out of the 10 diagnostic tests Merchant offers, and most of them not clearly so (only 2 out of the 10 do not demonstrate any implication at all). Interestingly enough, according to Almeida and Yoshida (2006) Brazilian Portuguese also passes 6 out of the 10 diagnostic tests, with 3 being the same ones as the ones CG does not pass (diagnostics 7-9) and differing on diagnostics 2 and 5 (CG does not pass the 2nd one whereas Brazilian Portuguese does not pass the 5th one).

However, the analysis offered above raises a number of questions. First, as already indicated by Merchant, not all 10 diagnostics are valid for English (diagnostics 8 and 9 are not applicable); therefore, in a similar manner, one could assume that not all 10 diagnostics should be applicable for any other given language in terms of distinguishing its sluicing from cleft questions with *wh*-pivots. The question, then, seems to be how many of the diagnostic tests should be valid, at minimum. Second, the diagnostics Merchant provides seem to be rather specific to English which (a) has had an influence from both Germanic languages and Romance languages (hence why the 7th diagnostic about swiping applies); (b) has a morphologically poor inflecting system probably favouring some of these diagnostics (such as the 5th diagnostic about the ‘mention-all’ modification); (c) does not exhibit free word order and is not a pro-drop language; (d) is a stress-timed language. Third, the fact that CG exhibits more complicated clefting structures (i.e. the ‘embu’ clefts) may also affect/restrict the applicability of certain diagnostics. The list could go on...

Lastly, the definition Merchant (2003:1) provides, namely that ‘Sluicing is the ellipsis phenomenon ... in which the sentential portion [TP] of a constituent question is elided, leaving only a *wh*-phrase remnant’, does not really exclude *wh*-pivot cleft structures, since a cleft structure can be ‘the sentential portion [TP] of a constituent question’ which gets ‘elided, leaving only a *wh*-phrase remnant’, as illustrated below (example (12) being repeated).

- (29) Mary was talking to someone, but I don’t remember ...
 a. who_i [TP ~~Mary was talking to t_i~~].
 b. who_i [TP ~~it was t_i~~ [CP ~~that Mary was talking to t_i~~]].

According, of course, to other syntactic accounts on clefts, such as the one provided by Grohmann (2007), the argument provided above may seem questionable, but that does not necessarily mean that ‘normal’ sluicing and cleft questions with *wh*-pivots cannot behave alike in sluicing; perhaps, the definition of sluicing needs to be refined, instead, and extended to FocPs, in line with the analysis Grohmann provides.

Overall, the data collected from CG, together with the limited degree to which Merchant’s (1999) diagnostics can be applied cross-linguistically, suggest that pseudosluicing may, in fact, be a subtype of sluicing, without meaning that the two can be reduced to the same syntactic structures and operations. Therefore, the reason why some languages seem to violate the PSG cannot be attributed to the distinction between pseudosluicing and sluicing, and needs to be sought for elsewhere.

5. Conclusion

The present study has argued that Cypriot Greek (CG) challenges Merchant's (1999) Preposition Stranding Generalisation (PSG), in line with evidence from other languages. As it has been demonstrated, CG does not allow preposition stranding (PS) under regular *wh*-movement, whereas it does (variably) allow it under sluicing. As other languages have been argued not to exhibit genuine sluicing but rather pseudosluicing (i.e. cleft questions with *wh*-pivots which seem to behave like sluicing), Merchant's diagnostics have been used to check whether CG sluicing is, in reality, pseudosluicing. Although the diagnostics have been found to be problematic as many of them seem to favour English (and, therefore, applying a certain number of diagnostics cross-linguistically may be rather partial to some languages), they have also shown that CG exhibits sluicing, and not pseudosluicing (or, to be more accurate, both genuine sluicing and pseudosluicing). However, it has also been suggested that despite the diagnostics, which mostly attempt to distinguish sluicing from cleft questions with *wh*-pivots, pseudosluicing may simply be a type of sluicing; therefore, the reason why some languages, including CG, do not abide by the PSG must be sought in other properties of these languages, which have not been studied so far.

The most plausible explanation why some languages exhibit preposition stranding under sluicing but not under regular *wh*-movement could have been the one Sato (2008) offers, regarding D-to-P incorporation, in combination with Chomsky's (1972) suggestion of the [+wh] feature's percolation from D to PP. Nevertheless, as the evidence from CG has shown this cannot be an explanation which holds cross-linguistically, since CG exhibits both D-to-P incorporation and PS within sluicing, which has been experimentally attested in the present study. Consequently, more work, involving both cross-linguistic research as well as refined theoretical approaches, needs to be done to decipher the riddle behind Merchant's PSG violations.

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Abbreviations

1SG	First person singular	FEM	Feminine
2SG	Second person singular	IP	Inflectional phrase
3SG	Third person singular		
ACC	Accusative case		
C	Complementiser	NOM	Nominative case
C^0	Empty complementiser	vP	Verbal phrase
CG	Cypriot Greek	P	Preposition
CP	Complementiser phrase	PAST	Past tense
DP	Determiner phrase	PP	Prepositional phrase

PPP	Preposition pied piping	PS	Preposition stranding
PRES	Present tense	PSG	Preposition stranding generalisation
PROG	Progressive aspect	SMG	Standard Modern Greek

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Does a hotel stand or lie?

A corpus-based study on the German positional verbs *stehen* and *liegen*

Ami Okabe

This study investigates the semantic difference between two German positional verbs, *stehen* ‘to stand’ and *liegen* ‘to lie’. The semantic characterisation proposed by previous studies can be generally summarised in terms of dimensionality: *stehen* presupposes a three-dimensional perception of a scene, whereas *liegen* evokes an abstract two-dimensional image of a scene, ignoring height. This study verifies the characterisation in terms of dimensionality using an analysis of co-occurring expressions based on corpora. It further provides a detailed illustration of the semantics of the verbs by categorising words and phrases which can be related to the dimensional meaning of each verb.

1. Introduction

The purpose of this paper is to reveal how the German verbs *stehen* ‘to stand’ and *liegen* ‘to lie’ are used to indicate geographical location. These verbs are frequently used in everyday language, and they are polysemous since they can refer to human and animal posture, the position of inanimate objects and abstract entities. In this paper, the focus is laid on their positional usage with inanimate objects. I deal specifically with cases where the verbs co-occur with words referring to buildings and landforms (e.g. mountain, forest). The location of these kinds of large entities can be expressed by both *stehen* and *liegen*; even the location of the same entity can be encoded by both, as in (1).

- (1) Und am Nollendorfplatz liegt, wenn ich mich nicht zufällig
and at.the Nollendorf-square lies if I REFL.1SG not by.chance
irre, das Hotel, in dem verschiedene Personen der Geschichte
be.mistaken the hotel in which various people of.the story
zusammentreffen, ohne sich die Hand zu geben. Das Hotel kann
meet without REFL.3PL the hand to give the hotel can
aber auch am Wittenbergplatz stehen. Vielleicht sogar am
but also at.the Wittenberg-square stand perhaps even at.the
Fehrbelliner Platz. Das heißt: ich weiß ganz genau, wo es
Fehrbelliner square that means I know quite exactly where it

steht!
stands

'And on Nollendorf Square, if I'm not mistaken, there is the hotel where various people in this story meet without shaking hands. But the hotel can just as well be on Wittenberg Square. Maybe even on Fehrbellin Square. Which is to say: I know exactly where it is!'

The text in (1) is about a hotel whose location is referred to by both *stehen* and *liegen*. Given such mixed occurrences of the verbs, the question arises as to what motivates the use of each verb and what are the criteria for distinguishing between them.

To explain the semantic distinction between the verbs, a fine-grained semantic system has been proposed for *stehen* and *liegen* as positional verbs. This semantic system is developed especially by Kutscher & Schultze-Berndt (2007) and is in line with the positional verb research of the Max Planck Institute for Psycholinguistics (see Levinson & Wilkins 2006; Ameka & Levinson 2007). The authors address the positional usage of the verbs mainly with regard to relatively small entities (e.g. a ball, a book, a hat, a dog) based on stimuli developed by the Max Planck Institute for typological research. According to the authors, *stehen* and *liegen* can be distinguished by several factors including verticality/horizontality and the rigidity of the object in question.

This characterisation of the verbs, however, does not apply entirely to the expression of geographical location. In contrast to the positional usage with relatively small entities, which emphasises the physical features of an object and location as well as their relationship as relevant for the verb choice, the principal rule for the distinction of *stehen* and *liegen* in geographical location is dimensionality. For instance, Fagan (1991) points out that the scene described with *stehen* is three-dimensional whereas that with *liegen* is two-dimensional. The different dimensionality for each verb is ascribed to a difference in perspective: in the case of *liegen*, the scene is 'portrayed as if it were a two-dimensional plane viewed from above' (*ibid.*:142), such as from a bird's-eye view.

The explanation in terms of dimensionality seems to be broadly plausible; however, there is still the question of what triggers the two- and three-dimensional view of a scene, respectively. The underlying assumption is that the verbs are not the only element to indicate dimensionality, or as Fagan (1991) puts it, the perspective difference; rather, dimensionality manifests in the context. In other words, the context, especially the sentence in which the verb is embedded, supports a two- or three-dimensional conceptualisation of the overall situation by containing expressions corresponding to either perspective. Therefore, analysing co-occurring expressions could contribute to identifying how a two- or three-dimensional situation is linguistically encoded in line with the semantics of *stehen* and *liegen* and what specifically the two- or three-dimensionality means in relation to these verbs.

Accordingly, this paper suggests a more detailed characterisation for the distinction of the German positional verbs *stehen* and *liegen* as they are used to indicate geographical location. In this paper, I use corpus data and focus especially on co-occurring expressions. Based on the results of the corpus survey, it could be proposed that the three-dimensionality of *stehen* is strongly connected to the expression of contrast between the vertical and the horizontal axis, while the two-dimensionality of *liegen* points to an abstraction of spatial features and direction. The latter can be further elaborated to relate to 'fictive motion' proposed by Talmy (1996).

2. The distinction between *stehen* and *liegen* in terms of dimensionality

The verbs *stehen* and *liegen* can be surely characterised by a difference in dimensionality. However, it is also true that this is just a general characterisation which can manifest differently depending on each context. In fact, at a more micro-level, the dimensionality can be subdivided into more specific contexts. These contextual factors play a crucial role in verb choice concerning geographical location, compared to the positional usage for relatively small objects, for which verb choice relies more on the topological configuration of objects.

Compared to the positional usage for relatively small objects, the geographical location has been regarded as deviant. The reason is that the position of buildings and some landforms¹ can be referred to by both *stehen* and *liegen* without change of a situation. In the major positional usage, either verb is usually consistently chosen unless the physical reality changes. For example, when the book takes a horizontally long lying-position, its location can be described not by *stehen* but by *liegen*, whereas, when it is in a vertically long standing-position, it can be referred to not by *liegen* but by *stehen*. In contrary, the position of buildings and a part of landforms can be encoded not only by *stehen* but also by *liegen*, even for the same situation, as in (1). This inconsistency calls for another way of accounting for the verb choice for the geographical location.

As mentioned above, Fagan (1991) suggests different perspective as a cause for the distinction of verbs. A similar illustration is provided by Serra Borneto (1996), which associates *stehen* with a perceptual scope and *liegen* with a non-perceptual one.² In (2), only *stehen* is rated as acceptable since there is a clear context in which the speaker sees the scene in front of him/her. In contrast, ‘geotopographical location’, such as in (3a), is encoded by *liegen*, reflecting that the town is conceived as a spot in an abstract geographical space, like a map. In this case, *stehen* is not allowed (see 3b).

- (2) [the speaker is standing with a friend in front of the apartment buildings at which s/he is pointing]

- a. Schau mal dort, da stehen einige Mietskasernen am Damm.
look just there there stand some apartments at.the embankment
'Look, there are some apartment buildings near the embankment.'
 - b. *Schau mal dort, da liegen einige Mietskasernen am Damm.
look just there there lie some apartments at.the embankment
- (Serra Borneto 1996:470)

- (3) a. Frankfurt *liegt* am Main.
Frankfurt lies at.the Main

'Frankfurt is on the Main.'

- b. *Frankfurt *steht* am Main.
Frankfurt stands at.the Main

(ibid.:469)

¹ I said here ‘some landforms’ to exclude those with no possibility to occur with both of the verbs. This type of landforms mostly corresponds to horizontal expansions with water, like *See* ‘lake’, whose location cannot be described by *stehen*. Since this study has focused on the comparison between *stehen* and *liegen*, this kind of landforms is not addressed.

² The perceptual scope is a limited range of view, in which the perception occurs, whereas the non-perceptual scope is a restricted field recognized without perception. The distinction between perceptual and non-perceptual scope is derived from the dichotomy of perceptual and non-perceptual location suggested by Serra Borneto (1996); the former indicates that an object can be seen to be located in the real perceptual world, and the latter describes the location in a more abstract space without a direct sensory perception.

The difference in perspective can be judged from the context in (2), which is reinforced by a strong indication of deictic scope by the expression ‘[s]chau mal dort’.³ Another contextual factor which may lead to a perspective difference is the size of the located place. This is suggested by Van Oosten (1986) for the Dutch positional verbs *staan* ‘to stand’ and *liggen* ‘to lie’, which correspond to German *stehen* and *liegen*, respectively. In this study, the author pointed out the importance of the extensiveness of the location by providing the two examples in (4).

- (4) a. Ons huis staat op een hoek.
our house stands on a corner
'Our house is on the corner.'

b. Ons huis ligt in Amstelveen. (Van Oosten 1986:145)
our house lies in Amstelveen
'Our house is in Amstelveen.'

According to the author, the difference in the extensiveness of the located place causes the different verb choice. In (4a), the location is not extensive and is restricted to the corner. This rather confined location makes the form of the house and its orientation salient, resulting in the use of *staan*. By contrast, Amstelveen (a Dutch municipality) is a relatively extensive location, in which ‘our house’ can be perceived only as a point. Although the study restricts itself to Dutch, the finding can be applied to German considering the similarity between the positional verbs in the languages (Okabe 2017b). Thus, the extensiveness of the location can be another factor in determining the verb choice.

The idea of correspondence between verb choice and the extensiveness of the location was actually tested in German based on corpus data as reported in Okabe (2015). The study classifies locations by whether they are almost the same size as a city or larger than it (e.g. city, state, country) or not (e.g. over there, square). The author concludes that *liegen* appears with larger locations and less with deictic adverbs (e.g. *da* ‘there’, *dort* ‘there’), whereas *stehen* occurs more with smaller locations and deictic adverbs. However, it should also be noted that *liegen* occurs not infrequently with smaller locations. Therefore, *stehen* has a rather strong tendency to co-occur with expressions indicating smaller locations, and the verb *liegen*, on the other hand, can be used more generally with a relatively weak tendency to appear with larger locations. Moreover, the study reveals that not only the size of location but also word order and co-occurring expressions may correlate with verb choice.

To examine the influence of word order and co-occurring expressions, Okabe (2017a) analyses corpus data for specific noun-verb combinations, namely *Kirche liegt* ‘church lies’ and *Rathaus liegt* ‘town hall lies’. The two nouns *Kirche* ‘church’ and *Rathaus* ‘town hall’ are characteristic in the sense that they co-occur more frequently with *stehen* compared to other nouns, such as, *Bahnhof* ‘station’, *Haus* ‘house’, *Hotel* ‘hotel’ and *Berg* ‘mountain’, which occur more frequently with *liegen*. Consequently, the co-occurring expressions of *Kirche* ‘church’ and *Rathaus* ‘town hall’ with *liegen* is relatively rare and could require a strong context to motivate its appearance. The analysis of 372 examples shows that there are four major contexts which could be related to the use of *liegen*. The first context is co-occurrence with an expression of distance such as *entfernt* ‘remote’ or *in der Nähe von* ‘near’, as in (5a).

³ Note however that the deictic scope does not directly trigger the use of *stehen*. For example, if the speaker is on an airplane and is looking down at the landscape, or if s/he is looking at a map, the perceived scene can be rather two-dimensional, allowing the use of *liegen*. Therefore, the deictic expression is not a necessary condition for the use of *stehen*.

According to Okabe (2017a), this can be expanded to include the location with regard to a linear object, such as a street or border, which shares the horizontal characterisation of a scene. The second context is that the location is an abstract area, for example, *Fußgängerzone* ‘pedestrian zone’ and *Unglücksstelle* ‘scene of an accident’. This type of area does not necessarily require a specific configuration and even disregards the physical characterisation of the scene, which easily triggers an image of an abstract extension as a location (5b). As the third context, the enumeration of entities results in a list of names, without a focus on the configuration of the entities (5c). Fourth, as pointed out by Okabe (2015), the word order is significant; i.e. the verb *liegen* appears more frequently with the order [subject-verb-locative phrase] (5a, b).

- (5) a. Die Kirche liegt nur einen Kilometer von der US-Botschaft
 the church lies only one kilometer from the US-embassy
 entfernt.
 remote
 ‘The church is only one kilometre away from the U.S. embassy.’
- b. Das Konstanzer Rathaus liegt in der Fußgängerzone (...). *(ibid.:32)*
 the Constance town-hall lies in the pedestrian-zone
 ‘The town hall of Constance is in the pedestrian zone (...).’
- c. Zwischen den Gebäuden liegen sechs Kitas, drei Kirchen, eine
 between the buildings lie six day-nurseries three churches one
 Bücherei, ein Jugendzentrum, vier Schulen und immer wieder Grünanlagen
 bakery one youth-centre four schools and always again green-space
 und Spielplätze.
 and playgrounds
 ‘Between the buildings, there are six day nurseries, three churches, one bakery, one youth centre, four schools, and green spaces and playgrounds here and there.’

The study concludes that there is no decisive contextual factor which motivates the use of the verb *liegen* only by itself; however, a combination of factors can strongly encourage it. Moreover, these factors can be related to the general idea of two-dimensionality of *liegen* proposed by previous studies, since all of them except word order call for a two-dimensional understanding of a scene.

In summary, the previous studies have indicated various contextual factors which can influence the verb choice: indication of deictic scope; extensiveness of the location; co-occurrence with an expression of distance and linear objects; abstraction of physical features of the location; the enumeration of entities; and the word order. In particular, Okabe (2017a) provides the detailed list of contextual factors, but it is limited to combinations of only two nouns and one verb. It mentions nothing about *stehen*, which cannot be only characterised as non-*liegen*. The present study, therefore, expands the data by including 17 nouns referring to various buildings and landforms in combination with *stehen* and *liegen*. The data are analysed specifically in terms of co-occurring expressions, which has not been investigated on a large scale. Therefore, this study addresses the verb choice related to geographical location from a new perspective and contributes to the current understanding of the characterisation of *stehen* and *liegen*.

3. Corpus survey

3.1. Methods

This study uses subcorpora of Das Deutsche Referenzkorpus (DeReKo) from IDS Manheim. The data sources are restricted to newspapers in order to exclude highly figurative examples which can occur more frequently in literature. The subcorpora used in this study were the following: (i) *Die Zeit* (a German national weekly newspaper, 2000–2014, 9,203 million tokens), (ii) *Süddeutsche Zeitung* (a German daily newspaper, 1992–2014, 61,432 million tokens) and (iii) *Die Tageszeitung* (a German daily newspaper, 2000–2014, 44,075 million tokens). From these subcorpora, sentences with the verb *stehen* or *liegen* and a noun referring to a building or landform were extracted as raw data via the COSMAS II software. The nouns were selected to cover various kinds of buildings and landforms, resulting in 17 nouns, listed below in Table 1. Then, the clauses which at least include a subject referring to a building or landform, a verb (*stehen* or *liegen*) and a locative phrase indicating a location were extracted from all the other clauses manually. There was one noun, for which the tokens were reduced to prepare a comparable and manageable size of data, namely, *Kirche* ‘church’. The noun *Kirche* ‘church’ yielded 77 clauses for *liegen* and 240 for *stehen*, from which random samples were extracted to account for roughly 150 clauses in sum. The processed data consisted of 1,587 clauses: 553 for *stehen* and 1,034 for *liegen*. The distribution of the clauses is shown in Table 1.

	<i>stehen</i> ‘stand’	<i>liegen</i> ‘lie’	Sum
<i>Bahnhof</i> ‘station’	23	93	116
<i>Bibliothek</i> ‘library’	13	18	31
<i>Geschäft</i> ‘shop’	7	75	82
<i>Hotel</i> ‘hotel’	49	111	160
<i>Kaufhaus</i> ‘department store’	27	14	41
<i>Kirche</i> ‘church’	110	36	146
<i>Kneipe</i> ‘pub’	6	35	41
<i>Laden</i> ‘shop’	12	87	99
<i>Museum</i> ‘museum’	54	88	142
<i>Rathaus</i> ‘town hall’	58	37	95
<i>Restaurant</i> ‘restaurant’	26	111	137
<i>Schloß</i> ‘castle’	48	85	133
<i>Stadion</i> ‘stadium’	51	85	136
<i>Supermarkt</i> ‘supermarket’	19	26	45
<i>Berg</i> ‘mountain’	19	72	91
<i>Hügel</i> ‘hill’	3	25	28
<i>Wald</i> ‘wood’	28	36	64
Sum	553	1,034	1,587

Table 1: Data overview

The table shows that the distribution of the verbs is not balanced. In most cases, the verb *liegen* is preferred, or even strongly preferred as in *Geschäft* ‘shop’, *Kneipe* ‘pub’, *Laden* ‘shop’ and *Hügel* ‘hill’. The verb *stehen*, on the other hand, is preferred with *Kaufhaus* ‘department store’, *Kirche* ‘church’ and *Rathaus* ‘town hall’.

Since this study lays focus on co-occurring expressions, the data were further processed by removing the subject⁴, article, the verbs *liegen* and *stehen* and any other words and phrases which modify the clause including *liegen* or *stehen* in a semantically unrelated way.⁵ The resulting data only comprise locative phrases, adjectives and adverbs (see Figure 1).

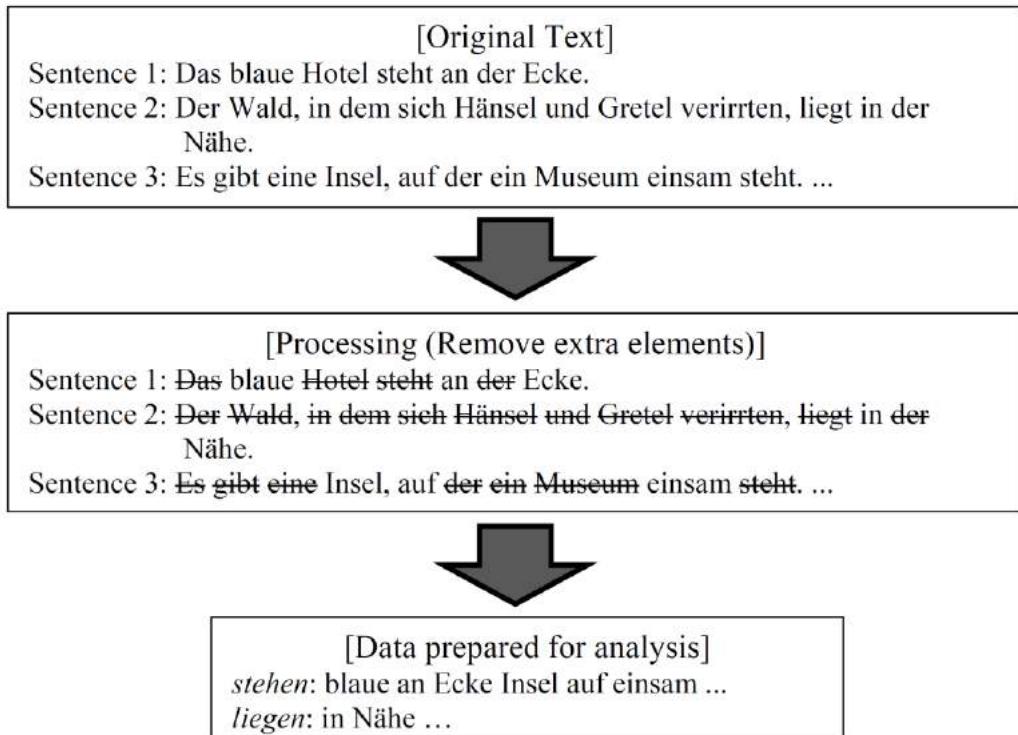


Figure 1: Process to prepare the data for the analysis of co-occurring expressions

The data were analysed with the freeware concordance program AntConc (Anthony 2014), and a word list based on frequency was generated for each verb. The list was modified to group all inflected words and compounds in one category (e.g. *daran/an/am* ‘at.that/at/at.the’ was incorporated into one category *an* ‘at’, and *Zone* ‘zone’ and *Fußgängerzone* ‘pedestrian zone’ into *Zone* ‘zone’). Additionally, proper nouns such as city names were also grouped

⁴ I need to admit that by omitting the subject, its individual physical properties are abstracted, which can also influence the verb choice. For example, the location of a free-standing building can be rightly described by *stehen*, compared to a shop or a restaurant inside other buildings; or a one-story library can be preferred to be described by *liegen* compared to a high-rise one. Although this kind of information was usually not clear in the text, it should be noted that this has not been considered in this study, which sets the limit of the current investigation.

⁵ The removal of the named elements was conducted to exclude systematically recurring components (the subject and the verbs) and to reduce the size of the data to make it manually processable. In addition to the subject and the verbs, all the articles are removed, since they occur highly frequently, which makes the data considerably large and difficult to process. Besides, the frequency of the article itself could have little connection with the verb choice. All the other components, such as adverbs, adjectives and prepositions, were left to keep the scope of the study as large as possible and to exclude any prejudice.

together under common nouns (e.g. *London* and *Amsterdam* were incorporated into a *Stadt* ‘city’ category).

3.2. Results

3.2.1. Co-occurring words

The lists of co-occurring words included nouns, prepositions, adverbs and adjectives for both *stehen* and *liegen*. Table 2 shows the most frequent ± 20 words for each verb in descending order of frequency with the number of occurrences indicated in the left column of each word.

<i>stehen</i> ‘stand’			<i>liegen</i> ‘liegen’		
1	201	<i>in</i> ‘in’	428	<i>in</i> ‘in’	
2	103	<i>an</i> ‘at’	242	<i>an</i> ‘at’	
3	98	<i>Stadt</i> ‘city’	146	<i>von</i> ‘from’	
4	85	<i>auf</i> ‘on’	141	<i>Stadt</i> ‘city’	
5	53	<i>wo</i> ‘where’	106	<i>Straße</i> ‘street’	
6	52	<i>dort</i> ‘there’	89	<i>auf</i> ‘on’	
7	43	<i>hier</i> ‘here’	74	<i>Meter/Kilometer</i> ‘metre/kilometre’	
8	32	<i>da</i> ‘there’	69	<i>entfernt</i> ‘remote’	
9	31	<i>heute</i> ‘today’	65	<i>und</i> ‘and’	
10	28	<i>Platz</i> ‘area’	48	<i>direkt</i> ‘direct’	
11	23	<i>von</i> ‘from’	41	<i>zwischen</i> ‘between’	
12	22	<i>noch</i> ‘still’	41	<i>hinter</i> ‘behind’	
13	22	<i>wie</i> ‘how’	40	<i>gegenüber</i> ‘opposite’	
14	20	<i>Straße</i> ‘street’	40	<i>nur</i> ‘only’	
15	18	<i>mitten</i> ‘middle’	38	<i>mitten</i> ‘middle’	
16	17	<i>Insel</i> ‘island’	37	<i>Platz</i> ‘area’	
17	17	<i>Dorf</i> ‘village’	35	<i>nicht</i> ‘not’	
18	16	<i>nicht</i> ‘not’	34	<i>östlich/nördlich/südlich/westlich</i> ‘eastern/northern/southern/western’	
19	15	<i>auch</i> ‘also’	32	<i>neben</i> ‘next to’	
20	15	<i>einst</i> ‘once’	31	<i>Viertel</i> ‘quarter’	
21	15	<i>Stelle</i> ‘place’	29	<i>Land</i> ‘land’	
22	15	<i>und</i> ‘and’			

Table 2: Frequently co-occurring words for *stehen* and *liegen*

The table shows that some words appear with both verbs, whereas some appear with only one. The words which co-occur frequently only with one of the verbs can be summarised as follows in (6), according to Table 2.

- (6) a. Frequent co-occurring expressions with *stehen* ‘stand’
auch ‘also’, *einst* ‘once’, *hier* ‘here’, *da* ‘there’, *Dorf* ‘village’, *dort* ‘there’, *heute* ‘today’, *Insel* ‘island’, *noch* ‘still’, *Platz* ‘area’, *Stelle* ‘place’, *wie* ‘how’, *wo* ‘where’
- b. Frequent co-occurring expressions with *liegen* ‘lie’
entfernt ‘remote’, *direkt* ‘direct’, *gegenüber* ‘opposite’, *hinter* ‘behind’, *Land* ‘land’, *Meter/Kilometer* ‘meter/kilometer’, *neben* ‘next to’, *nur* ‘only’, *östlich/nördlich/südlich/westlich* ‘eastern/northern/southern/western’, *Straße* ‘street’, *und* ‘and’, *von* ‘from’, *zwischen* ‘between’

One obvious characteristic of the co-occurring expressions with *stehen* is deictic words, namely, *hier* ‘here’, *da* ‘there’ and *dort* ‘there’. These adverbs are not always used for deixis, as in (7a), but also for anaphora, as in (7b).

- (7) a. Es reicht heute nicht mehr, dem Gast zu sagen, da drüber
it is.enough today not more the guest to say there there.above
steht der Berg, schau ihn dir an. (SDZ)
stands the mountain look it REFL.2SG at
‘It is no longer sufficient today to say to the guest over there is the mountain. Have a look at it.’
- b. In der Porschestraße fahren keine Autos: Sie ist die zentrale
in the Porsche-street drive no cars it is the central
Fußgängerzone in Wolfsburg. Das Rathaus steht hier (...). (TAZ)
pedestrian-zone in Wolfsburg the town-hall stands here
‘There is no car on Porsche Street. The street is the central pedestrian zone in Wolfsburg. The town hall is located here (...).’

Another word which appears often with *stehen* is *wie* ‘how’, which is used in figurative expressions. In (8), the form of a station is compared with that of a UFO by using *wie* ‘how’. The reference to the UFO presupposes that the speaker perceives the form of the station three-dimensionally. The figurative expression concerning the form of an entity is thus one of the indications of the three-dimensional perception of the scene.

- (8) Der futuristische Bahnhof steht wie ein soeben gelandetes UFO
the futuristic station stands like a just landed UFO
inmitten abgetakelter, abbruchreifer Miethäuser aus dem späten
in-the-midst-of ruined ripe-for-demolition apartments from the late
19. Jahrhundert. (SDZ)
19th century
‘The futuristic station like a just-landed UFO is in the midst of ruined, dilapidated apartments from the late 19th century.’

What also implies the spatial recognition of an entity is the use of temporal adverbs such as *einst* ‘once’, *heute* ‘today’ and *noch* ‘still’, as in (9).

- (9) Dort, wo heute das Rathaus und das Museum stehen, (...) dort war there where today the two-hall and the musem stand there was vor gut zehn Jahren nur Schlamm und Jangtse-Wasser. (ZT)
ago good ten years only mud and Yangtze-water
'Where the town hall and the museum exist today, there were only mud and water of Yangtze a good ten years ago.'

The temporal adverbs highlight that there is a contrastive context of now and past/future with and without an entity. In (9), the current situation with the buildings and the past without them are compared, which makes it relatively easy to lay the focus on the presence/absence, namely, existence, of an entity.

The idea of existence is also manifest in (10), which includes *nicht mehr an seinem Platz* 'not anymore at its place'. Additionally, the accompanying sentence, which describes the past situation, reinforces the passage of time.

- (10) Das Schloss stand nicht mehr an seinem Platz. (...) Vorher hatte es auf dem the castle stands not more at its place before had it on the örtlichen Marktplatz gestanden. (TAZ)
local marketplace stood
'The castle does not exist anymore in its place. (...) It was at the local marketplace before.'

In relation to the time-contrastive characteristics of *stehen*, we consider one construction which includes *Stelle* 'place' and *wo* 'where', and sometimes the adverb *auch* 'also' (e.g. *wo auch* 'where also'). This construction is illustrated already by (9), and also by (11) below.

- (11) Das Museum steht an der Stelle, an welcher der schwarze Bürgerrechtler Martin Luther King 1968 erschossen worden war. (SDZ)
the museum stands at the place at which the black civil-rights-campaigner Martin Luther King 1968 shoot.dead been was
'The museum is located in the place where the black civil rights activist Martin Luther King was shot dead in 1968.'

As implied in both examples (9) and (11), this construction establishes a contrastive context of the past without a building and the present with a building.

As for *liegen*, the co-occurring words indicate that the extensiveness of the location, which has been claimed to be one of the contextual factors to trigger the use of *liegen*, is present. The extensiveness can be associated to *Land* 'land', which appears 29 times with *liegen* (see (12a)). The extensiveness of *Land* 'land' is closely related to an abstract area, which does not necessarily imply the size of the location but shares the minimisation of interest in the physical characteristics and consequently the indifference to the spatial configuration of the whole scene. This can also be demonstrated by *Gebiet* 'region', which is not included in Table 2 but appears almost exclusively with *liegen* in the data (21 times with *liegen* and once with *stehen*). A further example is shown in (12b): although *Naturschutzgebiet* 'nature reserve' varies in size, what is crucial for the use of *liegen* is that it is not characterised by its configuration, including verticality, but rather by its two-dimensional extension, i.e. that it occupies some expanse as a plane regardless of its degree of extensiveness.

- (12) a. Die Wälder, die Carpentier im Sinn hatte, lagen in Venezuela. (TAZ)
 the forests which Carpentier in.the mind had lied in Venezuela
 ‘The forests which Carpentier had in mind were in Venezuela.’
- b. Der Berg liegt in einem Naturschutzgebiet, (...). (SDZ)
 the mountain lies in a nature-reserve
 ‘The mountain is in a nature reserve.’

The abstract expansion of location can be also encoded by the adverb *zentral* ‘centrally’, which accounts for 14 hits with *liegen* (the hits with *stehen* are classified only as adjectives). The word could be interpreted to presuppose a vague division of a central area and noncentral area, locating an entity in the former.

The same kind of horizontal expansion can be evoked in a different way by the preposition *zwischen* ‘between’ in combination with a conjunction *und* ‘and’. The preposition requires two objects and a link between them, evoking an image of a space ranging from one entity to the other.

- (13) Das Geschäft liegt zwischen der romanischen Kirche St. Aposteln und
 the shop lies between the Romantic church St. Apostles and
 der Ehrenstraße, (...). (SDZ)
 the Ehren-street
 ‘The shop is located between the Romantic church St. Apostles and Ehren Street, (...).’

Besides the extensiveness of the location, indifference to the physical characteristics can also be evoked by a salient horizontal line. This salient horizontality causes the tendency to ignore the verticality. One of the typical horizontally-extended entities which appear in the table is *Straße* ‘street’.

- (14) Das Hotel liegt an der Hauptstraße von Arosa, (...). (ZT)
 the hotel lies at the main-street of Arosa
 ‘The hotel is located on the main street of Arosa, (...).’

The other characteristic feature for co-occurring expressions with *liegen* is the directional expression. This includes the series of adverbs/adjectives, namely *östlich* ‘eastward’, *nördlich* ‘northward’, *südlich* ‘southward’ and *westlich* ‘westward’. These adverbs/adjectives evoke the image of a line in accordance with the cardinal direction stretching out from a certain geographical point. They usually denote a roughly bordered area located on this imaginary line extending to any cardinal direction (see (15a)). The nouns *Osten/Norden/Süden/Westen* ‘east/north/south/west’, which are not in Table 2 but account for 27 examples can be explained in the same manner (15b).

- (15) a. Schloss Elmau liegt etwa eine Autostunde südlich von München,
 catsle Elmau lies about one hour.by.car southward from Munich
 oberhalb von Garmisch-Partenkirchen. (SDZ)
 above from Garmisch-Partenkirchen
 ‘Castle Elmau is about an hour’s drive south from Munich , above from Garmisch-Partenkirchen.’

- b. (...) im Süden liegt der Berg Sneznik, wo noch Wölfe leben; (...). (TAZ)
 in.the south lies the mountain Sneznik where still wolves
 live
 (...) in the south, there is the mountain where wolves still live; (...).'

Thus, both of the sentences in (15) have an underlying image of a line that stretches out from a certain entity in a certain cardinal direction.

The concept of direction can also be demonstrated by some prepositions, for example, *gegenüber* ‘opposite’, *hinter* ‘behind’ and *neben* ‘next to’. All of these prepositions request the characterisation of a scene by a fictive directional movement from one object to the other. In other words, the location of an entity is expressed by referring to the access path that begins from one entity to the other. The former two prepositions often appear with *direkt* ‘direct’, as in (16).

- (16) Direkt gegenüber der Metzgerei Usinger's liegt das Restaurant an der
 direct opposite the Metzgerei Usinger's lies the restaurant at the
 Old World Third Street, (...). (SDZ)
 Old World Third Street
 ‘Just opposite the Metzgerei Usinger's, the restaurant is on the Old World Third Street,
 (...).’

The fictive directional movement characterises the expression of distance as well, which consists of a start point and end point of measurement. The expression of distance includes *Meter/Kilometer* ‘metre/kilometre’ and *entfernt* ‘remote’ in combination with *von* ‘from’. These words co-occur also with *nur* ‘only’, as shown in (17).

- (17) Sein Geschäft in der Al-Amirat-Straße lag nur 500 Meter entfernt vom
 his shop in the Al-Amirat-street lied only 500 meter remote from
 Hauptgebäude des irakischen Geheimdienstes. (TAZ)
 main-building of.the Iraqi secret-service
 ‘His shop was on Al-Amirat Street, only 500 metres away from the main building of the
 Iraqi secret service.’

The expression of distance can be also found in less frequent words such as *Nähe* ‘proximity’ (26 hits for *liegen*; 1 hit for *stehen*), *weit* ‘far from’ (25 hits for *liegen*; 7 hits for *stehen*), *nah* ‘close’ (23 hits for *liegen*; 4 hits for *stehen*) and *unweit* ‘not far from’ (14 hits for *liegen*; 2 hits for *stehen*).

As a summary for the different co-occurrence pattern in each verb, the use of *stehen* is strongly related to the fact that the speaker sees or at least imagines the form, including the verticality, of an entity, especially in contrast to the absence of it. The verb *liegen*, on the other hand, imposes the image of a plane without configurational features or a fictive directional movement on a scene.

3.2.2. Co-occurring phrases

The co-occurrence pattern suggested in the former section can be verified by a more detailed analysis of co-occurring phrases which appear often with each verb. These phrases can be identified by analysing the words which occur frequently with both verbs, such as *an* ‘at’, *auf* ‘on’, *in* ‘in’, *mitten* ‘mitten’ and *Stadt* ‘city’. The co-occurring words frequent for both of the verbs can be further classified according to their co-occurring expressions, as in Table 3 (only the phrases which appear more than three times are listed).

At first glance, it can be confirmed that some phrases occur with both verbs and others with only one of them. Those appearing more than five times with both verbs are the following: *am Ende* ‘at the end’, *am Platz* ‘in the area’, *auf der Seite* ‘on the side’, *in der Mitte* ‘in the middle’, *in der Stadt* ‘in the city’, *in der Straße* ‘on the street’, *im Viertel* ‘in the quarter’ and *mitten in der Stadt* ‘middle in the city’. Among these phrases, *in der Straße* ‘on the street’ and *im Viertel* ‘in the quarter’, including *mitten im Viertel* ‘middle in the square’, show a significant difference in frequency for each verb.

Table 3 also demonstrates that there are more striking differences between the verbs. As for *stehen*, it was proved that it has a preferred construction to occur with, i.e. that consisting of the phrase *an der Stelle* ‘at the place’ or *dort* ‘there’, followed by *wo* ‘where’ (cf. (11)). This can be also verified by looking at Table 3, which indicates there are 15 occurrences of *an der Stelle* ‘at the place’. The background for this construction is the contrastive context between the present and the past with and without an entity. This contrastive context can be further applied to cases where there is no existential contrast but rather a spatial contrast, namely, the verticality-contrast between the plane and the building. This is found in phrases such as *auf dem Grundstück* ‘on the plot’, *auf dem Areal* ‘on the area’ and *auf dem Platz* ‘on the area’. All of the nouns refer to a flat surface which is opposed to the verticality of the buildings located on it, as in (18).

- (18) Auf diesem über Jahrzehnte unbebauten Grundstück stand das damals
 on this over centuries undeveloped plot stood the then
 größte Kaufhaus Europas, (...). (SDZ)
 biggest department-store Europe's
 ‘The largest department store in Europe stood on this plot, which stayed undeveloped
 for centuries, at that time, (...).’

Moreover, the vertical extension of the object could remain salient, although the located place is not flat. The elevation of the ground, namely, *Hügel* ‘hill’, appears in the phrase as *auf dem Hügel* ‘on the hill’ to indicate the location of an entity. The same kind of rise can be recognised in *Insel* ‘island’, which rises above the horizontal sea level. This is illustrated in (19).

- (19) Auf Djurgården, einer Insel mitten in Stockholm, steht das Museum
 On Djurgården a island middle in Stockholm stands the museum
 Junibacken. (SDZ)
 Junibacken
 ‘The museum Junibacken is on Djurgården, an island in Stockholm.’

In a more abstract form, vertical orientation can be encoded by the preposition *oben* ‘up’, which accounts for 8 tokens with *stehen* and 2 with *liegen*.

	<i>stehen</i> ‘stand’	<i>liegen</i> ‘lie’
<i>an</i> ‘at’	<i>am Platz</i> ‘in the area’ (16), <i>an der Stelle</i> ‘on the place’ (15), <i>am Ende</i> ‘at the end’ (8), <i>an der Ecke</i> ‘on the corner’ (5), <i>an der Straße</i> ‘on the street’ (3)	<i>an der Straße</i> ‘on the street’ (47), <i>am Platz</i> ‘in the area’ (19), <i>am Ende</i> ‘at the end’ (17), <i>an der Grenze</i> ‘on the border’ (7), <i>an der Küste</i> ‘on the coast’ (5), <i>an dem Fluss</i> ‘on the river’ (3), <i>an der Ecke</i> ‘on the corner’ (3)
<i>auf</i> ‘on’	<i>auf der Seite</i> ‘on the side’ (11), <i>auf der Insel</i> ‘on the island’ (10), <i>auf dem Hügel</i> ‘on the hill’ (8), <i>auf dem Platz</i> ‘on the area’ (8), <i>auf dem Grundstück</i> ‘on the plot’ (7), <i>auf dem Gelände</i> ‘on the site’ (5), <i>auf dem Areal</i> ‘on the area’ (3)	<i>auf der Seite</i> ‘on the side’ (10), <i>auf dem Weg</i> ‘on the way’ (11), <i>auf dem Gelände</i> ‘on the site’ (4), <i>auf der Anhöhe</i> ‘on the rise’ (3), <i>auf dem Berg</i> ‘on the mountain’ (3), <i>auf der Insel</i> ‘on the island’ (3), <i>auf der Straße</i> ‘on the street’ (3),
<i>in</i> ‘in’	<i>in der Stadt</i> ‘in the city’ (65), <i>im Dorf</i> ‘in the village’ (9), <i>in der Landschaft</i> ‘in the landscape’ (7), <i>in der Straße</i> ‘on the street’ (7), <i>in der Mitte</i> ‘in the middle’ (6), <i>im Viertel</i> ‘in the quarter’ (5)	<i>in der Stadt</i> ‘in the city’ (37), <i>in der Nähe</i> ‘in the proximity’ (29), <i>in der Straße</i> ‘on the street’ (28), <i>im Viertel</i> ‘in the quarter’ (22), <i>im Gebiet</i> ‘in the region’ (17), <i>im Land</i> ‘in the land’ (11), <i>in der Zone</i> ‘in the zone’ (10), <i>in der Nachbarschaft</i> ‘in the vicinity’ (7), <i>in der Mitte</i> ‘in the middle’ (6), <i>im Staat</i> ‘in the state’ (5), <i>in der Bucht</i> ‘in the bay’ (4), <i>in Reichweite</i> ‘within reach’ (4), <i>im Dorf</i> ‘in the village’ (3), <i>in der Ecke</i> ‘in the corner’ (3)
<i>mitten</i> ‘mittin’	<i>mitten in der Stadt</i> ‘middle in the city’ (10)	<i>mitten in der Stadt</i> ‘middle in the city’ (10), <i>mitten im Viertel</i> ‘middle in the square’ (5)
<i>Stadt</i> ‘city’	<i>in der Stadt</i> ‘in the city’ (15)	<i>in der Stadt</i> ‘in the city’ (13), <i>im Osten/Norden/Süden/Westen der Stadt</i> ‘in the east/north/south/west of the city’ (4), <i>vor der Stadt</i> ‘outside the town’ (4)

- The named phrases can be modified by adjectives and adverbs, and their definite articles can be replaced by indefinite or possessive articles, and a single noun by plural nouns, and vice versa.

Table 3: Co-occurring expressions with words which appear frequently with both *stehen* and *liegen* (number of tokens)

The most deviational case for *stehen* is the co-occurring expressions with the noun *Landschaft* ‘landscape’. This word does not refer to a certain entity as a location but describes a visually perceived scene as one image, like a drawing. In this image, there are various entities, each contributing to the characterisation of the whole scene. This characterisation process would require the perception of the configurational features of each relevant object, which could be accompanied by consideration of the form of the object encoded as the subject of the sentence.

For example, *Musem* ‘museum’ in (20) can be regarded to pertain to its verticality in the scene.

- (20) Mitten in dieser historischen Landschaft steht jetzt ein
 middle in this historical landscape stands now a
 Museum (...). (ZT)
 museum
 ‘There is now a museum in the middle of this historical landscape (...).’

For *liegen*, we found two major characteristics in the analysis of Table 2: the conceptualisation of a scene as a plane and the fictive directional movement, which are further supported by the data shown in Table 3. The two-dimensional conceptualisation of a scene can be associated with large entities which appear in phrases such as *im Gebiet* ‘in the region’, *im Land* ‘in the land’ and *im Staat* ‘in the state’. It could also apply to a less extensive entity, resulting in the phrase *im Viertel* ‘in the square’, whose frequency is remarkably high compared to the combination with *stehen* (22 times for *liegen* and 5 times for *stehen*). Further examples include phrases like *in der Zone* ‘in the zone’ and *in Reichweite* ‘within reach’, which seem to have a more abstract nature than *Viertel* ‘square’. These phrases illustrate that the intended location is an unspecific range, which is abstracted in terms of spatial features; see (21).

- (21) Viele empfohlene Restaurants liegen in Reichweite der
 many recommended restaurants lie in reach of.the
 Sehenswürdigkeiten, (...). (SDZ)
 sights
 ‘Many recommended restaurants are within reach of the sights, (...).’

The other words related to the indifference to physical configuration, namely, verticality, are those referring to linear objects, including *Straße* ‘street’, which appears with the preposition *an* ‘at’, *auf* ‘on’ and *in* ‘in’, as in (22).

- (22) Das Hotel, (...) liegt in einer Seitenstraße mit Kopfsteinpflaster. (TAZ)
 the hotel lies in a side-street with cobblestones
 ‘The hotel (...) is located on a side street with cobblestones.’

The preposition *in* ‘in’ can be particularly characterised by the combination *in einer Seitenstraße* ‘in a side street’, which accounts for eight examples. The linear form can be perceived in some other entities occurring with *liegen*, such as *Grenze* ‘border’ and *Fluß* ‘river’, which generally refer to a line or line-shaped entity, and *Küste* ‘coast’, which represents a line between land and water. Consequently, they all show clear linear extension and no salient verticality. The same but slightly different kind of linear object also appears in the phrase *auf dem Weg* ‘on the way’. The noun *Weg* ‘way’ has a relatively abstract form compared to the other line-shaped entities named above, since it does not require a concrete path to exist and it can be an imaginable route from one point to the other. An example with *Weg* ‘way’ is shown in (23).

- (23) Und auf halbem Weg zwischen Teplitz und Prag liegt Schloss
and on half way between Teplice and Prague lies castle

Raudnitz, (...). (ZT)

Roudnice

‘And halfway between Teplice and Prague, there is castle Roudnice, (...).’

The characterisation of *liegen* in terms of fictive directional movement can be seen in expressions including a cardinal direction, for example, *im Osten/Norden/Süden/Westen der Stadt* ‘in the east/north/south/west of the city’, as previously stated (see (15b)). The same trend of fictive movement can be noticed in a somewhat different manner in the phrase *vor der Stadt* ‘outside the town’, which locates the entity in reference to the city by evoking an imaginary path from the entity to the city. The same manner of locating an entity is attested in *außerhalb* ‘outside’, which accounts for 6 tokens with *liegen* and 2 with *stehen*.

Another example is the expression of distance, for instance, *in der Nähe* ‘in the proximity’ and *in der Nachbarschaft* ‘in the vicinity’. Both phrases refer to the distance of two entities, namely, *Bahnhof* ‘station’ and *Büro* ‘office’ of the president of Belarus, in (24).

- (24) Der Bahnhof liegt in der Nähe des Büros von Präsident.

the station lies in the proximity of the office of president

Alexander Lukaschenko. (SDZ)

Alexander Lukashenko

‘The station is near the office of President Alexander Lukashenko.’

The co-occurring expressions of *liegen* with words referring to an elevated part of the ground, such as *Anhöhe* ‘rise’, *Berg* ‘mountain’ and *Insel* ‘island’, causes a minor concession in our description of the verb *stehen*. These words co-occur with both verbs, indicating that the vertical extension does not always stimulate the three-dimensional perception of the scene. This is illustrated by (25).

- (25) Malerisch liegt das weiße Schloss auf dem grünen Berg über

picturesquely lies the white castle on the green mountain over

den Plöner Seen. (TAZ)

the Plön Lake

‘The white castle is located on the green mountain over Plön Lake.’

Although *Insel* ‘island’ is attested with *liegen*, it could be argued that its frequency is higher with *stehen* compared to *liegen* (17 hits for *stehen*, 9 hits for *liegen*). This mixed appearance of the data could result from not considering the properties of the subject referent, which are not always obvious from a written text.

3.3. Summary

The analysis of the corpus data in this chapter showed that certain words and phrases occur frequently with only one verb and others appear with both. Table 4 and Table 5 show the categorisations for each verb. The phrases that frequently co-occur with both verbs are the following: *auf der Insel* ‘on the island’, *am Ende* ‘at the end’, *am Platz* ‘in the area’, *auf der*

Seite ‘on the side’, *in der Mitte* ‘in the middle’, *in der Stadt* ‘in the city’ and *mitten in der Stadt* ‘middle in the city’.

Deictic words		<i>hier</i> ‘here’, <i>da</i> ‘there’, <i>dort</i> ‘there’
Visual perception of configurational features	Figurative expression	<i>wie</i> ‘how’
	Landscape	<i>in der Landschaft</i> ‘in the landscape’
Contrast between horizontality and verticality	Temporal contrast	<i>auch</i> ‘also’, <i>dort</i> ‘there’, <i>einst</i> ‘once’, <i>heute</i> ‘today’, <i>noch</i> ‘still’, <i>Platz</i> ‘area’, <i>Stelle</i> ‘place’, <i>wo</i> ‘where’
	Formal contrast	<i>auf dem Grundstück</i> ‘on the plot’, <i>auf dem Areal</i> ‘on the area’, <i>auf dem Platz</i> ‘on the area’

Table 4: Characteristics of *stehen* and corresponding examples

Abstraction of spatial features	Extent as plane	<i>Land</i> ‘land’ (<i>im Land</i> ‘in the land’), <i>Gebiet</i> ‘region’ (<i>im Gebiet</i> ‘in the region’), <i>im Staat</i> ‘in the state’, <i>im Viertel</i> ‘in the square’, <i>in Reichweite</i> ‘within reach’, <i>in der Zone</i> ‘in the zone’, <i>und</i> ‘and’, <i>zwischen</i> ‘between’
	Salient horizontality of referential entity	<i>an der Grenze</i> ‘on the border’, <i>an der Küste</i> ‘on the coast’, <i>an dem Fluss</i> ‘on the river’, <i>Straße</i> ‘street’ (<i>an der Straße</i> ‘on the street’, <i>auf der Straße</i> ‘on the street’, <i>in der Straße</i> ‘on the street’, <i>in einer Seitenstraße</i> ‘in a side street’), <i>auf dem Weg</i> ‘on the way’
Fictive horizontal movement	Referential relationship	<i>direct</i> ‘direct’, <i>gegenüber</i> ‘opposite’, <i>hinter</i> ‘behind’, <i>neben</i> ‘next to’, <i>vor der Stadt</i> ‘outside the town’
	Distance expression	<i>entfernt</i> ‘remote’, <i>Meter/Kilometer</i> ‘metre/kilometre’, <i>nur</i> ‘only’, <i>von</i> ‘from’, <i>in der Nähe</i> ‘in the proximity’, <i>in der Nachbarschaft</i> ‘in the vicinity’
	Cardinal direction	<i>östlich/nördlich/südlich/westlich</i> ‘eastern/northern/southern/western’, <i>im Osten/Norden/Süden/Westen der Stadt</i> ‘in the east/north/south/west of the city’

Table 5: Characteristics of *liegen* and corresponding examples

4. Discussion

The analysis in Section 3 yielded lists of characteristics which can be associated with each verb. Some of them are in line with what has been proposed by previous studies. Particularly, the general dichotomy of two- and three-dimensionality suggested by the literature has been confirmed. Furthermore, one characteristic of *liegen*, namely, ‘fictive horizontal movement’, is strongly connected to the concept of fictive motion (Talmy 1996). The link between this concept and *liegen* is discussed below in detail.

The dimensionality connected to the two verbs in the previous studies is reflected in the characterisation of the verbs generally. Each characteristic of *stehen* presupposes a visual perception or recognition of verticality, sometimes even the whole configuration of a concerned entity, which is not included in a two-dimensional image. It can be also argued that the three-dimensional image can be facilitated by the contrastive context between a horizontal plane and a vertical axis. These characteristics are not attested by *liegen*, which presupposes the abstraction of concrete spatial features, especially the height, of entities. The abstraction process results in the conceptualisation of a scene as a plane and dots, namely, as a two-dimensional image without verticality. This image stimulates *liegen* to occur with words referring to extensive entities and those related to fictive movement between entities. When all the characteristics for each verb are examined, the general connections between *stehen* and three-dimensionality and *liegen* and two-dimensionality still hold.

Although a comparison of this study with the previous ones shows that they share a general trend, this study provides some further characteristics with a more detailed view. In general, the literature indicated that *stehen* occurs with smaller location and deictic adverbs, and *liegen* with larger locations, though the latter is a weak tendency. *Liegen* further appears with the expression of distance, linear objects and abstract areas. These features are all confirmed also by this study. Moreover, this study revealed a number of previously unnoticed characteristics, for example, the contrast between the presence and absence of entities for *stehen*, especially applicable to buildings. These subcategories cover a wide variety of factors, including a slight deviation from what has been suggested in the previous studies. For example, the extensiveness of location has been indicated to be relevant for selecting *liegen*. This idea was verified by this study but only for considerably large entities, such as land and state. The idea of extensiveness was further developed in this study by arguing that the extensiveness provokes indifference to the spatial configuration of the whole scene, leading to the occurrence of *liegen* with two kinds of entities, namely, an abstract location and linear object. However, despite of the more detailed view for the verbs, the categories proposed in this study do not deviate from the characterisation of *stehen* with three-dimensionality and *liegen* with two-dimensionality.

As for the characteristics of *liegen*, more than half of them can be summarised in the category ‘fictive horizontal movement’. This category is based on the concept of ‘fictive motion’ proposed by Talmy (1996). Talmy has introduced this concept to explain the inconsistency between a visual stative situation and a sensed motion concurrent with this situation. One form of this inconsistency can be seen in the examples in (26), labelled as ‘active path’ by Talmy.

- (26) a. The bakery is across the street from the bank.
 b. The vacuum cleaner is down around behind the clothes hamper.
 c. The cloud is 1.000 feet up from the ground. (Talmy 1996:242)

The examples in (26) share the conceptualisation that the location of one object is given in reference to the other object, which is connected to the first object by an imaginary line. For example, in (26a), the location of the bakery is expressed by evoking a path from the bank to the bakery, which can be followed physically but not necessarily. This path is not obviously stated in the sentence; however, it is sensed in the process as capturing the situation.

This type of fictive motion can also be confirmed in the data of this study in three ways. First, there are three prepositions which occur frequently with *liegen* and associate two entities to express the location of one of those entities with respect to the other: *gegenüber*

‘opposite’, *hinter* ‘behind’ and *neben* ‘next to’ (see (16)). Second, the same fictive motion from one entity to the other can be found in the expression of distance, including *entfernt* ‘remote’, *von* ‘from’, *in der Nähe* ‘in the proximity’ and *in der Nachbarschaft* ‘in the vicinity’ (see (17) and (24)). When these words and phrases are used, the focus is more on the length of distance; however, the basic idea of referential relationship between two entities is not lost. Third, fictive motion can be further applied to the locative expression based on the cardinal directions. The expression of the cardinal directions evokes the image of a line stretching out from an entity, as previously stated. Along the line, a fictive motion occurs from the source entity to the goal entity, which is located somewhere on this directional line.

Consequently, the category ‘fictive horizontal movement’ in Table 5 can be interpreted as a sort of fictive motion proposed by Talmy (1996), namely, access path. The concept of fictive motion itself allows a vertical orientation, as suggested in (26c). However, co-occurring expressions with *liegen* is restricted to horizontal motion, since *liegen* bleaches the component height from the concerned scene. In accordance with it, the fictive motion with *liegen* is labelled ‘fictive horizontal movement’ in Table 5.

In summary, the analysis in this study corresponds to the characterisation of *stehen* with three-dimensionality and *liegen* with two-dimensionality proposed by the literature on the one hand, but provides further novel perspectives and categories connected to each verb on the other hand. Furthermore, the analysis is related to Talmy’s (1996) concept of fictive motion to describe the fictive directional movement concurrent with *liegen* from a theoretical point of view.

5. Conclusion

This paper provided a detailed characterisation of the German positional verbs *stehen* and *liegen* used for geographical location based on a corpus survey for co-occurring expressions. The analysis indicated that the two verbs have different patterns of co-occurrence, resulting in individual groupings of words and phrases related to the verbs. The groupings form a few categories for each verb, each category reflecting the general characterisation of three-dimensionality and two-dimensionality for *stehen* and *liegen*, respectively.

Although the distinctive characters of the verbs suggested in this study contribute considerably to the explanation of the data, they are not to be regarded as definitive in nature. This is because the proposed characteristics seem to apply not always; there are a number of counter-examples, as in (27) below, where the word *entfernt* ‘remote’, which was labelled a *liegen*-preferring word, occurs with *stehen*.

- (27) Nur ein paar Schritte von der Stadtmauer entfernt steht das Rathaus. (SDZ)
 town-hall
 ‘The town hall is only a few yards away from the town wall.’

The words categorised in the ‘referential relationship’ group for *liegen* are also ambiguous in the sense that they occur also frequently with *stehen* (*gegenüber* ‘opposite’: 40 tokens with *liegen*, 14 tokens with *stehen*; *hinter* ‘behind’: 41 tokens with *liegen*, 11 tokens with *stehen*; *neben* ‘next to’: 32 tokens with *liegen*, 14 tokens with *stehen*). Therefore, the proposed

characteristics should be considered as a general tendency, which does not limit the co-occurring expressions with the other verb.

Besides, there are still words and phrases occurring with both verbs, such as *am Ende* ‘at the end’, *am Platz* ‘in the area’, *auf der Seite* ‘on the side’, *in der Mitte* ‘in the middle’ and *in der Stadt* ‘in the city’, namely, expressions with no strong indication for verb preference. The problem of the mixed appearance of words and phrases calls for further studies from other perspectives, especially from those which have been suggested to influence verb choice but not considered in this study, namely, word order and the enumeration of entities.

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Abbreviations

1SG	First Person Singular
2SG	Second Person Singular
3PL	Third Person Plural
REFL	Reflexive
SDZ	<i>Süddeutsche Zeitung</i>
TAZ	<i>Die tageszeitung</i>
ZT	<i>Die Zeit</i>

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Countability distinctions without linguistic cues

Aurore Gonzalez

This paper investigates experimentally the role played by morphosyntactic cues to atomicity in quantity judgment tasks (*Who has more NOUN?*, Barner & Snedeker 2005). Two experiments, conducted on English and on French, show that while the absence of linguistic cues to atomicity does not affect quantity judgments in these languages, the absence of the relevant nouns in the quantity judgment prompts has an important impact. In the latter case, quantity judgments can be influenced by the availability of salient portions and alternative dimensions of measurement (Scontras et al. 2017).

1. Introduction

Quantity judgments (Barner & Snedeker 2005) have been widely used across languages to assess how speakers represent the semantics of nouns (Barner & Bale 2018 and references therein): count nouns (e.g. *panda*) and aggregate nouns (e.g. *furniture*) which are counted are atomic, whereas mass nouns (e.g. *wine*) which are measured, are not. Interestingly, recent studies (Deal 2017 and Scontras et al. 2017) have shown that the language form, and more specifically, the presence or absence of morphosyntactic cues to atomicity in quantity judgment prompts, could influence quantity judgments. The goal of this paper is to investigate the role played by morphosyntactic cues to atomicity in quantity judgment tasks in English and in French. French is particularly interesting for the following reason: unlike in English, the morphosyntactic cues to atomicity are not always perceptible in the auditory signal allowing us to provide participants nouns without explicit cues to atomicity in the quantity judgment prompts.

1.1. Quantity judgments

A quantity judgment task goes as follows: participants are shown pictures depicting two characters with different quantities of the same object. One character has one large object whereas the

other character has three small objects of the same kind. Crucially, the three small objects have a smaller combined volume than the larger object. That way, the experimenter knows that a participant choosing the character who has the three small objects based his judgment on number, whereas a participant choosing the character who has one large object based his judgment on volume. Participants are then asked to choose which character has more.

Quantity judgment tasks have been used to investigate experimentally the interpretation of different types of nouns. In particular, Barner & Snedeker (2005) used this task to investigate the interpretation of aggregate nouns such as *silverware* as compared to the interpretation of count nouns such as *shoes* and mass nouns such as *toothpaste*. Examples of their stimuli are depicted in Figure 1.

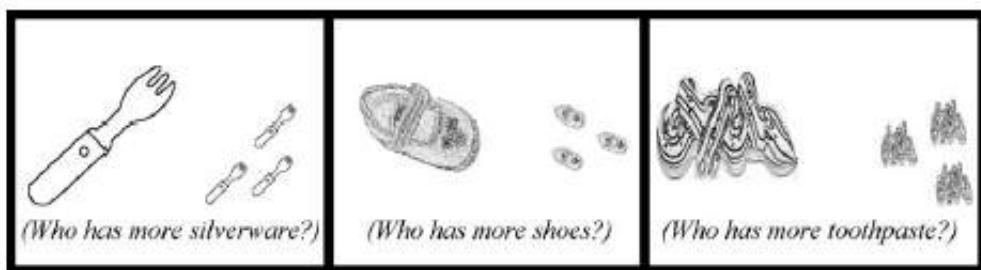


Figure 1: Example of Stimuli (Barner & Snedeker 2005:50)

Count nouns were judged on number (100% of cardinality judgments): the character who was judged to have more shoes was the character who had a greater number of shoes (regardless of the volume). By contrast, mass nouns were judged on volume (0% of cardinality judgments): that is, the character who was judged to have more toothpaste was the one who had a greater volume of toothpaste (regardless of the number of salient portions of toothpaste). Crucially, aggregate nouns such as *silverware* were judged on number (97% of cardinality judgments), as count nouns: that is, even if the volume of the big fork was greater than the combined volume of the three small forks, participants judged that three forks were more than one fork. These results support semantic theories arguing that nouns differ in the nature of their minimal parts (Bunt 1985, Chierchia 2010, Grimm 2012, Landman 2011).

Interestingly, recent crosslinguistic studies have shown that not all languages show this pattern. In particular, Lima (2014) found that in Yudja, a Tupi language spoken in Brazil, participants provide cardinality judgments for every type of nouns. In her study, she tested notional count nouns (e.g. *karaxu* ‘spoon’), notional mass nouns (e.g. *y'a* ‘water’) and aggregate nouns (e.g. *abeata* ‘clothes’). While participants provided judgments based on number for notional count nouns and aggregate nouns, as expected, they also provided judgments based on number for notional mass nouns. These results suggest that Yudja does not make any distinction between count nouns, aggregate nouns and mass nouns. Now, if providing a cardinality judgment in a quantity judgment task signals an atomic denotation, then mass nouns, as count nouns and aggregate nouns, are atomic in Yudja, as argued by Lima (2014).

Note however that as languages differ in the ways they express morphosyntactic cues to atomicity, the target question used in the Yudja study (*Ma de bitu NOUN dju au?* ‘Who has more NOUN?’) differs from the one used in the English study (*Who has more NOUN-s?*). Specifically, while the latter includes morphosyntactic cues to atomicity (in that case, singular

or plural morphology), the former does not. This raises the following questions: Could it be the case that the question used in the Yudja study favored cardinality judgments? Or is it really the case that all nouns are count in this language? And more generally, what is the role of linguistic cues to atomicity in quantity judgments? I will address the latter question in this paper.

1.2. Is it all about the cues to atomicity?

The interpretation of some nouns – so-called *flexible nouns* (e.g. *string*) – depends on the morphosyntactic cues they co-occur with. In particular, Barner & Snedeker (2005) have shown that when flexible nouns are pluralized, they are judged on number (97% of cardinality judgments), as count nouns, whereas when they occur in the singular form, they are judged on volume (3% of cardinality judgments), as mass nouns. Importantly, this study shows that in a quantity judgment task, participants can use morphosyntactic cues to atomicity to guide their quantity judgments. Other recent studies (Deal 2017 and Scontras et al. 2017) have shown that the language form, and more specifically, the presence or absence of morphosyntactic cues to atomicity in the target question, could influence quantity judgments.

To begin with, in Nez Perce, a Sahaptian language spoken in Idaho, Washington and Oregon, nouns typically lack morphosyntactic cues to atomicity. Noun modifiers such as adjectives are the ones that can be pluralized, when they combine with count nouns and when they combine with mass nouns. Deal (2017) investigated the interpretation of notional count nouns such as *soox* ‘spoon’ and notional mass nouns such as *qahas* ‘milk’ in Nez Perce using a quantity judgment task. She tested these nouns in two different conditions: (i) in the first condition, the target question included a bare adjective (i.e., an adjective that did not include any plural morphology) and (ii) in the second condition, the adjective was pluralized. As expected, in the latter condition, participants provided number based judgments for both notional count nouns and notional mass nouns (100% of cardinality judgments for notional mass nouns). Crucially however, when the adjective combining with notional mass nouns did not carry any plural morphology, Nez Perce speakers provided judgments based on volume (0% of cardinality judgments for notional mass nouns). These results interestingly show the impact that the linguistic form of the target question can have in quantity judgment tasks.

Furthermore, Scontras et al. (2017) investigated experimentally the influence of the linguistic form on quantity judgments by looking at the interpretation of English count nouns and mass nouns in the absence of clear linguistic cues to atomicity. They tested count nouns like *spoon* and mass nouns like *water* in two different conditions: (i) the NOUN condition and (ii) the NO NOUN condition. In the NOUN condition, the target question was of the following form: *Who has more NOUN?*. That is, the target question included a noun as well as morphosyntactic cues to atomicity (count nouns occurred in the plural form and mass nouns occurred in the singular form). By contrast, in the NO NOUN condition, the target question was *Who has more?*. That is, the latter did not include the relevant noun nor did it include any cue to atomicity. An example of stimuli is depicted in Figure 2.

In both conditions, they found a significant effect of ontological category: namely, count nouns were judged more often on the basis of cardinality than mass nouns, corroborating Barner & Snedeker’s (2005) results. Furthermore, a significant interaction between ontological category and cues was found: that is, while participants provided categorical judgments in the NOUN condition, these categorical judgments began to disappear in the NO NOUN condition.



who has more milk? vs. who has more?

two-noun	no-noun
----------	---------

Figure 2: Example of Stimuli (Scontras et al. 2017:6)

In particular, count nouns were judged less often on number in the NO NOUN condition than in the NOUN condition, and mass nouns were judged less often on volume in the NO NOUN condition than in the NOUN condition, as illustrated in Figure 3. Note that the cues being different for count nouns and mass nouns, the interaction between cues and ontological category was predicted. The comments provided by the participants who did not give the expected answers in the NO NOUN condition (that is, participants who based their judgments on volume for count nouns and on number for mass nouns) suggest that these participants used another dimension of measurement for count nouns (e.g. *Big knives are more expensive.*) and that they counted the salient portions of the substance named by mass nouns (e.g. *Left has three piles, right has one.* for the noun *Sugar*).

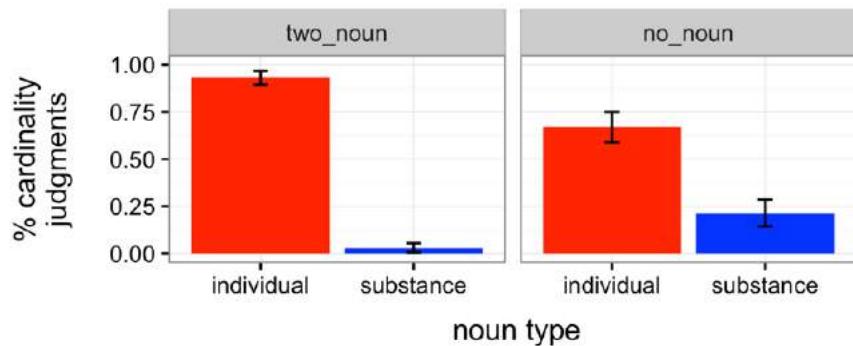


Figure 3: Results (Scontras et al. 2017:7)

At first sight, these results seem to suggest that the presence or absence of linguistic cues to atomicity influence quantity judgments in English as it was the case in Nez Perce. More generally, in the absence of linguistic cues to atomicity, quantity judgments are subject to a variety of factors such as alternative dimensions of measurement, contextually salient portions, etc. Since languages mark linguistic cues to atomicity differently, the results of crosslinguistic quantity judgments could well be influenced by these factors, and therefore could be not completely

telling. This study raises however two main questions: (i) What about other types of nouns (namely, aggregate and flexible nouns)? Are their quantity judgments also influenced by the presence or absence of linguistic cues to atomicity? (ii) In the NO NOUN condition, both the noun and the plural morpheme were omitted. Therefore, either the absence of the noun or the absence of the morphosyntactic cues to atomicity could have influenced the quantity judgments. What is the source of the effects observed in the results?

Note that the presence of the noun alone gives us presumably more information than the presence of a morphosyntactic cue to atomicity alone. In particular, the presence of the former tells us what the object or substance depicted in the stimulus is and how we may classify it. Since in English, it is not possible to omit the linguistic cues to atomicity while keeping the noun, it is hard to understand what exactly plays a role in quantity judgments. However, recall that in French, while the singular-plural distinction is made in the written forms, it is not pronounced in most contexts. As illustrated below, both the singular and the plural form of the noun *chat* ‘cat’ are pronounced the same way. In French, it is thus possible to remove experimentally the cues to atomicity while providing the noun at the same time.

- | | |
|--------------------------|------------------------|
| (1) <i>Singular form</i> | (2) <i>Plural form</i> |
| a. chat | a. chats |
| cat | cat+PL |
| b. [ʃa] | b. [ʃa] |

2. Experiment 1

Experiment 1 extends Scontras et al.’s (2017) study to every type of English nouns and sets a baseline for Experiment 2 on French. In particular, I investigate how participants perform quantity judgments of the four types of English nouns (count nouns, mass nouns, aggregate nouns and flexible nouns) in the presence (NOUN condition) or absence (NO NOUN condition) of morphosyntactic cues to atomicity.

2.1. Methods

2.1.1. Task and instructions

This experiment used a variant of Barner & Snedeker’s (2005) quantity judgment task. Participants were shown pictures depicting two characters with different quantities of the same object. One character had two large objects whereas the other character had six small objects. As illustrated in Figure 4, the boy was always on the left and the girl was always on the right. In half of the target items, the boy had the two large objects while the girl had the six small objects, and in the other half, the girl had the two large objects while the boy had the six small objects. Crucially, the combined volume of the two large objects was greater than the combined volume of the six small objects. Participants simultaneously listened to a question about which character had more and they were asked to answer that question by either pressing the “The boy” button or the “The girl” button. Finally, participants could optionally comment their answer as illustrated in Figure 4.

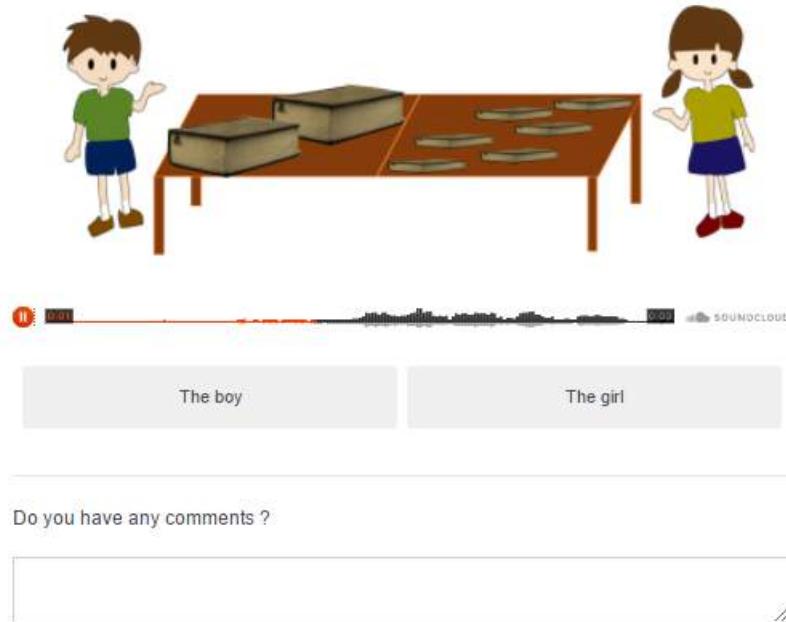


Figure 4: Example of Stimuli

2.1.2. Design and stimuli

Four types of nouns were tested: namely, count nouns, mass nouns, aggregate nouns and flexible nouns. The full list of nouns is provided in Table 1.¹

Noun Type	Nouns tested
Count Nouns	<i>Book, Hat, Candle, Mug, Bottle</i>
Mass Nouns	<i>Ketchup, Milk, Flour, Sugar, Ice Cream</i>
Aggregate Nouns	<i>Mail, Clothing, Furniture, Silverware, Jewelry</i>
Flexible Nouns	<i>Chocolate, Stone, String, Dessert, Cake</i>

Table 1: List of nouns tested in Experiment 1

These four types of nouns were tested in Scontras et al.'s (2017) NOUN and NO NOUN conditions. In the NOUN condition, the target question included the relevant noun as well as

¹To determine the category of the nouns tested in this experiment, we applied the following tests. Count nouns can be pluralized (e.g. *books*) and can combine with numeral modifiers (e.g. *two books*). Unlike count nouns, mass nouns cannot be pluralized (e.g. **ketchups*) nor can they combine with numeral modifiers (e.g. **two ketchups*). However, mass nouns can combine with *much* and *little* (e.g. *how much ketchup, little ketchup*), and they denote substances. As mass nouns, aggregate nouns cannot be pluralized (e.g. **furnitures*) nor can they combine with numeral modifiers (e.g. **two furnitures*). Aggregate nouns can also combine with *much* and *little* (e.g. *how much furniture, little furniture*). However, unlike mass nouns, aggregate nouns denote a collection of countable objects. Finally, flexible nouns behave as count nouns when they are pluralized (e.g. *chocolates, two chocolates*) and as mass nouns when they occur in the singular form (e.g. **two chocolate, how much chocolate, little chocolate*).

the relevant cues to atomicity (e.g. *Who has more books?*) whereas in the NO NOUN condition, neither the noun nor the cues to atomicity were provided (*Who has more?*). Furthermore, in the NOUN condition, mass nouns, aggregate nouns and flexible nouns were all given in the singular form, whereas count nouns were given in the plural form.

While the Noun Type factor was manipulated within participants, the target question was manipulated between participants. That is, half of the participants saw the target items of the NOUN condition and therefore listened to target questions that included cues to atomicity, whereas the other half saw the target items of the NO NOUN condition and therefore listened to the target question *Who has more?*. The schematic structures of the target questions used in the NOUN and NO NOUN conditions are given in Table 2.

Noun Type	Target question	Target question
	NOUN Condition	NO NOUN condition
Count Noun	<i>Who has more N-s?</i>	<i>Who has more?</i>
Mass Noun	<i>Who has more N?</i>	<i>Who has more?</i>
Aggregate Noun	<i>Who has more N?</i>	<i>Who has more?</i>
Flexible Noun	<i>Who has more N?</i>	<i>Who has more?</i>

Table 2: Schematic structures of the target questions associated with each type of nouns

Each combination illustrated in Table 2 was repeated 5 times, for a total of 40 stimuli. Examples of stimuli for each type of nouns are depicted in Figure 9.

To ensure that participants listened to the auditory target questions and were paying attention to the task, 10 filler items of the form *Click on the boy!* and *Click on the girl!* were added. The results of the participants who did not press the correct button more than once were excluded from the analysis.

All items were counterbalanced so that the order in which count nouns, mass nouns, aggregate nouns, flexible nouns and fillers occurred systematically varied. Each participant received 20 target items including five for each type of nouns and 10 filler items.

2.1.3. Participants

Participants were 90 native speakers of English (living in the US), recruited via Amazon Mechanical Turk and paid \$2 for their participation. 45 participants only saw the stimuli of the NOUN condition and the other 45 participants only saw the stimuli of the NO NOUN condition. Since each participant gave the correct answers to the filler items, none of them were excluded from the analysis.

2.2. Results

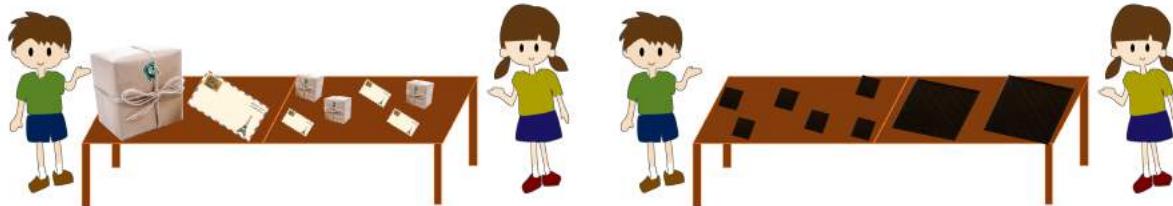
Figure 10 summarizes the results of Experiment 1: namely, the rate of cardinality judgments depending on noun type and cues. Error bars refer to standard errors. Figure 11 summarizes the results of Experiment 1 per noun.

I analyzed participants' responses using a generalized logistic mixed model with Nouns and Subjects as random effects. As expected, participants based their quantity judgments on number



*Figure 5: Stimuli for the count noun *book**
NOUN: Who has more books?
NO NOUN: Who has more?

*Figure 6: Stimuli for the mass noun *ketchup**
NOUN: Who has more ketchup?
NO NOUN: Who has more?



*Figure 7: Stimuli for the aggregate noun *mail**
NOUN: Who has more mail?
NO NOUN: Who has more?

*Figure 8: Stimuli for the flexible noun *chocolate**
NOUN: Who has more chocolate?
NO NOUN: Who has more?

Figure 9: Example of stimuli for each type of nouns

significantly more for count nouns and aggregate nouns than for mass nouns and flexible nouns in both conditions: a significant effect of the ontological category was found both in the NOUN condition ($X^2(1) = 52.17$, $p < 5.073e-13$) and in the NO NOUN condition ($X^2(1) = 33.67$, $p < 6.544e-09$).

Moreover, the results of this experiment corroborate Scontras et al.'s (2017) results: count nouns and mass nouns were judged differently in the NOUN and the NO NOUN conditions. More precisely, participants based their quantity judgments on number significantly less for count nouns in the NO NOUN condition than in the NOUN condition ($\beta = 4.10$, $z = 4.37$, $p = 0.0003$) and significantly more for mass nouns in the NO NOUN condition than in the NOUN condition ($\beta = -2.06$, $z = -3.20$, $p = 0.0298$).

Regarding the results of other types of nouns, I interestingly found that while count nouns and aggregate nouns were not judged differently in the NOUN condition ($\beta = 1.39$, $z = 1.55$, $p = 0.4072$), in the NO NOUN condition, aggregate nouns were judged on number significantly more than count nouns ($\beta = -1.56$, $z = -2.98$, $p = 0.0155$). By contrast, mass nouns were not judged differently from flexible nouns in both conditions (NOUN condition: $\beta = -0.73$, $z = -1.46$, $p = 0.4615$; NO NOUN condition: $\beta = -0.18$, $z = -0.37$, $p = 0.9829$). Surprisingly however, flexible nouns in the NOUN condition were not judged differently from flexible nouns in the NO NOUN condition ($\beta = -1.45$, $z = -2.33$, $p = 0.2774$).

Finally, I found a significant interaction between target question and ontological category

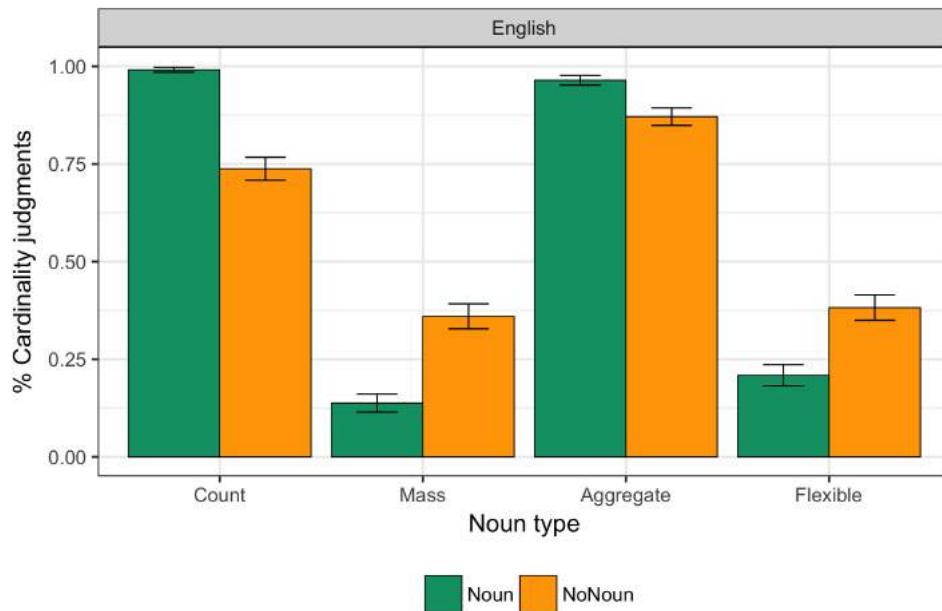


Figure 10: Rate of cardinality judgments depending on noun type and cues

($\chi^2 = 73.57$, $p < 2.2\text{e-}16$), corroborating once again Scontras et al.'s (2017) results.

2.3. Discussion

Recall that the goal of Experiment 1 was to investigate the role played by linguistic cues in quantity judgments by extending Scontras et al.'s (2017) study to every type of English nouns. Interestingly, while Scontras et al.'s (2017) results for count and mass nouns were confirmed, no contrast between the NOUN condition and the NO NOUN condition has been found for aggregate nouns and flexible nouns. In other words, while the absence of the noun and the morphosyntactic cues to atomicity did affect quantity judgments of count and mass nouns, it did not affect quantity judgments of aggregate nouns and flexible nouns. Another correlated surprising result is that while the absence of linguistic cues did affect count nouns and aggregate nouns differently, it did not affect mass nouns and flexible nouns differently.

In order to understand these results, let us look more closely at the results per noun summarized in Figure 11. To begin with, that count nouns in the NO NOUN condition were judged less often on number than count nouns in the NOUN condition may be due to the noun *bottle* and to the noun *candle*. *Bottle* being a container, it could be judged on volume if one takes into consideration the substances that can be contained into the bottles. Regarding the noun *candle*, participants may have taken into consideration the substance that makes up the candle. If that is the case, we would expect them to provide a judgment based on volume as they did for other substances. A post-hoc analysis confirms these claims. That is, when the results of the nouns *bottle* and *candle* are excluded from the analysis, count nouns are no longer judged differently in the NOUN and the NO NOUN conditions ($\beta = 3.60$, $z = 2.99$, $p = 0.0567$) and they are no longer judged differently from aggregate nouns in the NO NOUN condition either ($\beta = -0.83$, $z = -1.58$, $p = 0.76$).

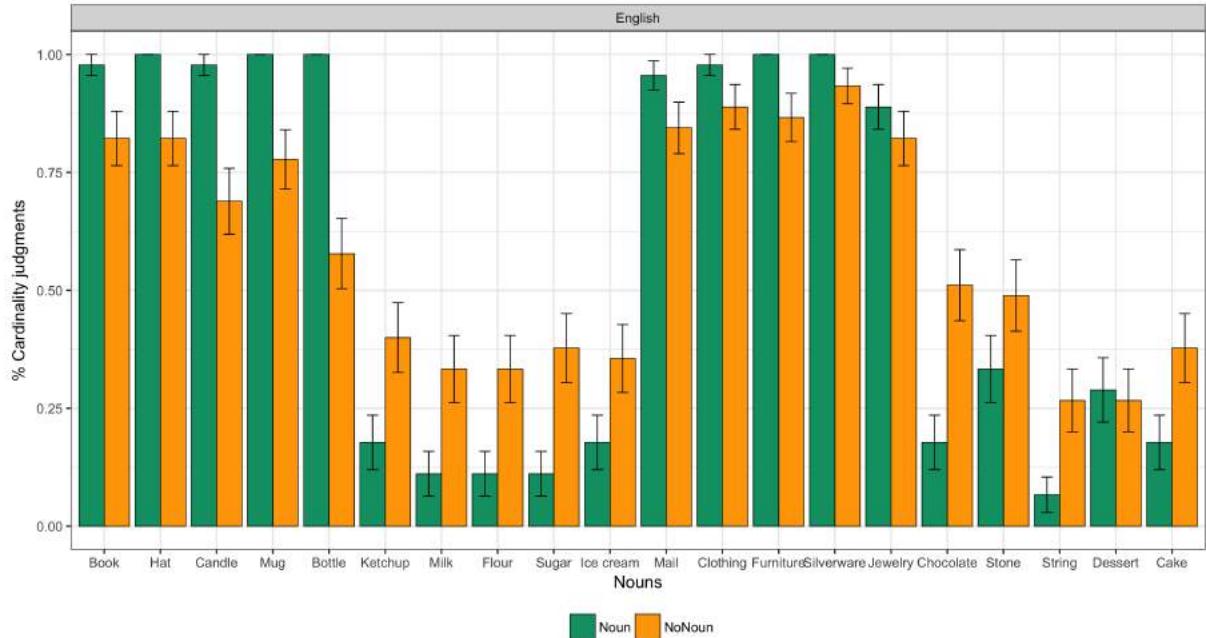


Figure 11: Rate of cardinality judgments per noun

If we now focus on flexible nouns, we observe a wide variation in the results.² This suggests that these nouns are not all flexible in the same way. For instance, unlike what was expected, the noun *dessert* does not seem to be flexible. One possible explanation is that although the noun occurred in the singular form in the NOUN condition, some participants provided a cardinality judgment because they took into consideration the different kinds of cakes. However, that flexible nouns were not judged differently in the NOUN condition and in the NO NOUN condition is surprising and still not understood given the results per noun.

Finally, the results of mass nouns corroborate Scontras et al.'s (2017) results suggesting that in the absence of linguistic cues, participants can count salient portions of the relevant substances. As noted by Scontras et al. (2017), these results contrast with the Yudja results from Lima (2014), who found that Yudja speakers provide cardinality judgments for every type of nouns. Our results show that counting salient portions of substances is not the default strategy in the absence of cues, suggesting that it is not the lack of cues that led to this default counting strategy in Yudja.

Now, recall that in the NO NOUN condition both the noun and the cues to atomicity were omitted. Therefore, that mass nouns were judged differently in the NOUN and in the NO NOUN conditions could either be due to the fact that the nouns were underspecified or to the fact that morphosyntactic cues to atomicity were missing. Since in English it is not possible to omit the linguistic cues to atomicity without eliding the noun, it is hard to understand what is the source of this effect. The goal of the second experiment is to address this issue.

²Note that since the singular form of flexible nouns was provided, I expected them to behave as mass nouns in the NOUN condition: that is, I expected participants to provide volume judgments for flexible nouns in the NOUN condition.

3. Experiment 2

In Experiment 2, I investigate the role of morphosyntactic cues to atomicity in quantity judgments by conducting the previous experiment in French. Recall that in French, while the singular-plural distinction is made in the written forms, it is not pronounced in most contexts. As illustrated below, both the singular and the plural form of the noun *chat* ‘cat’ have the same pronunciation. Using auditory stimuli, it is thus possible to remove experimentally the morphosyntactic cues to atomicity while providing the nouns to the participants at the same time.

- | | |
|--------------------------|------------------------|
| (3) <i>Singular form</i> | (4) <i>Plural form</i> |
| a. chat | a. chats |
| cat | cat+PL |
| b. [ʃa] | b. [ʃa] |

Now, if the contrasts observed in Experiment 1 as well as in Scontras et al. (2017) are due to the presence or absence of the relevant nouns in the quantity judgment prompts, count nouns and mass nouns should not be judged differently in the CUES condition (where both the nouns and the morphosyntactic cues to atomicity are provided to the participants) and in the NO CUES condition (where only the relevant nouns are provided to the participants) in this experiment. By contrast, if the previous results are due to the presence or absence of morphosyntactic cues to atomicity, the French results should be similar to the English results.

3.1. Methods

3.1.1. Task and instructions

I used the exact same task as in Experiment 1, namely a variant of Barner & Snedeker’s (2005) quantity judgments task. Note that in order to be able to remove experimentally the morphosyntactic cues to atomicity, it was crucial to have auditory stimuli.

3.1.2. Design and stimuli

As in Experiment 1, four types of nouns were tested: namely, count nouns, mass nouns, aggregate nouns and flexible nouns. The full list of nouns is provided in Table 3.³

This factor was crossed with the Cues factor. In the CUES condition, the target questions included morphosyntactic cues to atomicity. Count nouns occurred in the plural form (as indicated by the plural determiner *des*) whereas mass nouns, aggregate nouns and flexible nouns occurred in the singular form (as indicated by the singular determiners *du*, used with masculine nouns, and *de la*, used with feminine nouns). By contrast, in the NO CUES condition, the target questions did not include any cue to atomicity, the crucial determiners being absent of the quantity

³While the count nouns tested in this experiment are the same as the one tested in Experiment 1, the mass noun *ice cream* has been replaced by the mass noun *moutarde* ‘mustard’ for the following reason: the word for *ice cream* in French spoken in Québec is not the same as the word for *ice cream* in French spoken in France. Moreover, the list of aggregate and flexible nouns is quite different in both experiments since nouns that are aggregate and flexible in English do not necessarily fall into the same categories in French.

Noun Type	Nouns tested
Count Nouns	<i>Livre</i> ‘book’, <i>Chapeau</i> ‘hat’, <i>Bougie</i> ‘candle’, <i>Tasse</i> ‘mug’, <i>Bouteille</i> ‘bottle’
Mass Nouns	<i>Ketchup</i> ‘ketchup’, <i>Lait</i> ‘milk’, <i>Farine</i> ‘flour’, <i>Sucré</i> ‘sugar’, <i>Moutarde</i> ‘mustard’
Aggregate Nouns	<i>Courrier</i> ‘mail’, <i>Carrelage</i> ‘tiles’, <i>Vaisselle</i> ‘dishes’, <i>Matériel</i> ‘equipment’, <i>Monnaie</i> ‘change’
Flexible Nouns	<i>Chocolat</i> ‘chocolate’, <i>Corde</i> ‘rope’, <i>Fil</i> ‘thread’, <i>Pizza</i> ‘pizza’, <i>Gâteau</i> ‘cake’

Table 3: List of nouns tested in Experiment 2

judgment prompts. The schematic structures of the target questions used in the CUES and NO CUES conditions are given in Table 4. Crucially, in contrast to Experiment 1, each target question included the relevant noun.

Noun Type	Target question CUES Condition	Target question NO CUES Condition
Count Noun	<i>Regarde, il y a des X sur la table. Qui en a le plus?</i> ‘Look, there are some X on the table. Who has more?’	<i>Regarde ce qu’il y a sur la table. Qui a le plus de X?</i> ‘Look what is on the table. Who has more X?’
Mass Noun	<i>Regarde, il y a du/de la X sur la table. Qui en a le plus?</i>	<i>Regarde ce qu’il y a sur la table. Qui a le plus de X?</i>
Aggregate Noun	<i>Regarde, il y a du/de la X sur la table. Qui en a le plus?</i>	<i>Regarde ce qu’il y a sur la table. Qui a le plus de X?</i>
Flexible Noun	<i>Regarde, il y a du/de la X sur la table. Qui en a le plus?</i>	<i>Regarde ce qu’il y a sur la table. Qui a le plus de X?</i>

Table 4: Schematic structures of the target questions associated with each type of nouns

The Noun Type factor was manipulated within participants whereas the Cues factor was manipulated between participants. That is, half of the participants saw the target items of the CUES condition and therefore listened to target questions that included cues to atomicity, whereas the other half saw the target items of the NO CUES condition and therefore listened to target questions that did not include any cue to atomicity.

Each combination illustrated in Table 4 was repeated 5 times, for a total of 40 stimuli. Examples of stimuli for each type of nouns are depicted in Figure 16.

To ensure that participants listened to the auditory target questions and were paying attention to the task, 10 filler items of the form *Clique sur le garçon!* ‘Click on the boy!’ and *Clique sur la fille!* ‘Click on the girl!’ were added. The results of the participants who did not press the correct button more than once were excluded from the analysis.

All items were counterbalanced so that the order in which count nouns, mass nouns, aggregate nouns, flexible nouns and fillers occurred systematically varied. Each participant received 20 target items including five for each type of nouns and 10 filler items.

3.1.3. Participants

Participants were 69 native speakers of French (living in Canada and in France), recruited via Amazon Mechanical Turk and paid \$2 for their participation. 45 participants only saw the stimuli of the CUES condition and the other 24 participants only saw the stimuli of the NO CUES condition.⁴ Since eight participants (four in the CUES condition and four in the NO CUES condition) did not answer correctly some filler items, their results were excluded from the analysis.

⁴That less participants saw the stimuli of the NO CUES condition is due to the small number of native speakers of French on Amazon Mechanical Turk. Once the questionnaire of the CUES condition was completed, no more than 24 native speakers of French were available to complete the questionnaire of the NO CUES condition.



Figure 12: Stimuli for the count noun *livre*
CUES: Regarde, il y a des livres sur la table. Qui en a le plus?
NO CUES: Regarde ce qu'il y a sur la table. Qui a le plus de livres?

Figure 13: Stimuli for the mass nouns *ketchup*
CUES: Regarde, il y a du ketchup sur la table. Qui en a le plus?
NO CUES: Regarde ce qu'il y a sur la table. Qui a le plus de ketchup



Figure 14: Stimuli for the aggregate noun *courrier*
CUES: Regarde, il y a du courrier sur la table. Qui en a le plus?
NO CUES: Regarde ce qu'il y a sur la table. Qui a le plus de courrier?

Figure 15: Stimuli for the flexible noun *chocolat*
CUES: Regarde, il y a du chocolat sur la table. Qui en a le plus?
NO CUES: Regarde ce qu'il y a sur la table. Qui a le plus de chocolat?

Figure 16: Example of stimuli for each type of nouns

3.2. Results

Figure 17 summarizes the results of Experiment 2: namely, the rate of cardinality judgments depending on noun type and cues. Error bars refer to standard errors. Figure 18 summarizes the results of Experiment 2 per noun.

I analyzed participants' responses using a generalized logistic mixed model with Nouns and Subjects as random effects. As expected, participants based their quantity judgments on number significantly more for count nouns and aggregate nouns than for mass nouns and flexible nouns in both conditions. In other words, I found a significant effect of the ontological category in both the CUES condition ($X^2(1) = 43.29$, $p < 4.728e-11$) and the NO CUES condition ($X^2(1) = 31.70$, $p < 1.801e-08$).

Interestingly, neither count nouns ($\beta = -0.24$, $z = -0.31$, $p = 1.00$) nor mass nouns ($\beta = -2.32$, $z = -2.83$, $p = 0.09$) were judged differently in the CUES and the NO CUES conditions. This contrasts with the results of Experiment 1.

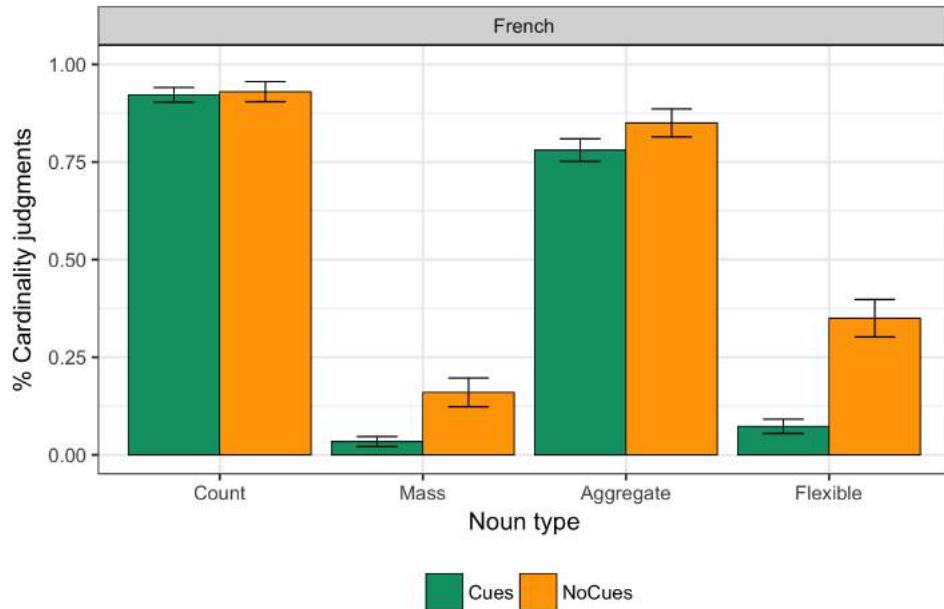


Figure 17: Rate of cardinality judgments depending on noun type and cues

Moreover, unlike in English, count nouns were not judged differently from aggregate nouns in both the CUES condition ($\beta = 1.42$, $z = 1.89$, $p = 0.23$) and the NO CUES condition ($\beta = 1.05$, $z = 1.39$, $p = 0.51$). And mass nouns were not judged differently from flexible nouns in both conditions either (CUES condition: $\beta = -1.28$, $z = -1.44$, $p = 0.4761$; NO CUES condition: $\beta = -1.67$, $z = -2.50$, $p = 0.06$). However, as expected, the presence or absence of cues did affect the quantity judgments of flexible nouns differently: participants based their quantity judgments on number significantly more in the NO CUES condition than in the CUES condition ($\beta = -2.77$, $z = -4.04$, $p = 0.001$).

Finally, combining the results of experiments 1 and 2 together, I found a significant interaction of language and linguistic cues ($X^2(7) = 22.45$, $p = 0.002$).

3.3. Discussion

Recall that the main goal of Experiment 2 was to investigate the role of morphosyntactic cues to atomicity in quantity judgments. The expectations were the following. If the results obtained in Experiment 1 as well as in Scontras et al. (2017) were due to the presence or absence of morphosyntactic cues to atomicity, we expected the results of Experiment 2 to be similar to the one of Experiment 1. By contrast, if the previous results were due to the presence or absence of the nouns in the target questions, we expected the results of this second experiment to be different from the English results. In particular, we expected count nouns and mass nouns to not be judged differently in the CUES and in the NO CUES conditions in French.

These results first suggest that morphosyntactic cues to atomicity do not influence quantity judgments in French. Indeed, the presence or absence of morphosyntactic cues did not affect the judgments of count nouns, mass nouns and aggregate nouns.⁵ The presence or absence of

⁵If we look at the results of aggregate nouns, we notice that two of them did not behave as expected: *carrelage*

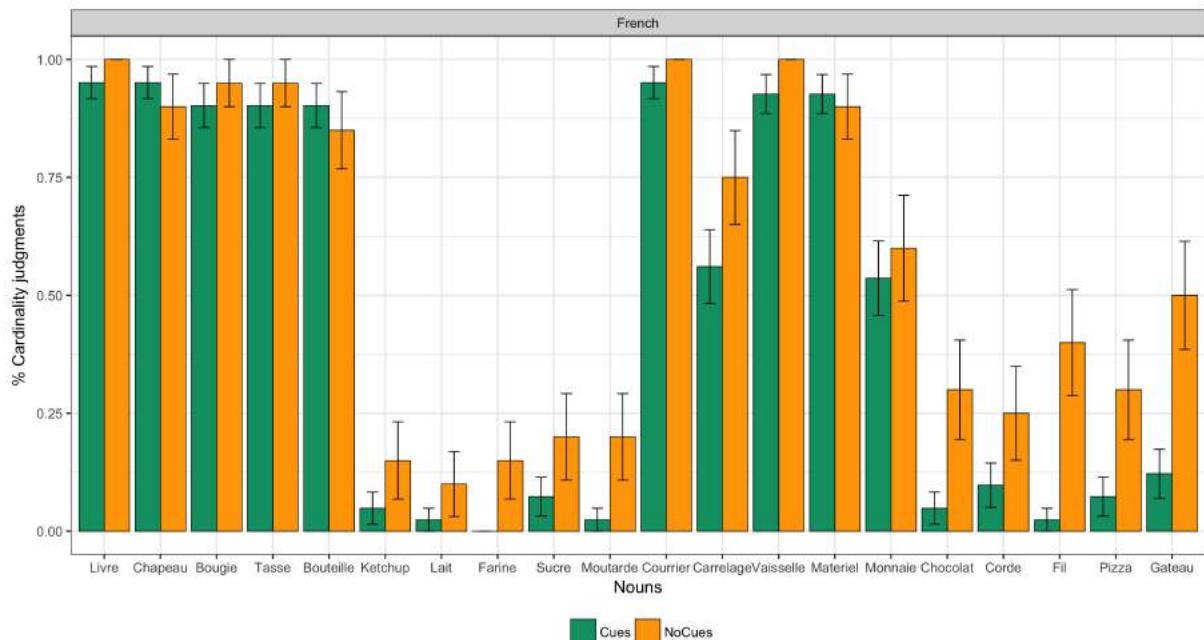


Figure 18: Rate of cardinality judgments per noun

morphosyntactic cues only affected the judgments of flexible nouns. In that case, the presence of linguistic cues helped participants to disambiguate the meaning of the nouns, corroborating Barner & Snedeker's (2005) results.

Furthermore, that we found a significant interaction between language and linguistic cues shows that the lack of cues is doing something different in English and in French. Now, recall that in English, the cues were twice underspecified in the NO NOUN condition: namely, both the nouns and the morphosyntactic cues to atomicity were missing. Knowing now that morphosyntactic cues to atomicity do not influence quantity judgments in French, this interaction between language and cues tells us that quantity judgments in English were affected by the absence of the relevant nouns in the quantity judgment prompts.

In a follow-up experiment, I show that quantity judgments in French are also affected by the absence of the relevant nouns in the target questions. This experiment uses the exact same task and stimuli as Experiment 2, but crucially in that case, the target question does not include the relevant nouns. That is, the target question is of the form *Qui en a le plus?* ‘Who has more?’. Participants were 45 native speakers of French (living in Canada and in France), recruited via Amazon Mechanical Turk and paid \$2 for their participation. The results of four participants who did not provide the correct answers to some filler items were excluded from the analysis. Figure 19 summarizes the results: namely, the rate of cardinality judgments depending on noun type. These results show that as was the case in English, the absence of the relevant nouns in the quantity judgment prompts affects quantity judgments in French. In that case, quantity judgments can be influenced by the availability of salient portions and alternative dimensions

‘tiles’ and *monnaie* ‘change’. While we understand that *monnaie* has a strong utility reading (in particular, participants could have assumed that two large coins are more valuable than six small coins), we do not understand the results obtained for the noun *carrelage*. Nevertheless, the important point is that these two nouns were not judged differently in the CUES and the NO CUES condition.

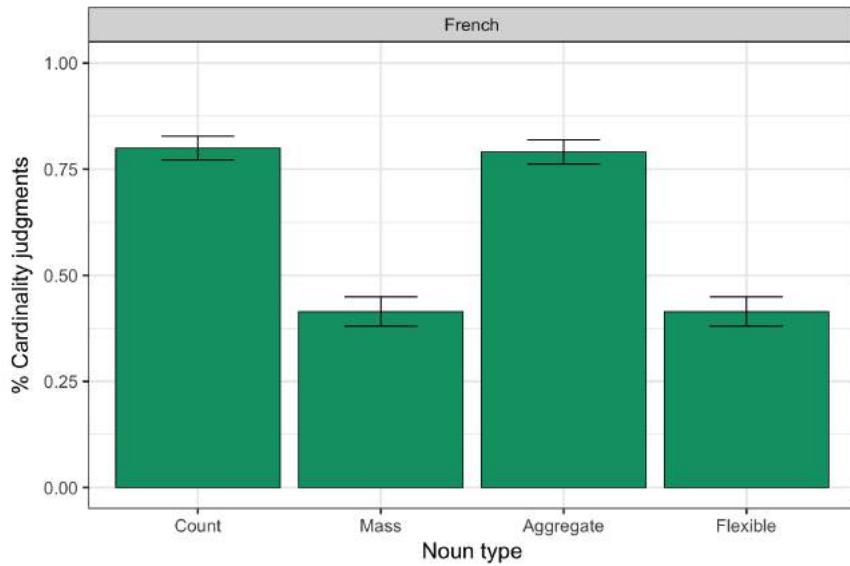


Figure 19: Rate of cardinality judgments depending on noun type

of measurement (consistent with Scontras et al. 2017).

When we have to perform a quantity judgment, the presence of the noun alone gives us a lot of information: what the object or substance depicted in the stimulus is and how we may classify it. But what do participants do when the nouns are not provided in the quantity judgment prompts? Presumably, they first have to fill in the nouns and the cues to atomicity to then give their quantity judgment. Scontras et al. (2017) tested the hypothesis that speakers mentally fill in the cues when the latter are absent from the quantity judgment prompts. They investigated the quantity judgments of count nouns and mass nouns in the following condition (named the FILL IN condition): participants were asked *Who has more ...?* and they had to fill in missing material in the target question before performing the quantity judgments. Interestingly, responses to the NO NOUN condition differed significantly from responses to the FILL IN condition, suggesting that the strategy participants adopted in the NO NOUN condition differs from the strategy they adopted in the FILL IN condition. However, as noted by Scontras et al. (2017), it is still possible that participants filled in missing material in the NO NOUN condition before performing their quantity judgment, but the material they filled in may differ from the material they provided in the FILL IN condition.

4. Conclusion

In this paper, I discussed the role of morphosyntactic cues to atomicity in quantity judgment tasks. The two experiments on English and on French show that while the absence of explicit cues to atomicity does not affect quantity judgments, the absence of nouns in the quantity judgment prompts has a great impact. What participants do when the nouns and the cues to atomicity are not provided in the quantity judgment prompts is still a mystery. While participants may fill in missing material before performing their quantity judgment, knowing what material they fill in could be a very hard task.

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Abbreviations

PL plural

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An experimental study on scalar implicatures

Comparing German native speakers and Chinese learners of German

Yuqiu Chen

To address the theoretical and empirical controversies on *Scalar Implicature* (SI), an experiment drawing comparisons between German native and non-native speakers was performed. The main finding shows that non-native speakers computed significantly less SIs by reading logically correct but pragmatically infelicitous sentences, which preferred the Processing Limitation Hypothesis and is therefore more consistent with Relevance Theory. The experiment also proved that numerals are more likely semantically exact, and that non-native speakers can serve as an important counter group to native speakers in pragmatic research. No significant correlation between judgments and logical thinking skill or learning duration was observed.

1. Introduction

Scalar implicature is a ubiquitous phenomenon in our daily conversations. Take, for example, the following conversation I once overheard on the street between two players of the game *Pokémon Go*.

- (1) Player A: Some Pikachu are cute.
Player B: Oh? Then which one is not cute?

Although A did not explicitly state that some Pikachu are not cute, B's reaction of asking A which Pikachu is not cute is still natural given the context. The process behind this conversation can be explained as the following: B interpreted the word *some* as *some and not all*, and therefore inferred from A's utterance the statement that *not all Pikachu are cute*. His confusion therefore arose naturally against the assumption that all Pikachu in the game should look almost exactly the same.

Inferences like B's are classified under the category of *Scalar Implicature (SI)*. The term SI describes the phenomenon where the use of a less informative term like *some* is inferred to mean the negation of a more informative term in the same linguistic scale, e.g. *not all* (Grice 1989; Horn 1976; Politzer-Ahles & Fiorentino 2013).

According to Levinson (1989:133) ‘[a] linguistic scale consists of a set of linguistic alternates, or contrastive expressions of the same grammatical category, which can be arranged in a linear order by degree of *informativeness* or semantic strength’. For instance, *<all, some>*, *<must, may>*, *<n... 5, 4, 3, 2, 1>*, *<and, or>*, as well as *<necessarily p, possibly p>* are all linguistic scales.

The theoretical debate about SI takes place between two groups: the neo-Gricean account adopting and modifying the Generalized Conversational Implicature (GCI) theory, and the post-Gricean account proposing communication principles like Relevance Theory. The neo-Gricean Account (e.g. Horn, Levinson) predicts that the computing of SI in conversations is automatic and therefore easier and faster, while Relevance Theory (e.g. Wilson, Sperber) assumes that such a process requires more conscious effort.

The next section briefly introduces the two theoretical accounts. Section 3 offers an overview of some important experiments on SI with native speakers (NS) and/or non-native speakers (NNS) as subjects, with emphasis on their methods, results and potential weaknesses. Section 4 then presents the experimental study with German native speakers and Chinese learners of German as subjects, followed by a discussion of the results in Section 5.

2. Theoretical Background

There are two main theories that seek to offer an explanation to the phenomenon of SI: the neo-Gricean theory that views SIs as a type of Generalized Conversational Implicature (GCI), and the post-Gricean theory that denies GCI theory and assumes that all implicatures are context-dependent. In this section, neo- and post-Gricean theories and maxims that are important for SI studies will be briefly introduced, followed by a summary of hypotheses from both accounts about SI computation.

The neo-Gricean account is developed under Grice’s ‘general approach to the study of meaning and communication’, the so-called *Gricean umbrella* (Levinson 2000:12). One of the essential features of the Gricean umbrella that the neo-Gricean account adopted is Grice’s classification of meaning as non-homogeneous (1989). Under this classification, the meaning of an utterance is separated into two parts: *what is said* and *what is implicated*, where *what is implicated* is further separated into the categories of conventional implicatures and nonconventional implicatures. Grice focused then on a subclass of nonconventional implicatures that he called Conversational Implicature. He defined this class of implicatures ‘as being essentially connected with certain general features of discourse’ (Grice 1989:26). Finally, Grice subdivides Conversational Implicatures into the categories of Generalized

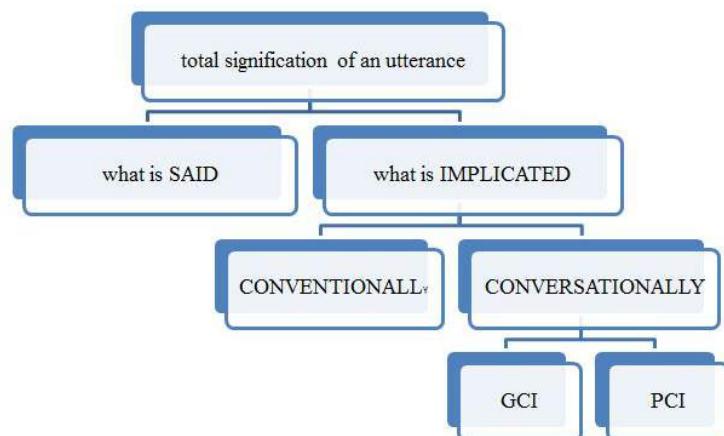


Figure 1 Structure of Grice’s classification of utterance meaning, adopted from (Levinson 2000:13)

Conversational Implicature (GCI) and the Particularized Conversational Implicature (PCI) based on whether the implicature is linguistically triggered or depends heavily on the particular context and situation. Figure 1 demonstrates this Gricean structure of sentence meaning.

Unlike PCIs, GCIs depend minimally on particular contexts. Instead, GCIs are linguistically triggered by the use of certain words that ‘carry such-and-such an implicature or type of implicature’ (Grice 1989:37), which provide the GCI with an entirely general currency. Therefore, the computation of a GCI should be triggered automatically by these words, and should take place by default.

According to Gricean and neo-Gricean theories, scalar terms such as *some* can typically trigger GCIs that are the negations of the more informative terms on the same scale. This thesis rests on the presumption that the speaker observes the first maxim of Quantity of the Gricean *Cooperative Principle* in making his contribution ‘as informative as is required’ (1989:26). Under this presumption, Player A in example (1) would have used the more informative term *all* to comply with the maxim of Quantity had he not meant to say that not all Pikachu are cute. His election to use the weaker term *some* thus implicated the negation of the stronger term *all* in the same scale.

The neo-Griceans endorse this distinction between GCIs and PCIs but modified the Gricean maxims. For instance, Levinson created three heuristics in order to increase the informativeness in conversation and to calculate the sentence meaning: the Q-, I- and M-heuristic. For the purpose of SI, the relevant one is the Q-heuristic that dictates ‘what isn’t said, isn’t’ (Levinson 2000:35). The application of this heuristic requires one to select from a set of salient contrasting terms that are limited to what the context of an utterance permits. When it comes to scalar sets, the Q-heuristic indicates that the use of one term rules out the other contrasting terms. Particularly, the use of a weaker one rules out all stronger alternates.

Unlike Levinson, Horn, another neo-Gricean researcher, reduced the four Grice’s maxims into only two principles: the Q and R principles. To explain the SIs from Horn’s perspective, the Q principle is useful.

(2) The Q Principle (Hearer-based):

Make your contribution sufficient (cf. Quantity 1)

Say as much as you can (given R)

Lower-bounding principle, inducing upper-bounding implicate

(Horn 1984:13)

If the weaker scalar term is used in a sentence, like the *some* in Example (1), the sentence literally offers a lower bound (e.g. at least some) and, according to the Q Principle, implicates an upper bound (e.g. not more than some). The conjunction of the literal and implicated bounds gives rise to the two-sided interpretation, of *exactly some, some and not all* (Horn 1984).

It is worth emphasizing that no matter how Gricean principles are modified, a SI is considered a typical GCI from both Gricean and neo-Gricean perspectives. Therefore, an enriched scalar interpretation like *some as some and not all* is predicted to be context-independent and occur by default.

In contrast, the post-Griceans reject the distinction between GCI and PCI, and claim that all implicatures are context-dependent (Noveck & Sperber 2007). Wilson and Sperber (1998) criticized the Gricean maxims for two reasons: the first is that the maxims are too vague for failing to specify either the content or the function; the second, and the more important one, is

that the Gricean model understates certain crucial limitations of the interpretation process ‘by allowing the literal meaning of figurative utterances to act as no more than a loose set of hints at the intended message, rather than being a necessary part of the message itself’ (Wilson & Sperber 1998a:370). As a solution, Wilson and Sperber replaced the Gricean *Cooperative Principle* with the *Principle of Relevance*.

(3) The *Principle of Relevance*

The speaker tries to express the proposition which is the most relevant one possible to the hearer.

(Wilson & Sperber 1998a:373)

Unlike the Grice’s maxim of Relation (‘Be relevant’), the Principle of Relevance is not a submaxim of the Cooperative Principle. It does not contradict the principle of cooperation. However, in Relevance Theory, cooperation is not the governing principle that in turn requires relevance. Rather, cooperation is only a price paid by the speaker in a successful conversation, an ‘essentially egotistic enterprise’ (Wilson & Sperber 1998b:366).

Based on Relevance Theory, Noveck and Sperber (2007) challenged the neo-Gricean assumption that SI is a typical kind of GCI which should be generated faster and more efficiently in conversations. They made the following proposals regarding SI instead.

(4) Two core ideas of Relevance Theory regarding SI:

- Linguistic expressions serve not to encode the speaker’s meaning but to *indicate* it. The speaker’s meaning is inferred from the linguistic meaning of the words and expressions used taken together with the context.
- Inferring the speaker’s explicit and implicit meaning (her explicatures and implicatures) is not done sequentially but in parallel. The final overall interpretation of an utterance results from a mutual adjustment of implicatures and explicatures guided by expectations of relevance.

(Noveck & Sperber 2007:190)

According to Relevance Theory, the calculation of a pragmatic interpretation of a scalar term is not automatic. It takes place only if such an interpretation is relevant under the given conversational contexts. The context-dependent nature of this process makes the pragmatic understanding of a scalar term slower and more complex than the literal one.

Noveck and Sperber (2007) summarized the main predictions of the GCI theories and Relevance Theory on SI computation as follows.

Interpretation of the scalar term	GCI theories	Relevance theory
literal	default enrichment + context-sensitive cancellation, hence slower	no enrichment, hence faster
enriched	default enrichment hence faster	context sensitive enrichment, hence slower

Table 1 Difference and predictions of both theoretical accounts on SI, adopted from Noveck & Sperber (2007:196)

3. Empirical background

This section summarizes some previous empirical studies on scalar implicature. The first part gives a brief overview of research involving native speakers, including their methods and the discoveries that are relevant to my experiment. In the second part, two SI-studies involving non-native speakers are presented, with focus on their designs, results, and weaknesses. A graphic summary of the empirical background of SI is given in *Figure 2* at the end of the section.

3.1 SI-studies with native speakers

The first empirical study on SI, which compared children's interpretations with those of adults, was done by Noveck (2001). The first experiment in his study focused on the scale <must, might>. In the experiment, the weaker word *might* was used in the strong context that satisfied the stronger alternate *must*; for example, the critical item *there might be a parrot in the box* was presented with the context in (5).

(5) Context in Noveck's (2001) experiment:

A friend of mine gave me this (covered) box and said, 'All I know is that whatever is inside this box (the covered one) looks like what is inside this box (the one with a parrot and a bear) or what is inside this box (the one with just a parrot).'

(Noveck & Sperber 2007:198)

The design, asking participants to judge a weaker scalar term in a context that satisfies a stronger term in the same scale, guaranteed that those critical items are logically correct. However, if participants produce SIs during the conversations, these weaker terms become infelicitous. The results showed that children are less likely than adults to reject these logically correct but *underinformative* weaker terms. This indicates that the literal interpretation is more accessible to children than the pragmatic one. Similar results were also observed in subsequent experiments, such as in Papafragou & Musolino (2003) and Guasti et al. (2005). Interestingly, besides the difference between children and adults, what Noveck called *developmental effect*, Papafragou & Musolino (2003) also observed in their experiments that the scale *numeral* yielded a different result from other scalar terms – the weaker terms in this scale were rejected by both subject groups.

Nevertheless, the developmental effect cannot be the 'knock down evidence' against other theories, because both GCI theories and Relevance Theory can offer a plausible explanation for these results. From the perspective of GCI theories, children cannot compute SIs because of the pragmatic delay. The Pragmatic Delay Hypothesis proposes that children lack the essential piece of pragmatic knowledge for SI-computation. Once they grow up, they can also compute SI by default. Relevance Theory, on the other hand, supports the *Processing Limitation Hypothesis*, which holds that SI-computation does not happen by default for adults either, because of its demand on one's memory and processing system. Children have difficulties with SI because of their processing limitation (Guasti et al. 2005; Noveck & Sperber 2007), not because of acquisitional delays of linguistic natural.

Addressing this problem and the limitation of studies involving developmental effects, the computing time of SI was also experimentally measured. Several online studies on native adults (e.g. Bott & Noveck 2004; Noveck & Posada 2003) discovered that the mean reaction

times were longer if participants rejected the underinformative utterances. These results demonstrate that even adults need more time to exclude the stronger terms and produce SIs.

While Relevance Theory is supported by the computing time measurements among adult native speakers, experiments with non-native speakers, another group of testers who should have processing limitation but no difficulty with pragmatic knowledge, offer supports for GCI theories.

3.2 Recent SI-studies with non-native speakers

Unlike the research on native speakers (NS), very few studies have been conducted comparing native and non-native speakers (NNS). In this part, I will introduce two experimental studies that have influenced the design of my experiment: the study by Slabakova (2010) and the study by Lin (2016). The following short summary will focus on the designs of the experiments, their results, and flaws in the experiment that may potentially weaken the strength of the conclusions drawn.

To the best of my knowledge, Slabakova (2010) first researched the lexically triggered scalar implicatures with NS and NNS. The study compared acceptance rates on scalar <all, some> amongst NS of Korean in Korean, NS of English in English and two groups of NNS of English of Korean descent.

The first experiment repeated the third experiment in Noveck (2001) with the scale <all, some>. The items were presented in written forms and the subjects had to choose whether they agreed with the utterances. All sentences were presented without context, meaning that participants had to judge them based on their world knowledge. Three types of items were created, (6) shows a set of examples.

- (6) A set of example items used by Slabakova (2010) in the first experiment

Type infelicitous some/True all: All/Some giraffes have long necks.

Type felicitous some/False all: All/Some books have color pictures.

Type absurd all/some: All garages sing/Some fish are made of leaves.

(Slabakova 2010:2461)

It was observed that the NNS accepted the type *infelicitous some* significantly less than the native English speakers did in English, and the native Korean speakers in Korean. This result indicated that the NNS compute scalar implicature significantly more often than native speakers, which is inconsistent with the post-Gricean *Processing Limitation Hypothesis*.

In the second experiment, the same participants were re-tested after more than six months. First, the participants were shown a series of pictures. The pictures ended with a mother asking a child with an angry face what s/he had done, after the child had done something naughty behind the mother's back, such as eating all the cookies. Following the pictures, the critical sentences with the weaker terms, such as *I ate some of the cookies*, were presented as an answer. The main idea was that the stories were designed to implicate the stronger trigger, and the mother-child-scenario sought to contextually emphasize the relevance of the SI that the participants could compute from the target sentences. The participants had to judge whether the answer was acceptable.

Comparing to the results in the first experiment, the NNS showed even less acceptance of the logically correct but pragmatically infelicitous utterances in these scenarios. A decline in acceptance was also observed among the native speakers. In sum, Slabavoka concluded that the results from both experiments are more consistent with the GCI Theory.

As far as I am aware, the most recent SI study involving Chinese learners of a western language was held by Lin (2016). In her study, a group of 30 Chinese students studying English as a foreign language attended the experiments, and their working time was measured online.

Unlike the previous investigations, the weaker term *some* was given explicitly in the contexts instead of in the target sentences. The participants' task was then to judge interpretations of the context with 'yes' or 'no', like the example given in (7).

- (7) Context: John has many dictionaries. Some of the dictionaries are used.

Interpretation 1: Some and possibly all of dictionaries are used.

Interpretation 2: Some but not all of the dictionaries are used.

(Lin 2016:7)

In the experiment, the NNS had an acceptance rate exceeding 85% for the sentences with *some but not all*, which is significantly higher than their acceptance for sentences with *some and possibly all* (below 20%). There was a significant time difference between the two sentence types as well. On average, the NNS needed only about 1350 milliseconds to accept the utterance with SI, but 2500 milliseconds, about twice as much time, for accepting the second interpretation. The results in Lin (2016) indicated that the Chinese NNS of English achieved faster reaction times and a higher acceptance rate by interpreting *some* with SI (*some but not all*), which also support the GCI Theories.

Although the results from both comparisons with NNS are more consistent with the GCI hypothesis, I will mention and explain some flaws in the experiments that could potentially undermine the reliability of these results. The weakness in Slabokava's study is in the item design: in both experiments, no context was added. Hence, the judgments were strongly influenced by the testers' own world knowledge or background assumptions. Without context, there is also an increased change of preference effects to obscure the obtained results and create a skewed picture. For instance, in the first experiment, the participant could have rejected sentences such as *some giraffes have long necks*, not due to default SI computation, but because s/he assumed that there could be some giraffes without long necks in the world. This option can be supposed by the fact that the rate of correct answers to the sentence type *correctly all* was significantly lower than to the sentence type *absurd all* across all subject groups (by *correctly all* 75.5% – 88%, by *absurd all* 97% – 98.9%). Thus, it is important to present all items with a context that can give enough information for a conclusion with strong triggers, in order to avoid the influence of participants' world knowledge and background assumptions as much as possible. In the second experiment, the added mother-child-scenario offered no additional context information for the conclusion, but could aid the SI production by making the utterance relevant. Therefore, the rejection of weaker terms in this design can be predicted by both theoretical accounts, and the decline in acceptance cannot exclude Relevance Theory. Hence, such a scenario was not adopted in my experiment.

Lin's experiments have two crucial weaknesses. The first one is the illogical design of the items. The main idea behind Lin's experiment was to invite the participants to judge the truth value of a stronger statement under a weaker context. However, the basic rules of logic mandate that the condition *some X* is necessary, but not sufficient for an inference of *all X*. Although Lin tried to circumvent this problem with the word *possibly*, the problem persists because *possibly* itself is a weaker trigger in the scale <certainly, possibly>. Depending on whether the NNS chose a pragmatic or a logical interpretation, s/he might consider *possible* as either *certainly inclusive* or *certainly exclusive*, which could result in different ratings. In this

case, a better logical interpretation of *some* should at least be: *some and possibly all and possibly not all*.

The second defect lies in the component of participants. In comparison with the previous experiments, Lin has changed the design of the SI-test almost fundamentally. Even so, no native English speaker was tested, although it is necessary to test them as a control group.

A summary of the empirical background is shown in *Figure 2*. Given the weaknesses in these NNS experiments, and the contrasting results that were uncovered between the experiments involving NS only and those also involving NNS, an experiment with an improved design is needed to further examine computation of SI amongst foreign language learners.

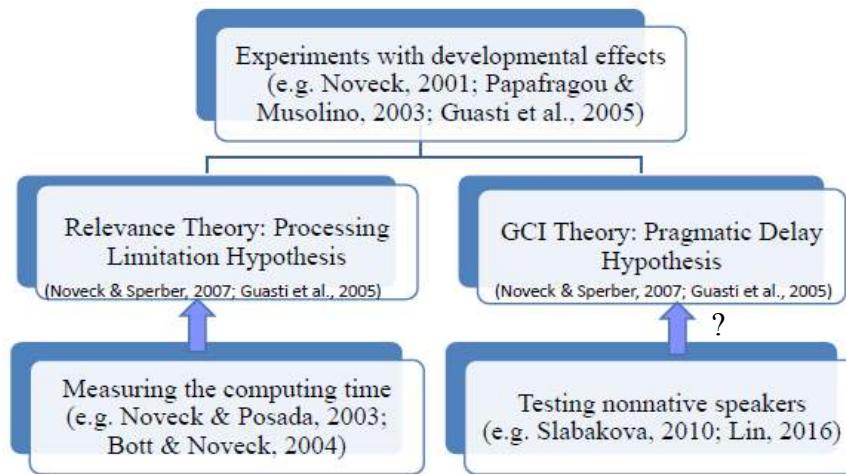


Figure 2 Experimental background of SI: while the studies measuring the computing time of NS support the Relevance Theory, the tests with NNS support rather GCI Theory; however, with some flaws in experiment design.

4. Experiment

In this study, an questionnaire in German was conducted. Unlike previous experiments involving NNS, my experiment borrowed the fundamental idea of NS SI-testing, namely the idea of testing logically correct but underinformative weaker terms. Both native and non-native speakers were tested. Three scales were evaluated: *<alle, einige>* ('<all, some>'), *<muss, es kann sein>* ('<must, can>') and the numerals *<n ..., 3, 2, 1>*. The results with statistical analyses will be presented in the last subsection.

4.1 Participants

I included German native speakers in my experiment for two reasons. One was due to the changes and improvements from previous experiments that I have made in my experiment design that required the re-testing of native speakers as a control group. The other was to use them as a check on potential imprecisions that might result from translating the English trigger words into German.

The group of native speakers (DE group) consisted of 15 German students from the seminar of German philology, held at the University of Göttingen. They had not learned

anything about semantics and pragmatics before the experiment. All of them are monolingual. Their average age is 21.53 years, with a standard deviation of 1.75.

20 Chinese students who studied German philology or Intercultural German Studies at the University of Göttingen were invited to take part in the experiment. The choice for this exact group was to ensure that their individual social characteristics like native language and cultural background differed as little as possible from one another within the group, and that their knowledge background was as similar as possible to that of the participants in the DE group. According to these students' grades in placement tests at the *facility for languages and key qualifications*, their German language levels were between B2 and C1. According to the CEFR (Common European Framework of Reference for Languages) standard, students with language level between B2 and C1, unlike the A-level learners, should possess the necessary grammatical knowledge to understand all items in the test, but are not able to use German as well as native speakers, like the C2 students (for more details, see Qualitative aspects of spoken language use - Table 3 (CEFR 3.3): Common Reference levels, Council of Europe, 2018). Non-native speakers under B1 were not chosen, because they might have difficulties with literal understanding. The C2 group was not tested either, for their language skills are described already as 'native'. It was assured before the experiment that all NNS participants had no prior knowledge of semantics or pragmatics. 19 Chinese participants completed the questionnaire in full. The mean age of them, the CN group, is 22.53 with a standard deviation of 1.54.

4.2 Design

The experiment consisted of two tasks. The first task asked participants to ascertain the appropriateness of the target sentences in the given context. The second task tested participants' logical skill and asked them to judge the correctness of inferences from the given conditions.

The first part contained three subexperiments, as three types of triggers were tested: *<alle, einige>* ('<all, some>'), *<muss, es kann sein>* ('<must, it can be>') and *the numerals <n ..., 3, 2, 1>*. I chose these three scales due to the following two reasons. Firstly, Horn (1976) classified linguistic scales into two groups. One is called quantificational scale and contains a series of quantifier terms, for instance *<all, most, many, some>*, *<always, usually, often, sometimes>*. The other one is called modal scale and contained several sets about possibility, such as *<certain, probable, possible>*, *<must, could>*. Interestingly, Horn's classification of scales was rarely mentioned and verified in empirical research. The questions of whether the scales of one group behave differently from those in the other group, and whether these two groups are sufficient for the classification of scale types, remained empirically unclear. Thus, one classical set from each group was chosen to verify if Horn's classification is valid and meaningful from an empirical perspective. I chose *<alle, einige>* ('<all, some>') from the group quantificational scale, and *<muss, es kann sein>* ('<must, it can be>') from the group modal scale.

Secondly, as mentioned before, in Papafragou & Musolino (2003) it was observed that the numerals behaved differently from the scale *<all, some>*, despite the fact that both of them belong to the group of quantificational scales according to Horn's assumption (a more detailed discussion can be found in section 5). Thus, I decided to also test the numerals in my experiment. Based on these three subexperiments, a comparison between trigger types is possible.

Every item in the first part consisted of a discourse context and a target sentence. Each item pair consisted of two items that shared the same context sufficient to trigger the stronger term. In order to avoid the interference of background knowledge and ensure that all participants had exactly the same background information to aid their judgment, the contexts always offered information about a given person. The target sentence had, depending on the condition, a stronger or a weaker trigger.

For the reliability of the experiment, 6 items were constructed per experimental condition, yielding 12 item pairs per subexperiment and 36 item-pairs in total. The first part of the questionnaire was constructed by using a within-design and a Latin Square distribution of items across lists, so that each subject could judge in every subexperiment under both conditions (the stronger vs. weaker triggers) 6 times, and all item pairs were only presented in one condition. In order to reduce the effect of the sequence, a total of four versions were designed. Two lists were created directly from the randomization of the Latin Square, while the other two had the same items but in a reverse order.

Additionally, 18 filler items were mixed randomly with the 36 critical items, in order to check for inattentive participants, random responses, or potential problems with the experimental task. They should also help prevent manipulations of the questionnaire and situations where participants directly recognize the proposal.

Although the literal interpretation was described in several studies as the logical understanding of the scalar term, the logical reasoning abilities of the subjects was hardly measured in the previous studies. To test whether there is a correlation between the preferred interpretation and the subjects' logical reasoning capabilities, the questionnaire included a second task. In this part, the subject's logical reasoning ability or intuition was examined through 12 items containing syllogisms and material implications. The number of correct answers in the second task was considered as an indicator of the participants' logical reasoning skills.

To ensure that the answers in the first task were not influenced by the second part, in the task description the subjects were explicitly asked not to change their answers in the first part once they start with the second part.

4.3 Materials

When creating the material, special emphasis was placed on two points: the translation of the scales into German, and the context from which an interpretation with the stronger scalar expression had to be deduced without being explicitly mentioned.

The quantificational scale *<alle, einige>* is translated from the English scale *<all, some>*, which was also used to test NNS in Lin (2016) and Slabakova (2010). In this subexperiment, the hyponymies were used in the context while hypernymy occurred in the target sentence, so that a conclusion was to be generated naturally with *all*. An example is given in (8).

- (8) An example item pair in subexperiment *<alle, einige>* ('<all, some>')

Context:

Von seiner Reise hat Herr Lange seinen Schwestern
 From his journey has Mr. Lange his sisters
 Seidentaschentücher und seinen Brüdern Krawatten mitgebracht.
 silk handkerchiefs and his brothers ties brought.

'From his journey, Mr. Lang has brought his sisters silk handkerchiefs and his brothers ties.'

Target sentence:

Alle/Einige Geschwister von Herrn Lange haben Mitbringsel
All/Some siblings of Mr. Lange have souvenir
bekommen.
received.

‘All/Some Mr. Lange’s siblings have received souvenir.’

The item creation in subexperiment on numerals was similar to that in the subexperiment with the quantificational scale *<alle, einige>* (‘*<all, some>*’). Whenever two smaller numerical terms were used with hyponymies in the context, their hypernymies would appear in the target sentence, inviting participants to add the two numerical terms up in interpreting the target sentence. The weak trigger in the target sentence was one of the two addends from the context, and the stronger trigger was the sum of both addends. One items pair is showed in (9).

(9) An example item pair in subexperiment numerals

Context:

In der Kaffeepause hat Herr Wagner zwei Stück Apfelkuchen und zwei
In the coffee break has Mr. Wagner two piece apple cake and two
Stück Schokokuchen gegessen.
piece chocolate cake eaten.

‘During the coffee break, Mr. Wagner has eaten two pieces of apple cake and two pieces of chocolate cake.’

Target sentence:

In der Kaffeepause hat Herr Wagner vier/zwei Stück Kuchen gegessen.
In the coffee break has Mr. Wagner four/two piece cake eaten.

‘During the coffee break, Mr. Wagner has eaten four/two pieces of cake.’

The scale with modal verb *<must, can>* occurred in Noveck (2001) in the structure *there must /can be*. This structure can hardly be coded word by word into German. After discussion with some German native speakers, I decided on the translation *<muss, es kann sein>* in order to avoid ambiguity in the trigger words. The items in the subexperiment *<must, can>* were based directly on the design of Noveck (2001). One example is given in (10).

(10) A example item pair in subexperiment *<muss, es kann sein>* (‘*<must, it can be>*’)

Context:

Andrea hatte heute Mathe und Physik, und Stella nur Mathe.
Andrea had today math and physics, and Stella only math.
Sophies Stundenplan ist wie der von Andrea oder von Stella.
Sophie’s timetable is like that of Andrea or of Stella.

‘Andrea had math and physics today, and Stella only math. Sophie’s timetable is like that of Andrea or Stella.’

Target sentence:

Sophie muss heute Mathe gehabt haben/Es kann sein, dass Sophie
Sophie must today math had have/It can be, that Sophie
heute Mathe gehabt hat.
today math had has.

‘It must/can be that Sophie had have math today.’

Items in the second task contained three sentences each. The first two were given as conditions, and the last as a conclusion. 6 of the 12 items were deductively true, the other six were false. (11) shows a true item and a false item used in the task.

(11) Example items in the second task:

T-item:

Kein Pokemon kann Schokoladen essen. Alle Pikachu sind Pokemons.
No Pokemon can chocolate eat. All Pikachu are Pokemons.

'No Pokemon can eat chocolate. All Pikachu are Pokemons.'

Kein Pikachu kann Schokoladen essen.
No Pikachu can chocolate eat.

'No Pikachu can eat chocolate'

F-item:

Wenn es regnet und Peter ohne Regenschirm draußen spazieren geht,
When it rain and Peter without umbrella outside for a walk go,
Wird er erkältet. Es hat nicht geregnet.
become he cold. It has not rained.

'When it rains and Peter goes outside for a walk without an umbrella, he has a cold. It did not rain.'

Peter ist nicht erkältet.
Peter is not cold-having.

'Peter did not catch a cold.'

4.4 Procedure

A paper-and-pencil questionnaire in German was collected from the two groups of participants in the presence of the experimenter. In the first task, the participants were asked to assess the appropriateness of the target sentences on a scale from 1 to 7. On this scale, '1' meant 'totally unacceptable' and '7' meant 'perfectly acceptable'. Four variations of the questionnaire were used, ensuring that neighboring participants had different versions so that their answers were not influenced by their neighbors'. In the second part, they had to judge whether the last sentences in the item can be deductively concluded from the previous conditions. They were asked to choose between 'T' for true and 'F' for false. To force the participants to choose and to measure their logical skills, a third alternate was not made available.

At the beginning of the introduction, the participants were asked about their personal data such as age, native language, studying subject, et cetera. Additionally, the NNS were asked to indicate how long they had studied German. After the introduction, a judged sample pair was given to the participants as an example. If the participants were still uncertain about the task, they could ask the experimenter directly. In addition, the participants were also advised to rate

the sentences intuitively and to avoid long deliberations. The NNS were informed that they could ask questions about unknown words or unclear syntax at any time if needed.

4.5 Hypothesis

The null hypothesis in this experiment is that there is no difference between NS and NNS, which means that both groups would deem the underinformative sentences similarly unacceptable, and there not being an interaction between trigger and group. According to Noveck & Sperber (2007), the null hypothesis is comparatively more compatible with the neo-Gricean theories.

On the other hand, according to the post-Gricean prediction and the *Processing Limitation Hypothesis*, the NNS should be more likely to find the underinformative sentences appropriate than the NS do. This is because more working resource is required for comprehension in a foreign language than in one's mother tongue, and thus, less SIs are produced by the NNS. Beside the difference between NS and NNS by the weaker trigger, an interaction of *trigger* (weaker and stronger) and *group* (DE and CN) is also expected.

The null and alternative hypotheses are graphically demonstrated in *Figure 3*.

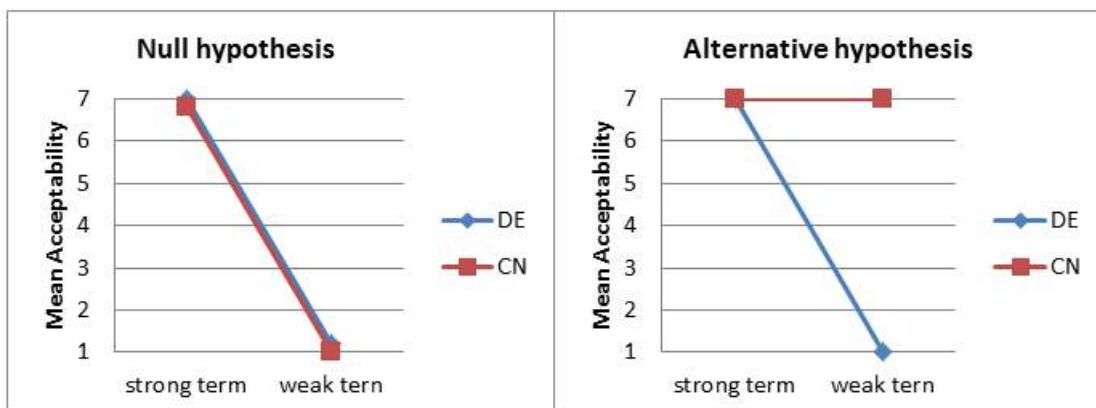


Figure 3 Graphical representation of the hypothesis: the null hypothesis is more consistent with the GCI Theory while the alternative hypothesis is more compatible with Relevance Theory.

4.6 Results

In this part, the results are demonstrated descriptively and inferentially with the statistical analyses calculated using R (R Core Team, 2015). All filler items are excluded. First, the results are analyzed within each subexperiment, followed by the contrasts between the three subexperiments to determine if and to what extend the three scales behave similarly or differently. The comparisons verify not only Horn's classification of the scales empirically, but also whether Chinese NNS of German also perceive the SIs of numerals differently than the other scales, as the Greek children did in the experiments by Papafragou and Musolino (2003). Afterwards, the correlations between the acceptance of underinformative term and logical reasoning skills are analyzed separately in both subject groups. The correlation between the judgments and the duration of foreign language learning of the NNS is also analyzed.

4.6.1 Results and analyses of the subexperiments:

In this part, the descriptive results as well as the statistical comparisons within the subexperiments are listed. Using ANOVA, the effects of the conditions and their interactions are first examined. In addition, the differences within each group between the two triggers are analyzed, followed by comparison between two groups under the same condition.

The mean value and the standard deviation (SD) of the judgments in subexperiments *<alle, einige>* ('<all, some>') are showed in Table 2. The fact that CN group has a larger SD than DE group for both triggers shows that the NNS were more heterogeneous in their judgments, especially with regard to the *some*-sentences.

Group	Trigger	Mean (SD)
DE	alle 'all'	6.34 (1.25)
	einige 'some'	3.23 (1.93)
CN	alle 'all'	5.67 (1.93)
	einige 'some'	4.96 (2.02)

Table 2 Mean and SD in subexperiment *<alle, einige>* ('<all, some>')

The results of ANOVA are listed in Table 3. Because the participants had only one native language, no *p*-value by subject can be calculated for the condition *group* and comparisons involving this condition.

	by item	by subject
Effect of condition <i>trigger</i>	p<.01	p<.001
Effect of condition <i>group</i>	p<.01	--
Interaction <i>trigger*group</i>	p<.001	--
DE group: comparison of triggers	p<.001	p<.001
CN group: Comparison of trigger	p<.001	p<.001
Trigger <i>alle</i> 'all': Comparison of groups	p<.01	--
Trigger <i>einige</i> 'some': Comparison of groups	p<.001	--

Table 3 ANOVA results of subexperiment *<alle, einige>* ('<all, some>')

In this subexperiment, statistically significant differences are found in all comparisons. According to the comparison between triggers, the utterances with *einige* ('some') are rated significantly lower than those with *alle* ('all') by both NS and NNS. Meanwhile, the difference between the responses of the DE and CN group to the two triggers is significant as well. Interestingly, the data from the CN group shows a smaller difference between *some* and *all* in the mean rating value than the one from DE group, which indicates that regarding underinformative expressions, the NNS are not as sensitive as the NS.

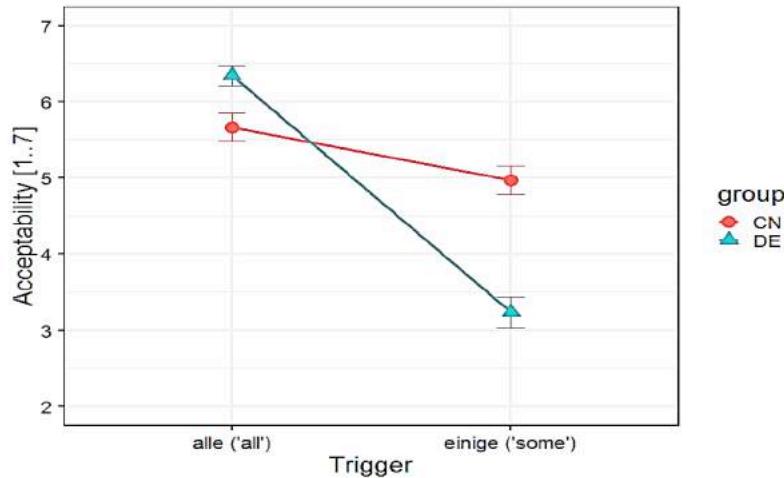


Figure 4 The plot of rating in the subexperiment $\langle\text{alle}, \text{einige}\rangle$ ('<all, some>') with standard error bars

The significant interaction of *trigger* and *group* confirms that the deviations in CN group of two triggers differ from that in DE group, and the NNS produced less SI by *einige* ('some') than NS, as showed in Figure 4. This observation is more compatible with the alternative prediction in Figure 3 and therefore the *Processing Limitation Hypothesis*.

Table 4 shows the descriptive results of the subexperiment $\langle\text{muss}, \text{es kann sein}\rangle$ ('<must, it can be>'). Unlike by the scale <all, some>, the Chinese group had a lower dispersion than the native speakers on the weak trigger *es kann sein* ('it can be'). They also estimated the weaker term more felicitously than the stronger term *muss* ('must'). The ANOVA analyses of the data are listed in Table 5.

Group	Trigger	Mean (SD)
DE	<i>muss</i> 'must'	5.38 (1.90)
	<i>es kann sein</i> 'it can be'	4.84 (1.89)
CN	<i>muss</i> 'must'	5.41 (2.16)
	<i>es kann sein</i> 'in can be'	6.12 (1.68)

Table 4 Mean and SD in subexperiment $\langle\text{muss}, \text{es kann sein}\rangle$ ('<must, it can be>')

	by item	by subject
Effect of condition <i>trigger</i>	p>.05	p>.1
Effect of condition <i>group</i>	p<.01	--
Interaction <i>trigger</i> * <i>group</i>	p<.05	--
DE group: comparison of triggers	p<.05	p>.1
CN group: comparison of triggers	p>.05	p>.05
Trigger <i>muss</i> 'must': comparison of groups	p>.1	--
Trigger <i>es kann sein</i> 'it can be': comparison of groups	p<0.001	--

Table 5 ANOVA results of subexperiment $\langle\text{muss}, \text{es kann sein}\rangle$ ('<must, it can be>')

Interestingly, the condition *trigger* has no significant effect, neither in the NS group nor in the NNS group. However, the difference between the two groups regarding the weaker term *es kann sein* ('it can be') is exceedingly significant. This observation indicates that although the

weaker utterances are neither obviously rejected by German native speakers, nor significantly more accepted by Chinese NNS of German, it is without any doubt that NS and NNS perceive them differently. Above all, the significant interaction of *trigger* and *group* and the higher acceptance of the weaker term by the CN group are comparatively more consistent with the post-Gricean prediction. For a graphical presentation of the subexperiment, see Figure 5.

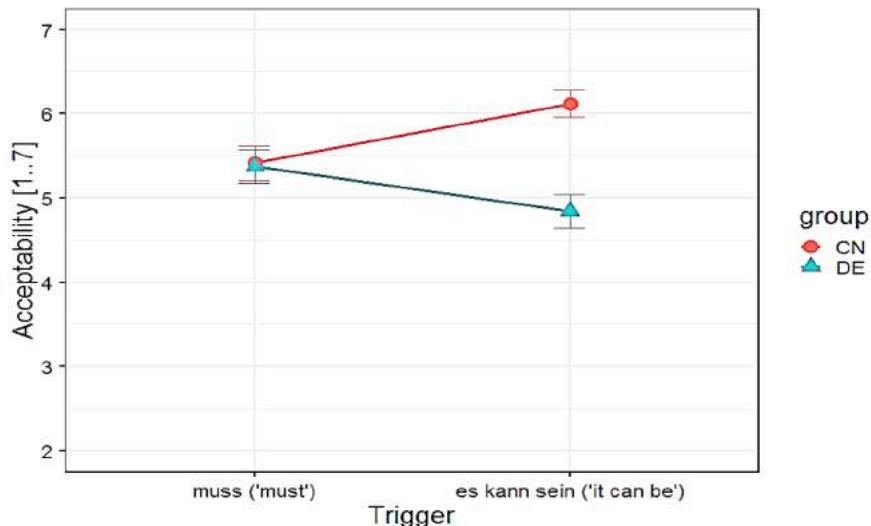


Figure 5 The plot of rating in the subexperiment <muss, es kann sein> ('<must, it can be>') with standard error bars

A descriptive summary of the subexperiment numerals is given in Table 6. In this experiment, the weaker trigger is one of the two addends, and the stronger, more informative trigger is the sum of the two addends.

Group	Trigger	Mean (SD)
DE	sum	6.39 (1.32)
	addend	2.21 (1.92)
CN	sum	6.37 (1.25)
	addend	2.35 (2.1)

Table 6 Mean and SD in subexperiment numerals

In the case of numerals, the NS and the NNS behaved similarly. Both groups considered the utterances with the weaker trigger to be clearly inappropriate ($p < .001$ by subject and item in both groups). While the difference in triggers is highly significant, there is neither a significant effect of *group*, nor a significant interaction of conditions. Figure 6 demonstrates the judgments in the subexperiment and it seems almost the same as the null hypothesis.

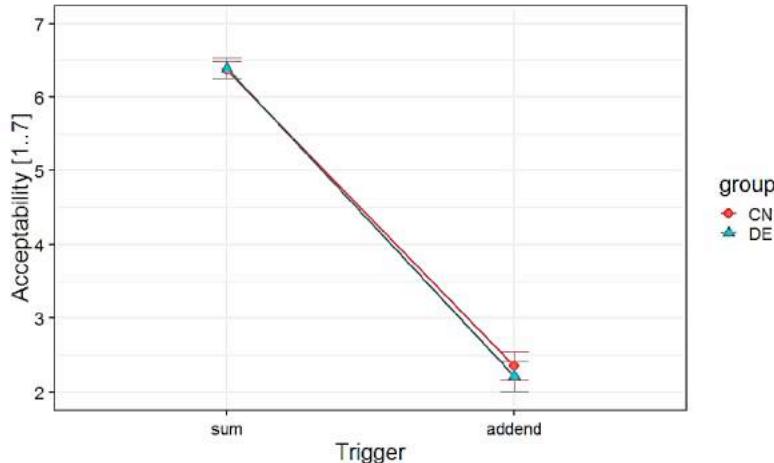


Figure 6 The plot of rating in the subexperiment numerals with standard error bars

4.6.2 Comparison of the three weaker terms

After comparing judgments within the subexperiments, the interaction of *trigger type* (*subexperiment*) and *group* is analyzed with the Linear Mixed Model (LMM)¹, using rating data under the condition *trigger-weaker*. The aim is to examine whether the deviations of the NNS from the Germans are equal to each scale type. More specifically, the question is how different are the differences in acceptance between NS and NNS on processing the triggers *einige* ('some'), *es kann sein* ('it can be') and *addend*. The judgments are illustrated in Figure 7.

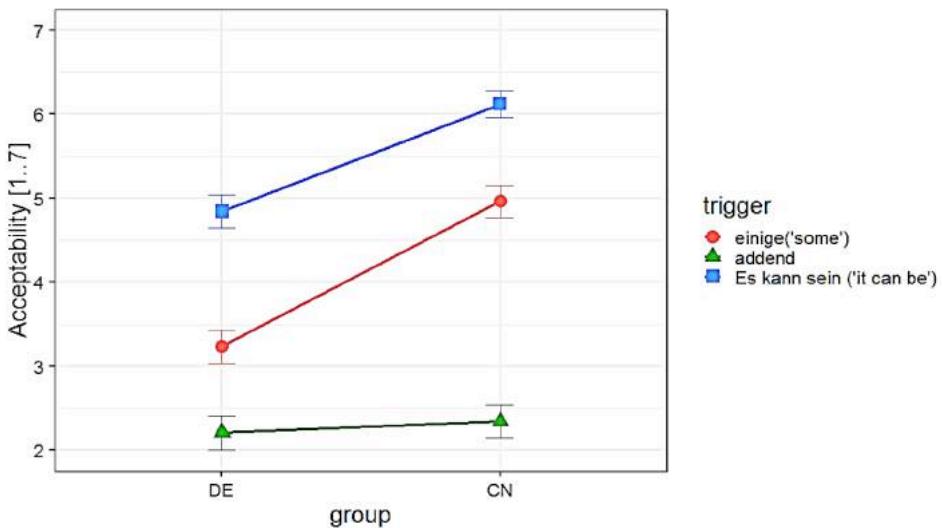


Figure 7 The graphic representation of CN group's and DE group's rating on all three weaker triggers with standard error bars

In Table 7, results of LMM analyses are listed. According to Kliegl et al. (2010), the difference is considered significant ($p < 0.05$) if and only if the absolute t -value is greater than

¹Linear mixed model fit by REML ['lmerMod']: judgment ~ (group * Experiment) + (1 | subject) + (1 | item)

2. For this comparison, only the interaction of *subexperiment* and *group* is relevant, and it is only significant in the comparison between *addend* and *einige* ('some'), which had a *t*-value of -4.552.

Fixed effects:

	Estimate	Std. Error	<i>t</i> value
(Intercept)	3.2359	0.2897	11.170
groupCN	1.7269	0.3518	4.909
Experimentaddend	-1.0222	0.2614	-3.910
Experimentes kann sein	1.6111	0.2614	6.163
groupCN:Experimentaddend	-1.5918	0.3497	-4.552
groupCN:Experimentes kann sein	-0.4532	0.3497	-1.296

Table 7 LMM result of comparison of the weaker term between groups

The comparison shows that the bias of the NNS from NS is similar for the triggers *einige* ('some') and *es kann sein* ('it can be'); only the numerals display a different behavior. This outcome is consistent with the observation among children in Papafragou and Musolino's (2003) experiment.

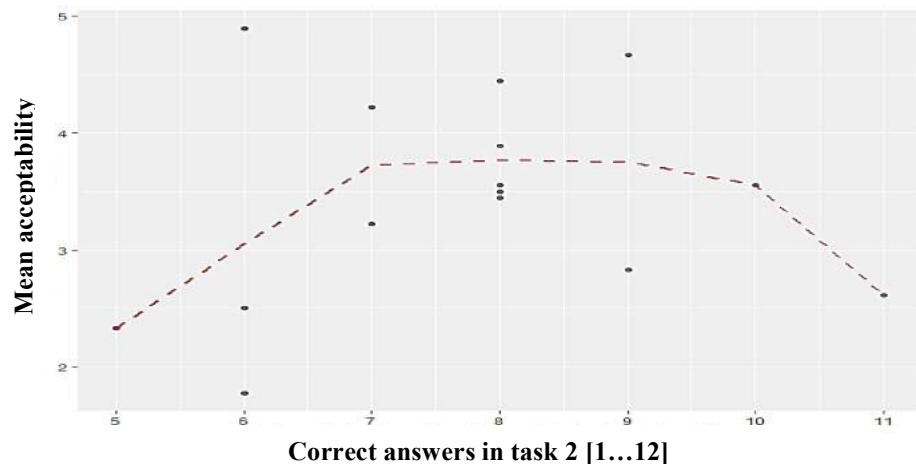
4.6.3 Correlation analyses

The most important value in this part is the correlation coefficient *r*, which measures the strength and direction of a linear relationship between the two variables. The value for *r* can range from -1 to 1. According to Rumsey (2010), an absolute value of *r* greater than 0.3 indicates a weaker correlation, while a $|r| > 0.7$ means the correlation is strong..

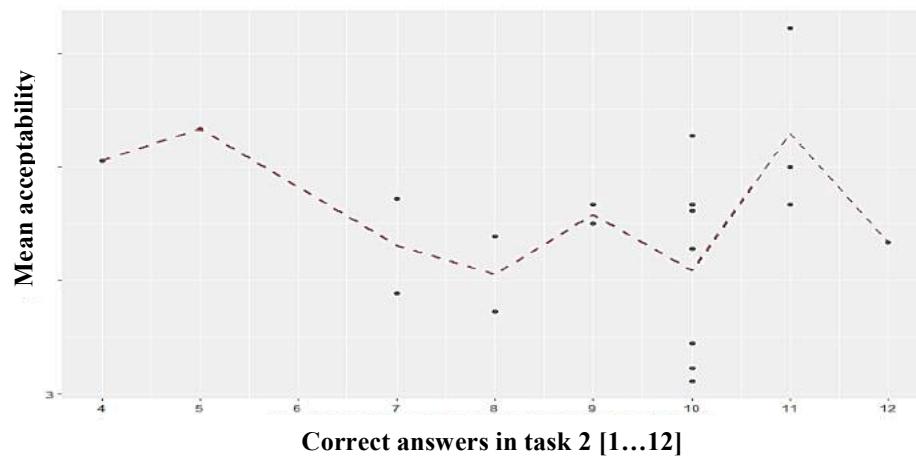
First, the relationship between evaluation in the first task and the logic capabilities of the participants is analyzed. In order to reduce the influence of other elements, the analysis takes place within the groups. According to the design of the experiment, the logical capability of the participants is to be measured by how correct they are in the second task. In the second task, CN group responded to an average of 9.05 items correctly with a SD of 2.09, while DE group judged 7.73 items correctly with a SD of 1.62. The difference between the two groups in the number of items judged correctly is significant ($p < 0.05$).

The scatter plot of the two groups (see Figure 8) shows on the *y*-axis the mean acceptance of the *underinformative*, weaker items in the first task, and on the *x*-axis the number of correct answers in the second task. The dotted line connects the mean rating values of the subjects, who answered as many tasks correctly. In the plots, there is hardly any linear relationship. Correspondingly, the *r*-value in the DE group is about 0.16, in the CN group around -0.10, no linear relationship can be interpretable.

Additionally, it is to be examined whether the Chinese students' ratings are influenced by their length of German learning. Unexpectedly, the scatter plot (see Figure 9) shows no linear relationship between the two either, and the *r* value is 0.20. Since the average score of the Germans for the weaker triggers is 3.43, the ratings of the Chinese NNS are especially similar to the native speakers' when they had studied German for about four years. Those who had studied German for less or more than four years perceived the scales differently than the native speakers and were more prone to finding the underinformative sentences appropriate, a more detailed discussion can be found in next section.



(a) Plot of DE group's mean rating of underinformative items, and their correct answers in task 2 with range [5...11]



(b) Plot of CN group's mean rating of underinformative items, and their correct answers in task 2 with range [4...12]

Figure 8 Subjects' mean acceptability of underinformative items with respect to their logical capability. The dotted line connects the mean values.

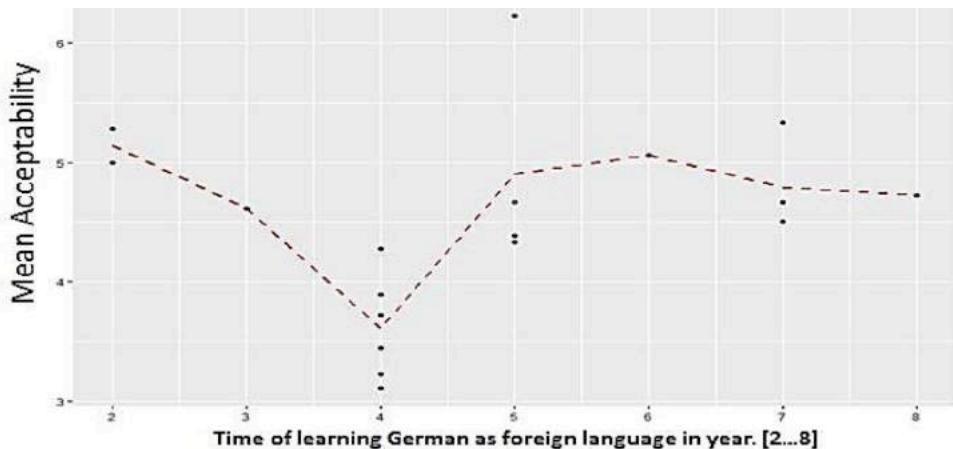


Figure 9 Mean acceptability of Chinese students who had same learning time of German. The dotted line connects the mean values.

5. Discussion

In this section, I will focus on four issues: first, the participants' judgments regarding the two classical SI-triggers in the experiment; second, the ways in which the numerals behaved differently compared to the other two triggers; third, the absence of any correlation between judgments and elements such as logical reasoning capability and durations of learning; and fourth, the role of NNS in pragmatic research.

Firstly, in case of the two classical scales, *<alle, einige>* ('<all, some>') and *<muss, es kann sein>* ('<must, it can be>'), it was observed that the NNS rejected the weak terms significantly less than the NS, which indicates that speakers produce less SIs in a non-native language. This observation can be explained with the *Processing Limitation Hypothesis*: similar to children in their native language, adults have limited cognitive resources for language processing when speaking a non-native language. The calculation of SI can severely burden or overburden their working resources. Therefore, the non-native speakers refrained from pragmatic interpretations to a certain extent, and preferred to perceive the utterances literally when the context or the expectation in the conversation did not require SI.

However, it must be admitted that elements such as the NNS's native language, culture, and educational background can also influence their judgments. For instance, it may be that the Chinese accepted the *underinformative* items more than the Germans, because they also produced fewer SIs when encountering the same utterances in Chinese than the Germans did in German. Additionally, after the questionnaire collection, some Chinese participants commented that they deemed *es kann sein* ('it can be') to be more correct than *muss* ('must') because they had learned the logical relations between the two in their math class in school. Besides that, the neo-Gricean prediction that a GCI like SI is more 'default' than its literal meaning can be rescued by arguing that default inferences are only done by default in one's native language, and once it comes to comprehension in a foreign language, speakers might adopt a different, more semantically focused strategy.

Considering that more evidence is required to address these problems, there are two potential ways to collect the evidence. One is to have the Chinese native speakers complete a Chinese version of the same questionnaires. The other is to include a second group of NNS of German in the experiment whose native language is not Chinese.

Secondly, the conditions *group* and *trigger* only did not interact when it came to numerals. In the experiment, numerals were evaluated almost exactly the same by the NS and the NNS. The absence of such an interaction is consistent with the observation in Papafragou and Musolino's (2003) study, and demonstrates that numerals behave differently than other SI triggers. This observation can be explained in several ways.

An implausible explanation is to support the null hypothesis and the neo-Gricean theories by postulating that only the numerals are typical SI triggers and the other two are not.

A more plausible explanation is that the scales have variant degrees of accessibility. Upon this explanation, numerals build a special class of SI triggers that require extremely low processing effort and the inference *exactly X* is extremely easy to enrich. Correspondingly, in Horn's classification, it makes sense then to no longer assign numerals to the class *quantificational scale*, but to separately create a class for them.

The most plausible option is that the numbers actually do not trigger SI and that the meaning *exactly X* is lexically retained. Support for this explanation is provided by the study on quantity processing in Chinese by Wei et al. (2014) with neuronal comparisons between quantifiers and numerals. Magnetic resonance imaging has been used and demonstrates that the processing of numerals and quantifiers occupy different regions of the brain. Additionally,

based on experiments with adults and 2- to 3-year-old children, Huang et al. (2013) also showed that numbers have exact semantics.

Thirdly, in this experiment, no reliable correlation between judgments and learning time was observed. This is different from what was expected, which was that if SI computation is related to NNS' limited processing resources, then the more skillful a non-native in German is, the less processing resources one should need in calculating the SI. But the curve in Figure 9 demonstrates that the Chinese students with about four years of German language learning had pragmatic intuition that was most akin to the native speakers'. The same level of pragmatic intuition is not found in the Chinese students who had studied German for two to three years, and oddly, not among those who had studied German for more than four years either. This observation contradicts the *U-shaped learning curve*, which is often observed in language acquisition, especially in grammar learning (Carlucci & Case 2013).

(12) A U-shaped curve in a cognitive-developmental trajectory refers to a three-step process: good performance followed by bad performance followed by good performance once again. In learning contexts, U-shaped learning is a behavior in which the learner first learns the correct behavior, then abandons the correct behavior and finally returns to the correct behavior once again.

(Carlucci & Case 2013:56)

The mean value of the six subjects' rating, who had learned German for four years, is to some extent statistically representative and therefore should not be considered a coincidence. It is unclear why the fourth year is a turning point in SI computation among Chinese NNS of German, and why the learning curve of SI in a foreign language the opposite of that of grammar. However, unlike the group of the 4th year learners, it has to be admitted that there were not enough 5th to 8th year learners in the study to make a statistically reliable representation of these groups. An experiment with more students in each year may render different results.

Still, it can be stated that one's pragmatic capabilities in one's native language, such as SI computation, are not automatically transferable when one communicates in a foreign language. Even if such pragmatic capabilities are acquired by the foreign language learner, they are not guaranteed to be maintained afterwards. Considering that one's ability to compute SI is not acquired through the process of learning the rules of logic or learning a language, it is necessary to consider whether the computation and understanding of implicatures should be additionally taught in foreign language class, and whether it should be taught as a part of grammar.

Lastly, the experiment proves that NNS serves as an important counter group to NS in SI research. Unlike native young children, adult learners of a non-native language have sufficient pragmatic capabilities in their native language, but limited processing resources in a non-native language. They offer important insights into some of the questions that were left unanswered from studies comparing adult and children native speakers. Additionally, thanks to language courses and tests, these adult learners' level of vocabulary and grammar knowledge can be conveniently measured. Consequently, in such linguistic comparisons, adult NNS can be clearly classified according to their level of non-native language skills. They can also express their ideas and feedback precisely, as well as accepting and understanding different experiment instructions. All these can facilitate better experiment design and execution.

Assuming, as the experiment shows, that not all of one's pragmatic capabilities in one's native language can be transferred when one is using a non-native language, or automatically acquired through learning vocabulary and grammar, the linguistic intuitions of NNS serve important functions at the interface of semantics and pragmatics, and provide new research questions. However, in making these comparisons, the effects of the NNS's native language and potential intercultural differences must be checked and controlled for.

6. Conclusion

To address the inconsistencies in the results of existing experimental studies on SI, and the weaknesses in previous experiments with NNS, a new experiment with improvements and changes in the experiment design was performed.

The most important observation in the experiment was the differences in SI computing between native and non-native speakers. For the two classical SI trigger sets, the Chinese learners of German were significantly more inclined to find the *underinformative* utterances appropriate than the German native speakers did. These observations strongly support the Processing Limitation Hypothesis and are better explained by Relevance Theory. Additionally, numerals are proven to behave appreciatively differently from the other classical triggers, which highly support that number words are not SI triggers but are semantically – as opposed to pragmatically – exact. The experiment also confirmed the importance of the NNS's role in pragmatic research.

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Abbreviations

ANOVA	Analysis of variance
CEFR	Common European Framework of Reference for Languages
CN	Chinese
DE	German
GCI	Generalized conversational implicature
LMM	Linear Mixed Model
NS	Native speakers
NNS	Non-native speakers
PCI	Particularized conversational implicature
SD	Standard deviation

SI Scalar implicature

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Nonatomic distributive readings – an experimental perspective

Kata Wohlmuth

This paper presents two experiments that tested the availability of nonatomic distributivity in sentences with a plural subject and a singular indefinite object. In the literature, it is often assumed that while these sentences have an atomic distributive reading, they lack the nonatomic distributive interpretation. The results, however, indicate that the nonatomic distributive reading of those sentences is not only generally available, but virtually to the same extent as atomic distributivity. These findings support accounts like the one in Schwarzschild (1996) where the nonatomic distributive reading of such sentences is predicted, the distinction between atomic and nonatomic distributivity is eliminated and both readings are accounted for by the same means.

1. Introduction

Sentences like (1), with a definite plural subject and a singular indefinite object, are generally assumed to be ambiguous.¹

- (1) The students baked a cake.

One of the possible readings of (1) is the collective reading, where the verbal predicate holds of the plurality denoted by the subject as a whole, paraphrased in (2). The other reading is called the atomic distributive reading – or often just distributive reading – where the verbal predicate holds of every individual student in the denotation of the subject, paraphrased as in (3).

¹See Link (1983), Roberts (1987), Link (1991), Landman (2000), Winter (2001), Champollion (2016a), among many others.

The focus of this paper is whether (1) is only two-way ambiguous or it has yet another reading, the so-called nonatomic distributive reading. The nonatomic distributive reading is the one where the verbal predicate is distributed, not down to atomic individuals, as in (3), but to some plural subparts of the plurality denoted by the subject.

- (4) *Each salient group of students baked a cake.* nonatomic distributive reading

The question whether (4) is a possible reading of (1) arises because, on the one hand, there are accounts that actually predict (1) to have a nonatomic distributive reading (see Gillon (1987) and Schwarzschild (1996)). On the other hand, it has been claimed that this reading of (1) is not attested (see Link (1998) and Winter (2001)), restricting the possible readings of sentences like (1) to collectivity and atomic distributivity. However, empirical data on the availability of the nonatomic distributive reading of sentences like (1) has not been collected, which puts all the analyses of distributivity on somewhat uncertain footing.

The debate about nonatomic distributivity raises fundamental questions about distributivity in general. The atomic-only view entails that distributivity is a phenomenon that can be accounted for in purely semantic terms, whereas the nonatomic view advocates that distributivity is at least partially pragmatic in nature. It also raises the question to what extent the denotation of the plural noun phrase determines the possible readings of a sentence: the atomic view indicates that the possible readings are restricted by some ontological property associated with count nouns, i.e. that they have atomic individuals in their denotation. The nonatomic view, on the other hand, suggests that the inherent properties of the denotation of nouns play a less important role than contextual factors, posing fewer restrictions of the possible reading on sentences like (1).

This paper reports two experiments. The first one tested whether speakers access the nonatomic reading of sentences like (1), i.e. if nonatomic distributive is a possible reading of sentences like (1). The second experiment tested whether speakers differentiate between the atomic and the nonatomic reading, i.e. if they access any of the two readings more easily. The results of both of these experiments support the nonatomic view of distributivity, and suggest that the granularity of the distribution (i.e. atomic vs. nonatomic) is not as an important factor as previously assumed.

The structure of the paper is as follows. Section 2 gives a review of the different takes on nonatomic distributivity in the past three decades; Section 3 and 4 describe the design and the methods of the first and the second experiment respectively; Section 5 discusses the results of the two experiments and finally, Section 6 presents the conclusions.

2. Variations on a theme – Takes on nonatomic distributivity

2.J. Gillon (1987)

One of the earliest accounts that argues for nonatomic distributivity is the one in Gillon (1987). Gillon shows that (5) is true in the actual world, if *the men* refers to Richard Rodgers, Oscar Hammerstein II, and Lorenz Hart, who never wrote musicals either together, or by themselves. What they did do is that Rodgers and Hammerstein on the one hand, and Rodgers and Hart on the other, collaborated on writing musicals.

- (5) The men wrote musicals.

Gillon uses this example to show that distributive readings can involve not only a partition over the plurality the verb phrase is distributed over, but also a more flexible cover. A partition P_A over a set A is a set of non-empty, and necessarily disjoint subsets of $\mathcal{P}(A)$, the power set of A , whose union is A itself. A cover C_A of A , on the other hand, is like a partition, except sets in a cover do not have to be disjoint.

(6) *Partition*

$$P_A \subseteq \mathcal{P}(A) \wedge \bigcup P_A = A \wedge \forall x, y \in P_A (x \cap y = \emptyset)$$

(7) *Cover*

$$C_A \subseteq \mathcal{P}(A) \wedge \bigcup C_A = A$$

Based on (5), Gillon argues that the truth conditions of sentences with a plural subject are very weak, and he gives the following truth schema for them.

- (8) [s NP_{PL} + VP] is true iff there is a cover over the plurality denoted by the subject – in the situation with respect to which the sentence is evaluated – that the VP is true of each element in it. (based on Gillon 1987:212)

According to (8), the so-called *cover reading* – or nonatomic distributive reading in our terms – is the weakest possible reading that all sentences with a plural subject can receive. This claim has gotten much attention and has been debated ever since.

2.2. *Contra Gillon (1987)*

Gillon attempted to give a general truth schema of any sentence where the main predication is over a plurality. His critics questioned both his basic assumptions and his data.

First, Gillon assumed that the source of ambiguity of sentences like (5) is in the noun phrase, that is, the different readings of sentences like (5) are due to different interpretations the plural NP might have. This assumption was seriously challenged already by Dowty (1987), who pointed out that in sentences with conjoined verb phrases collective and distributive readings can coexist, as in (9), where the first VP *are a happy couple* is understood collectively of John and Mary, while the second VP *are well-adjusted individuals* is understood distributively.

- (9) John and Mary are a happy couple and are well-adjusted individuals, too.

Examples like (9) are hard to account for under the NP-ambiguity analysis; thus, it is generally assumed that the collective-distributive ambiguity is located in the verb phrase.²

Second, it has also been questioned whether the data used by Gillon is sufficient to motivate a general truth schema like the one in (8). This is based on the following observation: unlike (5), (10) and (11) do not have a cover interpretation even though there exists a cover over the plurality denoted by the subject such that the VP is true of each element in that cover. Thus, the general truth schema in (8) cannot be correct, and it has been argued that the flexible truth conditions of (5) should be attributed to some lexical property of the VP.

²Note, however, that Gillon (1990) defends the NP ambiguity assumption and gives possible ways to account for sentences like (9). Also, Winter (2001:Chapter 6.3) points out that the VP-ambiguity assumption is also problematic, although it has never been seriously challenged in the past three decades.

- (10) [Context: There are three TAs at the linguistics department, Bill, Mary and Jane, and each of them were payed \$7000 last year.]
 #The TAs were paid \$14 000 last year. (Lasersohn 1989)
- (11) [Context: The actual world]
 #Rodgers, Hammerstein and Hart wrote a musical. (Link 1998)

In order to account for the cover reading of (5), Lasersohn (1989) proposes a meaning postulate which ensures that *write* has a cumulative reference, hence if any two individuals are in the denotation of the verb, the group formed by these individuals will also be in the denotation of the verb:

$$(12) \quad [\![\text{write}]\!](w,y) \wedge [\![\text{write}]\!](x,z) \rightarrow [\![\text{write}]\!](w \oplus x, y \oplus z)$$

No such meaning postulate is defined for *was paid \$n last year*, so the so-called cover reading is not available for (10).

Based on (11), Link (1998) also assumes that the nonatomic distributive or cover reading of (5) – which Link calls *mixed reading* – is due to a lexical property of VPs with bare plural objects. He calls this property homogeneity, and although he does not give a formal definition of this property, Link assumes VPs with this property do not carry an entailment that any individual denoted by the subject is in a relation with any complete object denoted by the bare plural. In the case of (5), a mere involvement in musical writing satisfies the VP *write musicals*.³

The claims against Gillon (1987) indirectly supported the silent operator account of distributivity developed by Roberts (1987) and Link (1991). According to this approach, sentences like (1), but not (5), are structurally ambiguous: on their collective reading, the VP is applied directly to the group of individuals denoted by the plural subject. On their distributive reading there is a silent verbal operator taking scope over the VP which modifies its meaning so that it will apply to every atomic part of the group denoted by the subject. This operator, called the *D*-operator, is defined in (13), and is assumed to apply to derive the distributive reading of sentences where there are no other (lexical) cues to determine the meaning of the sentence.

$$(13) \quad [\![D]\!] = \lambda P \lambda x \forall y [y \leq x \wedge At(y) \rightarrow P(y)]$$

The answer the *D*-operator approach to distributivity gives to the initial question, whether sentences like (1) have a nonatomic distributive reading, is negative. The predictions of the *D*-operator are clear-cut, but they might also be too restrictive, as is argued by Schwarzschild (1996), and we might need a way to account for nonatomic distributivity after all.

2.3. Schwarzschild (1996) – context sensitivity

The *D*-operator based analysis was challenged by Schwarzschild (1996) who revived Gillon's view and argued that the possible meanings of sentences with a plural subject are many, and the collective and the atomic distributive readings are only the two extremes on the scale of possible readings. But Schwarzschild's account departs radically from Gillon's in at least two ways. First,

³Note that Link (1998) does not commit for or against the so-called mixed readings, he merely points out that Gillon's example in (5) is insufficient to motivate these readings. Still, Link shows how his analysis can be extended to account for mixed readings if need be.

Schwarzschild assumes VP ambiguity just like Gillon's critics. Second, Schwarzschild assumes that it is pragmatic factors that play the crucial role of determining the meaning of sentences with a plural noun phrase.

Schwarzschild shows that the *D*-operator is insufficient to account for all the possible readings of sentences with plurals and argues for an operator that is more sensitive to the context, based on examples like (14).

- (14) [Context: Two merchants are attempting to price some vegetables. The vegetables are sitting in front of the merchant, piled up in several baskets. To determine their price, the vegetables need to be weighed. Unfortunately, our merchants do not have an appropriate scale. Their grey retail scale is very fine and is meant to weigh only a few vegetables at a time. Their black wholesale scale is coarse, meant to weigh small truckloads. Realizing this, one of the merchants truthfully says:]

The vegetables are too heavy for the grey scale and too light for the black scale.
(Schwarzschild 1996:67)

The argument is the following: even though both VPs are true either of the vegetables as a group (*are too heavy for the grey scale*) or of individual vegetables (*are too light for the black scale*), what the merchant intended to talk about in (14) were the baskets of vegetables, which is clear given the context of the merchant's utterance. Since the baskets of vegetables are not atomic parts of the denotation of *vegetables*, (14) is a clear case of nonatomic distributive reading. To account for this reading, the *D*-operator defined in (13) is insufficient, because it can only generate atomic distributive readings, so Schwarzschild redefines the silent verbal distributivity operator under the name of *Part* in the following way.

- (15) $\llbracket \text{Part} \rrbracket = \lambda P \lambda x \forall y[y \leq x \wedge y \in C(x) \rightarrow P(y)]$, where $C(x)$ is a contextually salient cover over the plurality x

The crucial thing about *Part* is that there is a free variable in it, C , which gets its value from the context, that is, according to *Part* the granularity of the distribution will always be determined by pragmatic factors. This account ensures that the sentence uttered by the merchant in (14) is on its nonatomic distributive reading, but on other occasions it might be on its collective or atomic distributive reading, depending on the context.

This is radically different from Gillon's account: there, a sentence with a plural subject was predicted to be true on its nonatomic distributive reading as long as there is a cover over the plurality whose members the VP holds true of. Schwarzschild's account claims the mere existence of this cover is not sufficient, it also has to be salient in the context in order for the sentence to have a nonatomic distributive interpretation.

2.4. The limits of context sensitivity

Even though Schwarzschild's *Part*-operator offers a one-size-fits-all solution to account for distributivity – and collectivity as well – merely appealing to pragmatic factors to determine the granularity of the distribution does not necessarily entail an increase in predictive power. That is, *Part* might be too flexible, generating unattested readings. Moreover sentences like (1), restated below, still pose a potential problem.

- (16) The students baked a cake. (= (1))

As far as Schwarzschild's account goes, (16) can have a nonatomic distributive interpretation as long as the grouping of the individuals denoted by the subject is salient in the context, analogously to what was demonstrated in (14). However, whether the nonatomic reading of (16) should be predicted by any theory of distributivity is still an open question.

Winter (2001) is among those who claim that (16) is two-way ambiguous between the collective and atomic distributive readings, while its nonatomic distributive reading 'is not attested'. Winter criticizes Schwarzschild's account for not specifying the pragmatic factors that might play a role in the availability of the nonatomic distributive reading: as the context sensitive component of the distributivity operator is the biggest innovation in Schwarzschild (1996), leaving the relevant pragmatic factors unspecified is problematic when one wants to test the predictions of the analysis.

Champollion (2016a) argues for nonatomic distributivity à la Schwarzschild (1996), but departs from Schwarzschild's analysis in a crucial way: he proposes a dual system with both silent distributivity operators employed, where the *D*-operator takes care of atomic distributivity and the *Part*-operator of nonatomic distributivity. Champollion motivates this system by showing that unlike atomic distributivity, nonatomic distributivity is necessarily anaphorically connected to the context.⁴ According to this approach, sentences like (16) have an atomic distributive interpretation, but they do not have a nonatomic distributive reading, and that is due to the lack of a context providing a salient cover over the plurality denoted by the subject.

Even though Champollion suggests that the salient cover provided by the context sentences like (16) can be understood as nonatomic distributive, he gives no example of such a case. Instead, he uses (17) as a clear and uncontroversial example of nonatomic distributivity, which he contrasts with sentences like (16).

- (17) The shoes cost \$50. (Lasersohn 1998)

According to Champollion, (17) has a nonatomic distributive reading because a cover with a pair of shoes in each of its cell is salient in the context, i.e. based on world knowledge. Although *prima facie* (17) is a clear-cut case to motivate an operator like *Part*, it counts as an irregular case within Champollion's system, where atomic distributivity is assumed to be the unmarked case and nonatomic reading is the one that requires more context. However, to understand (17) on its atomic distributive reading – as *each* shoe costs \$50 – definitely more context is needed than for the nonatomic distributive reading, since based on what we know about the world, the price is normally applied to pairs of shoes, and not to single shoes.

Mendia (2015) provides an account which analyses sentences like (17) as atomic distributive, appealing to the notion of *typicality*. He argues that the denotation of certain noun phrases contains not only regular or pure atoms, but also impure atoms formed by groups of atoms of typical cardinality. Since both pure and impure atoms are technically atoms, Mendia argues that sentences like (17) involve atomic distributivity as long as the predication is over individual shoes, or pairs of shoes (which are groups of typical cardinality in the denotation of *shoes*).

⁴It is important to point out that Champollion himself acknowledges that the *Part*-operator is powerful enough to account for both atomic and nonatomic readings and offers an alternative explanation for the preference for atomic distributive readings in count domains. His ultimate motivation for employing *D* and *Part* is to draw a parallelism between the silent verbal operators and overt lexical items of similar mechanism, see Champollion (2016b), but that discussion is outside of the scope of this paper.

To conclude, the context-sensitivity introduced by Schwarzschild (1996) does not solve the issues concerning nonatomic distributivity. Sentences like (16) are still problematic because we still do not know whether their nonatomic reading should be predicted, and if it should, under what circumstances it arises. Furthermore, even if we assume that sentences like (16) lack the nonatomic distributive reading, we have no explanation for why this is, so we do not know exactly how to revise the previous analyses to fit the data.

2.5. Exploring the relevant factors of the availability of nonatomic distributivity

One of the accounts that attempts to identify at least some of the restrictions applying to the availability of nonatomic distributivity is Wohlmuth (2017), which diverges from previous accounts in crucial ways. A fundamental, yet implicit assumption of those is that the verbal distributivity operator takes care of distributivity and specifies the granularity of the distribution by itself. However, in Wohlmuth (2017) it is assumed that there is a division of labor between the VP and the plural subject when it comes to determining the reading of sentences like (16). On the one hand, a silent operator on the VP establishes the fact of distribution, and on the other hand, the plural subject gives the granularity of the distribution.

The motivation behind this division of labor lies in the assumption that the availability of the nonatomic distributive reading is connected to the vagueness associated with definite plurals; see Malamud (2006).⁵ However, in discussion of the non-availability of the nonatomic distributive reading, the form of the subject in the sentences is more diverse, and the definite plural subject is often replaced by conjoined proper names (see Link (1998)). Based on these observations the hypothesis is that the form of the subject also plays a role in the availability of nonatomic distributivity in the following way.

- | | | |
|------|---|---|
| (18) | a. The students baked a cake. | \checkmark atomic, \checkmark nonatomic |
| | b. Eleanor, Finn, Gillian and Harry baked a cake. | \checkmark atomic, \times nonatomic |

If the judgments in (18) are correct, it would suggest that the context sensitivity enters in the nominal domain and not the verbal domain, as most previous accounts suggested. Moreover, it would suggest that common nouns have more flexible denotations than conjoined proper names insofar as their denotation can be modified by the context. To accommodate this assumption, an operator called *Pack* was defined which gives the contextually salient groupings of the individuals in the denotation of the subject, and it can only apply in the structure of common nouns, but not of conjoined proper names. This operator is defined in (19), where $\llbracket *P \rrbracket$ is $\llbracket P \rrbracket$ closed under the sum formation, see Link (1983).

$$(19) \quad \llbracket \text{Pack}(*P) \rrbracket = \{x : x \text{ is a contextually salient part of the maximal element in } \llbracket *P \rrbracket \text{ and} \\ \oplus x \text{ equals the maximal element in } \llbracket *P \rrbracket\}$$

When *Pack* is applied in the structure of the NP, it modifies its denotation in a way that it picks out the contextually salient groupings of the denotation of the plural NP. I assume that these contextually salient elements are *minimal elements* which are much like relative atoms à la Chierchia (2010), i.e. individuals that are atomic with respect to a predicate, see (20).

⁵This assumption appears indirectly in Schwarzschild (1996), where all sentences presented in support of nonatomic distributivity contain definite plural subjects.

$$(20) \quad Min(x) = \forall x[P(x) \wedge \neg \exists y[y < x \wedge P(y)]]$$

Because *Pack* can only apply in the structure of NPs, the denotation of conjoined proper names is assumed to be unaffected by the context; hence minimal elements will always correspond to atoms in the denotation of the conjoined proper name.

The nominal domain can only provide the salient groupings of the individuals in the denotation of the NP, so I assume that when the predication is distributive, a silent operator takes scope over the verb, just as in the other verbal operator based approaches of distributivity discussed earlier. The main difference is that the D_{min} -operator defined in (21) does not set the granularity of the distribution to a specific value. Instead, it modifies the meaning of the verbal predicate in a way that it will apply to every minimal element part of the plurality denoted by the subject.

$$(21) \quad \llbracket D_{min} \rrbracket = \lambda P \lambda x \forall y [y \leq x \wedge Min(y) \rightarrow P(y)]$$

The system developed in Wohlmuth (2017) predicts the distinction established in (18). If the subject is a common noun – a definite plural common noun in the case of (18-a) – the granularity of the distribution is determined by the context, but if the subject is conjoined proper names, the granularity of the distribution can only be atomic. By assuming that the distributive reading is achieved by a silent verbal operator which is not specified for the granularity of the distribution, this analysis predicts both (18-a) and (18-b) to be two-ways ambiguous between the collective and the distributive readings, and only (16) is undetermined with respect to the granularity of the distribution.

In Wohlmuth (2017) one of the main goals was to develop an analysis that recognizes the restrictions on the availability of (nonatomic) distributivity. However, just like every previous analyses of nonatomic distributivity, it fails to ground the inquiry empirically. The distinction made in (18) regarding the availability of a nonatomic distributive reading and the form of the subject is merely based on clues extracted from previous accounts and some speakers' intuition. In these terms, the view put forward in Wohlmuth (2017) lacks the empirical basis, just like the previous accounts concerning nonatomic distributivity, so I decided to collect data on the availability of nonatomic distributivity by designing and conducting a truth-judgment experiment.

3. Experiment 1

The goal of the experiment was two-fold. Firstly, it meant to test whether sentences with a plural subject and a singular indefinite object have a nonatomic distributive reading and secondly, it also meant to test the predictions of Wohlmuth (2017), namely if the form of the subject has an effect of the availability on the nonatomic distributive reading. When creating the design, I worked with the following assumptions (i)–(ii) and hypotheses (iii)–(iv):

- (i) Nonatomic distributivity is available if the grouping of the individuals is salient in the context, see Schwarzschild (1996).
- (ii) The meaning of sentences with a plural subject and a bare plural object is vague, so they are true in a nonatomic distributive context, see Gillon (1987), Lasersohn (1989), Schwarzschild (1996), Link (1998), Winter (2001), Champollion (2016a), among many others.
- (iii) If the reading of sentences with a plural subject and a singular indefinite object merely depends on the context, they are true in a nonatomic distributive context, see Schwarzschild

(1996).

- (iv) If the nonatomic distributive reading of sentences with a plural subject and a singular indefinite object also depends on the form of the subject, as it is predicted in Wohlmuth (2017), sentences with a conjoined proper name subject will not be true, unlike the ones with a plural common noun subject.

With these assumptions and hypotheses in mind, I designed a survey experiment where sentences with different subjects and objects had to be judged for truthfulness given a nonatomic distributive context presented as a short text.⁶

3.1. Materials

The test material consisted of sixteen short texts and four possible test sentences for each text (64 sentences in total). Each text described a nonatomic distributive scenario, where pairs of individuals carried out a certain type of event. In each text, the relevant characters were four – all of them were introduced by name and also as part of the extension of the same common noun (no other individual in the context was introduced as part of the common noun's extension).

The four possible sentences were constructed according to the two two-level variables that were tested in the experiment (2 x 2 within subjects design). The first variable was the form of the subject with two possible levels (*definite plural common noun* and *conjoined proper name*), and the second variable was the verb phrase, also with two possible versions (*bare plural object* and *indefinite singular object*). To avoid possible confounds due to the possibility of generic vs. episodic interpretations, each sentence contained an episodic spatio-temporal modifier. A summary of the set of tested conditions for each text can be found in Table 1, and an example in (22).

	Context	Subject	Object
CONDITION 1		definite plural	bare plural
CONDITION 2		conjoined proper names	bare plural
CONDITION 3	nonatomic distributive	definite plural	indefinite singular
CONDITION 4		conjoined proper names	indefinite singular

Table 1: Summary of tested conditions in Experiment 1

- (22) Mrs. Brady had only four students in home economics class this year, Eleanor, Finn, Gillian and Harry. Today's lesson was cake baking. After a short introduction, Mrs. Brady split the class into two groups for the actual baking. Eleanor and Finn worked together on the one hand, and Gillian and Harry on the other. At the end the cakes turned out to be so good that they were served after the football game in the afternoon.
- a. *Today in home economics class, the students baked cakes.*
 - b. *Today in home economics class, Eleanor, Finn, Gillian and Harry baked cakes.*
 - c. *Today in home economics class, the students baked a cake.*
 - d. *Today in home economics class, Eleanor, Finn, Gillian and Harry baked a cake.*

⁶The general design of the experiment was evaluated and approved by Parc de Salut MAR - Clinical Research Ethical Committee of Universitat Pompeu Fabra.

The predicates in the sentences were such that their lexical meaning is not specified with respect to collectivity or distributivity, and therefore they can possibly contribute to nonatomic distributive readings. To avoid bias, the exact predicates that were tested were not mentioned in the corresponding texts.

To avoid the repetition of the short texts, the test material was distributed over four different lists. A list consisted of the sixteen texts with one of the four possible sentences, with the four conditions appearing four times. The sixteen critical items were presented among eight filler items – whose structure was identical to that of the critical items – their order was pseudorandomized.

3.2. *Procedure and predictions*

The experiment was implemented as an online survey using Qualtrics. Participants were presented with one item per page: one text and the corresponding sentence set off from the text, and the test question. The task was to rate the sentence in the given context in terms of truthfulness on a scale from 1 to 6, where 1 corresponded to *absolutely untruthful*, and 6 as *absolutely truthful*. ‘Truthfulness’ was introduced at the beginning of the experiment as an extended notion of truth in order to accommodate possible uncertainty regarding the meaning of sentences with plurals. Each participant saw only one of the four lists – the lists were presented randomly to a participant and were distributed evenly among all the participants. The predictions for Experiment 1 were the following.

- (I) I assumed that the meaning of the sentences with a bare plural object is vague, so I expected Condition 1 and 2 sentences to be rated 6, i.e. ‘absolutely truthful’ in the nonatomic distributive contexts regardless the form of the subject.
- (II) As for Condition 3 sentences, I assumed if they have a nonatomic distributive interpretation, they would be rated as high as Condition 1 and 2 sentences.
- (III) Finally, I predicted that if conjoined proper names do not support a groups of group interpretation, Condition 4 sentences would get a lower rating compared to Condition 3 sentences.

3.3. *Participants and exclusion process*

64 participants were recruited on Prolific Academic. The distribution of the survey was restricted to native speakers of English. Participants had to report within the survey that their first language is English.

6 participants were rejected without payment due to unreliable responses. One of the rejected participants completed the survey in an extremely short time (the estimated completion time was 20 minutes, and this participant finished in 5 minutes 44 seconds) and failed all of the false fillers. The other five participants were rejected based on their poor performance on fillers: they failed to differentiate between the false and true filers. Retrospectively, the method of rejection based on the performance on the fillers seemed too strict – given the small number of fillers – and it was revised for Experiment 2.

58 participants were paid £2 for participation. I excluded 5 participants based on their per-

formance on the fillers, so for the analysis, I used data from 53 participants.

Originally, I wanted to exclude participants who got three or more fillers wrong. Among the eight fillers, four were false, and four were true, and I expected the false ones to get low ratings – between 1–3 – and the true ones get high ratings – between 4–6 – so I considered a wrong answer to the false fillers to be on between 4–6, and for the true fillers, between 1–3.

However, after obtaining the data of the fillers it turned out one of the false fillers, in (23), received unexpectedly high ratings: 33 of the 64 participants gave a rating from the wrong range, between 4 and 6, so it was decided to exclude the responses of this particular item for the exclusion process which was modified in Experiment 2.

- (23) My friends, Abby and Bobby, wanted to not slack off and be bored the whole summer and rather do something new and productive with their time. Somewhat randomly they decided to jointly make a short film using stop-motion technique. Despite their complete lack of experience they managed to finish it by the end of August, and it turned out to be pretty good.

This summer, my friends each produced a stop-motion video.

Having been left with only seven filler items, I revised the criterion of exclusion, and I excluded every participant who got two or more fillers wrong ignoring their response to item in (23).

3.4. Results

The results can be found in Figure 1. They show that while speakers accept sentences with a bare plural object as truthful in nonatomic distributive contexts, they tend to downgrade sentences with a singular indefinite object. An ordinal regression analysis revealed that only the type of the VP has a significant effect on participants' responses ($p<.001$), and there was no significant effect due to the type of the subject ($p=.304$).

3.5. Discussion

The results of Experiment 1 demonstrate that sentences with a plural subject and a bare plural object are accepted as true in a nonatomic distributive context, which confirms prediction (I). However, the acceptance of sentences with singular indefinite objects is not so straightforward: given that the majority of the responses were in the higher range (between 4 and 6) and the most frequent response to sentences with a singular indefinite object was 6, speakers definitely do not reject these sentences in a nonatomic distributive context. Nonetheless, their judgments show more variance than with the sentences with a bare plural object, thereby prediction (II) is not fully confirmed. Finally, the results of the experiment suggest that the form of the subject does not play a role in speakers' judgment, so prediction (III) is not confirmed.

4. Experiment 2

The experiment discussed below was a follow-up on Experiment 1 to see if the VP-effect found there is associated with the granularity of the distribution, i.e. nonatomicity, or rather distribu-

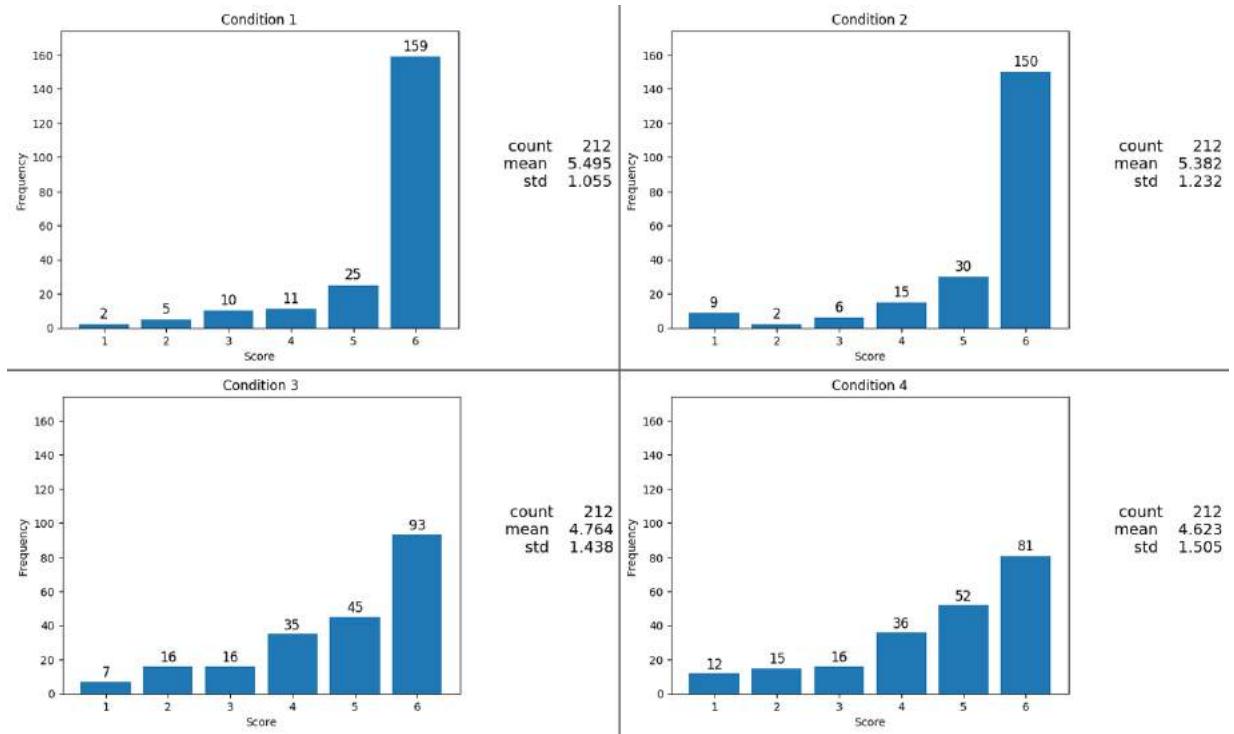


Figure 1: The frequency of the scores for each condition in Experiment 1

tivity itself.⁷ Experimental studies suggest that speakers access the atomic distributive reading of sentences with a plural subject and an indefinite singular object at a lower rate than their collective reading, see Pagliarini et al. (2012) for Italian and Syrett & Musolino (2013) for English. These results are echoed in Experiment 1, where it was found that on their distributive reading sentences with a plural subject and a singular indefinite object are accepted at a lower rate than the ones with bare plural objects. However, the results of Experiment 1 in isolation do not indicate whether the effect found there, and the one found in Pagliarini et al. (2012) and Syrett & Musolino (2013) is the same – i.e. associated with distributivity – or different – i.e. associated with the granularity of the distribution.

In order to determine what the effect found in Experiment 1 is associated with, I designed a follow-up experiment. The design of this experiment was similar to that of Experiment 1, except here I tested sentences with a plural subject and a singular indefinite object both in atomic and nonatomic contexts. I assumed that if the effect found in the previous experiments in the literature is different from the one found in Experiment 1, the context will have an effect on the rating of the sentences. Also, to see if the form of the subject has an effect on speakers' judgment of sentences in atomic versus nonatomic contexts, I tested both definite plural and conjoined proper name subjects.

⁷I would like to thank Jakub Dotlačil for drawing my attention to this question.

4.1. Materials

The test material consisted of 16 pairs of short texts and two corresponding sentences for each context pair – 32 texts and 32 sentences in total. Each text pair consisted of an atomic distributive and a nonatomic distributive version of a scenario. The nonatomic distributive versions were the same ones used in Experiment 1. The atomic distributive versions were similar to their nonatomic distributive counterparts, but instead of describing a situation where pairs of individuals performed a certain event, it described the same event being performed by each individual separately. The further characteristics of the texts were the same as in Experiment 1.

The corresponding pairs of sentences were constructed based on the same two-level subject variables, as in Experiment 1: *definite plural* and *conjoined proper name*. Hence Experiment 2 had a very similar design to Experiment 1 with a 2 x 2 within subjects, but instead of having both variables in the sentence, here one of them was in the short text. The summary of the tested conditions can be found in Table 2, and an example of the pair of short texts in (24-a), with the corresponding test sentences in (25). [The full list of atomic distributive scenarios used in Experiment 2 are in Appendix.]

	Context	Subject	Object
CONDITION 1	atomic distributive	definite plural	
CONDITION 2	atomic distributive	conjoined proper names	
CONDITION 3	nonatomic distributive	definite plural	indefinite singular
CONDITION 4	nonatomic distributive	conjoined proper names	

Table 2: Summary of tested conditions in Experiment 2

- (24) a. [atomic distributive context] Mrs. Brady had only four students in home economics class this year, Eleanor, Finn, Gillian and Harry. Today's lesson was cake baking. After a short introduction, the students started the actual baking, working on different recipes. In the end the cakes turned out to be so good that they were served after the football game in the afternoon.
 b. [nonatomic distributive context] Mrs. Brady had only four students in home economics class this year, Eleanor, Finn, Gillian and Harry. Today's lesson was cake baking. After a short introduction, Mrs. Brady split the class into two groups for the actual baking. Eleanor and Finn worked together on the one hand, and Gillian and Harry on the other. In the end the cakes turned out to be so good that they were served after the football game in the afternoon.
- (25) a. *Today in home economics class, the students baked a cake.*
 b. *Today in home economics class, Eleanor, Finn, Gillian and Harry baked a cake.*

The material was divided into four different lists where only one condition per item was presented, just as in Experiment 1. The scheme of the lists was the same as in the previous experiment.

4.2. Procedure and predictions

The procedure was identical to that of Experiment 1. The predictions for Experiment 2 were the following.

- (IV) The effect detected in Experiment 1 is associated with the granularity of the distribution, speakers would downgrade Condition 3 and 4 items compared to Condition 1 and 2 items.
- (V) If conjoined proper names do not support groups of groups interpretations, Condition 4 items would get lower ratings than Condition 3 items.

4.3. Participants and exclusion process

66 participants were recruited on Prolific Academic. The distribution of the survey was restricted to native speakers of English and participants also had to declare within the survey that their first language is English.

4 participants were rejected without payment due to their short completion time (the estimated completion time was 20 minutes, and their completion time was between 2 minutes 05 seconds and 4 minutes 10 seconds). Their performance on the fillers did not play a role in their rejection.

62 participants were paid £2 for participation. For the analysis, I used only data from the subset of the paid 62 participants who gave good responses on the fillers (52 participants).

Since the problematic filler item in Experiment 1 was modified for Experiment 2, this time no fillers were ignored for the exclusion process. All participants who got three or more fillers wrong were excluded. Just like in Experiment 1, among the eight fillers, four were false, and four were true, and I expected the false ones to get low ratings – between 1–3 – and the true ones get high ratings – between 4–6 – so I considered a wrong answer to the false fillers to be rated between 4–6, and for the true fillers, between 1–3.

4.4. Results

The results of Experiment 2 can be found in Figure 2. The ordinal regression analysis revealed that neither the context ($p=.674$), nor the type of the subject ($p=.223$) is a significant factor affecting speakers' judgments.

4.4.1. Discussion

The results of Experiment 2 show that speakers do not differentiate between atomic and nonatomic distributivity, hence prediction (IV) is not confirmed. This suggests that the VP-effect found in Experiment 1 is associated with distributivity rather than the granularity of distribution. Moreover, the results indicate, just like in Experiment 1, that the form of the subject does not influence the availability of the nonatomic distributive reading, thus prediction (V) is once again not confirmed.

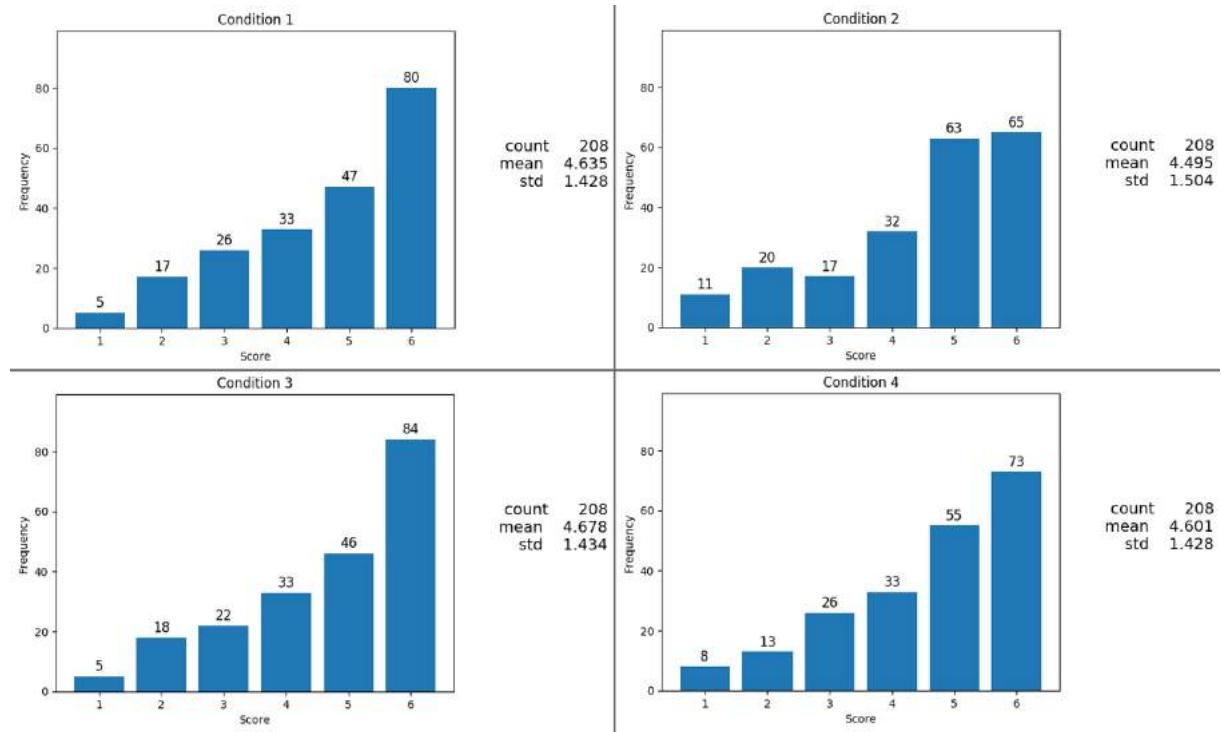


Figure 2: The frequency of the scores for each condition in Experiment 2

5. General discussion

The main goal of the experiments presented in this paper was to obtain data on the availability of nonatomic distributive reading of sentences with a plural subject and a singular indefinite object, like (1), restated below, given they are presented in a supporting context.

- (26) The students baked a cake. (= (1))

The motivation behind conducting the experiments came from the fact that there is no consensus in the literature regarding the question of whether the nonatomic distributive reading is possible for sentences like (26). Some, like Link (1998) and Winter (2001), claim that it is not, which can be used to argue for the assumption that distributivity is primarily, if not exclusively, atomic, rendering it to a semantic phenomenon. Others, like Schwarzschild (1996), Champollion (2016a) or Wohlmuth (2017), predict, if not explicitly claim, that sentences like (26) can have a nonatomic distributive interpretation, given an appropriate context. These accounts suggest that distributivity is, at least in part, a pragmatic phenomenon.

The results of the experiments show that, given the appropriate context, speakers are able to infer a nonatomic distributive interpretation of sentences like (26), thus supporting accounts that predict this reading over the ones that do not. Nonetheless, even the accounts that do not predict nonatomic distributivity are partially supported by the results, as they show that speakers are more ready to accept sentences with a bare plural object over the ones with an indefinite singular object. This validates the criticism against Gillon's original example for nonatomic distributivity in (5), repeated below, and supports the view that the meanings of sentences with a bare plural object and those with a singular indefinite object are obtained by different means.

- (27) The men wrote musicals. (= (5))

Moreover, the results show that speakers are not sensitive to the granularity of the distribution since no detectable difference was found between the rate of acceptance of (26) on its atomic or nonatomic distributive reading. This finding supports the analyses that do not differentiate between the two readings, like Schwarzschild (1996) and Wohlmuth (2017), over those which do, like Champollion (2016a). One might argue that the distinction does not show in the experiments because preferences are levelled out by the detailed contexts that the sentences were presented in. Even if we assumed that, it would be hard to explain the lack of a granularity effect. If the difference between atomic and nonatomic distributivity is a matter of two distinct silent verbal operators in the structure of the sentences, as is assumed by Champollion (2016a), one should hypothesize that there might be variance among speakers who can only access one operator but not the other. The results for Experiment 2 showed no significant difference between the atomic and nonatomic readings, and considering that Experiment 2 repeated the results of Experiment 1 for nonatomic distributive readings, we can conclude that speakers do not differentiate between the two readings, hence there is no reason to assume different ways by which the readings are obtained.

Finally, the results also show that speakers' judgment is not affected by the form of subject and that definite plural subjects and conjoined proper name subject are accepted to the same rate in all the tested environments; hence we can conclude that the predictions of Wohlmuth (2017) are not borne out. There, I assumed that the granularity of the distribution is determined by the plural subject, and that while definite plurals can have contextually salient groupings in their denotation, conjoined proper names cannot. The results suggest that speakers do not make such a distinction and can access nonatomic distributive readings regardless of what form the subject is presented in. This finding further supports Schwarzschild (1996).

However, some features of the experiments' design inherently carry some limitations, which have to be taken into account upon interpreting the results. First, as the judgments were given on a 6-point scale, they are not as straightforwardly indicative of the sentences' truth value as the ones given on the classical 2-point scale. While the two extremes on the 6-point scale correspond to the two values of a categorical judgment, responses given in the middle are not transformable into either of the categorical values. By using such a fine-grained scale, there is no way to know how a 5 differs from a 6: maybe it is the difference between computing the meaning generated by *Part* vs. not, but it could also be something else.

Second, the detailed scenarios described in the texts give a good amount of information which could potentially push speakers' judgments towards higher values on the scale, so that it is not possible to tell whether speakers are just generous or neglectful when giving the higher scores, or whether they do access a genuine nonatomic distributive interpretation of the sentences. In other words, the results do seem to support Schwarzschild's account but, given the scale used in the experiment and the abundance of information provided by the short texts, we cannot infer that speakers access the nonatomic distributive interpretations by an operator like *Part* or by completely other means.

Still, it would be hard to argue that the results are just byproducts of the scale or the detailed description of the scenarios. For each condition with singular indefinite object, the most frequent score given was 6, which means that speakers judged these sentences 'absolutely truthful' more frequent than anything else. This suggests that speakers do accept sentences with a plural subject and a singular indefinite object on their nonatomic distributive reading, given that they had many

other options to chose from on our fine-grained scale. However, the other 5 points of the scale overall were used more frequently in conditions where the object is singular indefinite than in the ones where the object is bare plural, so despite the detailed descriptions participants reported various judgments. This indicates that the detailed descriptions did not have a crucial effect.

Finally, I would like to point out that although Gillon's original example and Schwarzschild's *Part* allow for more flexible covers over the plurality, I only tested partitions in the experiments. This is important, because readings involving a cover over a plurality require even more flexibility than the ones involving a partition. Whether speakers are flexible enough to allow for cover readings is not indicated by the results of the experiments.

6. Conclusions

This paper discussed two experiments focusing on the availability of nonatomic distributivity. The results, unlike some previous analyses, suggest that speakers accept this reading in sentences with a singular indefinite object, however to a quite low rate. Moreover, the experiments revealed that speakers accept these sentences on their nonatomic distributive reading to the same rate as on their atomic distributive reading. These findings suggest that the previously assumed atomic vs. nonatomic distinction, which, on a larger scale, corresponds to the role of semantics vs. pragmatics within the theory of distributivity, might be unfounded, and distributivity is a phenomenon that is ultimately determined by pragmatic factors.

Additional files

The materials and the results of the experiments reported in this paper can be found at <http://hdl.handle.net/10230/35842>.

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Interactions of discourse particles and sentence mood operators:
Japanese *ne* in contrast with German *ja* under the framework of multidimensional semantics

Katsumasa Ito

A German discourse particle *ja* and Japanese discourse particle *ne* seem to have been analyzed in a similar way: They modify a propositional content *p* and indicate CG-status of *p*. However, this analysis cannot explain why *ne* is felicitous in questions, answers, and denial contexts, where *p* cannot be in CG. Adopting the framework of multidimensional semantics (cf. Gutzmann 2015), this paper proposes that *ne* modifies a sentence mood operator. It is shown that the analysis accounts for not only the distribution of *ne*, but also the ambiguity of an interrogative clause with *ne*, which is reported in Hashimoto (1993).

1. Introduction

This paper investigates a Japanese discourse particle (*Shûjoshi* in Japanese) *ne*. As noted by many authors (cf. Kamio 1994; McCready 2009; Oshima 2016 among many others), this particle typically appears in a sentence which conveys hearer-old information.¹ For example, in (1), the speaker confirms with his brother that their mother turns seventy tomorrow, which is the information that the hearer (the speaker's brother) surely knows.

- (1) (First brother to second brother:)
Ashita-de mama-wa nanajuu da **ne**.
tomorrow-on mum-TOP seventy is PRT
'Mum turns seventy tomorrow, y'know.'

In German, there is an expression which seems to have a similar function to *ne*; a discourse particle (*Modalpartikel* in German) *ja*. According Zimmermann (2011), the basic semantic function of *ja* 'consists in establishing or reconfirming a proposition *p* as part of the Common Ground, often based on perceivable contextual evidence' (Zimmermann 2011:2016). (2) is an example of *ja* presented by Zimmermann.

¹Note that not every author uses the term 'hearer-old information'. With this term, I intend to mean 'information in hearer's territory' in terms of Kamio (1994) as well as 'shared information' in terms of Oshima (2016).

(2) (*First brother to second brother:*)

Morgen wird Mama **ja** siebzig.
 tomorrow turns mum PRT seventy
 'Mum turns seventy tomorrow, y'know.'

(Zimmermann 2011:2016)

Other authors, for example Thurmail (1989) and Repp (2013), also point out that the particle *ja* indicates that the proposition is already known by the addressee. At first sight, this description seems to be also the case for *ne*, because *ne* as well as *ja* is infelicitous in a breaking news context like (3).² In (3), the proposition cannot be known by the hearer.

(3) *Breaking News Context*

(*Happy young dad to passer-by:*)

- a. #Musume-ga umareta **ne**.
 daughter-NOM was.born PRT
 'I have a daughter, y'know.'
- b. #Ich habe **ja** eine Tochter.
 I have PRT a daughter
 'I have a daughter, y'know.'

From this fact, one may conclude that *ne* and *ja* mark the common-ground-status (CG-status) of a proposition and that both particles are infelicitous in (3) because the proposition is not in CG. However, a further observation reveals that this analysis is inadequate at least for *ne*. As shown in (4)-(6), *ne* is felicitous in contexts where the proposition is apparently not in CG. This is a sharp contrast with German *ja*, which is infelicitous in (4)-(6).³

(4) *Question*

- a. Peter-wa sugu kuru ka **ne**?
 Peter-TOP soon come Q PRT
 (with a falling intonation:) 'I wonder whether Peter will come soon.'
 (with a raising intonation:) 'Will Peter come soon?'
- b. *Kommt Peter **ja** gleich?
 comes Peter PRT soon

(5) *Answer*

Homes: Where were you at the time of the murder?

- a. Moriarty: [Sono toki]-wa ie-ni imashita **ne**.
 that time-TOP home-at was PRT
 'I was at home at that time. (I'm pretty sure of it.)'
- b. Moriarty: Ich war (#**ja**) zu Hause.
 I was PRT at home
 'I was at home (#, y'know).'

²The context of (3) and the German data (3b) are adopted from Zimmermann (2011:2016).

³If the speaker assumes that hearer should have known the proposition, the acceptability of *ja* in (5) and (6) improves slightly. Conversely, *ne* is perfectly acceptable in (4)-(6) even if the speaker believes that the hearer does not know the proposition.

(6) *Denial Context*

Watson: Well, then, Prof. Moriarty was at home at the time of the murder, wasn't he?

- a. Homes: Iya, chigau **ne**.

no differ PRT

‘No, it's not the case. (I'm pretty sure of it.)’

- b. Homes: Nein, das ist (#ja) nicht wahr.

no that is PRT not true

‘No, it's not the case (#, y'know).’

In a question like (4), the proposition cannot be in CG because normally one does not ask what is already known. When one answers to a question like (5), he or she has a good reason to believe that the hearer does not know the proposition *p* and thus *p* is not in CG. The reason why the proposition is not in CG in denial contexts like (6) is that the speaker (Sherlock Homes) asserts a proposition *p* which contradicts with the proposition *q* the hearer (Dr. Watson) seems to believe — in other words, the speaker denies *q* and asserts *p*, because *p* is not in CG.

As for *ja*, it seems possible to keep the assumption that it marks the CG-status of the proposition insofar the data presented here are concerned.⁴ On the other hand, *ne* cannot be a CG-status marker, and a semantics of *ne* which can predict the (in)felicitousness in (3)-(6) is needed. The semantics should also account for the ambiguity of questions with *ne* — as the translations in (4) show, the interpretation of a question with *ne* differs depending on the intonation. The goal of this paper is to propose such a semantics.

This paper is structured as follows. In the next section, I introduce two previous studies that analyzes *ne* formally and point out its empirical problems. Section 3 introduces the difference between truth-conditional meanings and use-conditional meanings, suggesting that *ne* should be treated as a use-conditional item. Section 4 is dedicated to presenting the framework. This paper adopts multidimensional semantics devised by Gutzmann (2015) and his analysis of sentence mood. The formal semantics of *ne* is proposed in section 5. It is claimed that *ne* takes a sentence mood operator as its argument, showing that the analysis correctly predicts the distribution and intonation of *ne*. The conclusion is presented in section 6.

2. Previous Studies

This section reviews two previous studies that formally analyze *ne*. The first one is Kamio (1994). Under the framework of the ‘theory of territory of information’, Kamio analyzes expressions that involve information status of discourse participants. He divides *ne* into ‘obligatory *ne*’ and ‘optional *ne*’ and claims that their distributions are (7a) and (7b) respectively (cf. Kamio 1994:95–96).

- (7) a. obligatory *ne*: Speaker \leq Hearer = 1

- b. optional *ne*: Speaker \geq Hearer $< n$

where (i) Information takes values between (and including) 1 and 0 on the speaker's/

⁴There are, however, also controversial data for *ja*. See Rinas (2007) and discussions therein. For a fine-grained formal analysis of *ja* in a recent framework, see Rieser (2017).

- the hearer's scales.
- (ii) n is the threshold value for the speaker's/hearer's territory.
 - (iii) $x < y$ means that a given piece of information belongs more to y 's territory of information than to x 's.

Kamio's 'theory of territory information' explains a wide range of phenomena in Japanese, but as for his analysis of *ne*, there are several problems. Firstly, 'obligatory *ne*' in his term is not obligatory. (8a) under the context of (8) is an example of 'obligatory *ne*' presented by Kamio (1994:89–90). According to my intuition, an utterance without *ne* like (8b) is perfectly acceptable in this context, and we thus have to say *ne* is optional in the context of (8). However, in this context, the hearer is better informed than the speaker and thus the condition for 'optional *ne*' in (7b) is not fulfilled. As a result, the theory predicts that *ne* is (always) infelicitous in the context of (8), which is not the case, as shown in (8a).

- (8) *Context: The hearer has taken the speaker to a restaurant. The hearer has been there many times, and knows well that good food is served there, while the speaker is there for the first time. The hearer has said to the speaker 'Oisii desyo? (Isn't this delicious?)' and in response to this utterance, the speaker says:*
- a. Kore, oisii desu ne.
this delicious is PRT
'This is delicious, isn't it?'
 - b. (Hai,) kore oisii desu.
yes this delicious is
'(Yes,) it's delicious.'

In addition, note that neither (7a) nor (7b) can account for the data presented in (3)–(6). When we assume (7a) as the condition for *ne*, it is predicted that $ne(p)$ is felicitous if and only if the hearer is equally or better informed about p than the speaker (i.e. Speaker \leq Hearer) and the hearer is sure about p (i.e. Hearer = 1). This condition is too strict for *ne*. Recall that *ne* is felicitous in answers like (5) and denial contexts like (6). In these contexts, the speaker is apparently better informed about p than the hearer, and thus Speaker \leq Hearer in (7a) is not fulfilled, but *ne* is acceptable. Then, how about (7b)? In this case, it is predicted that $ne(p)$ is felicitous if and only if the speaker is equally or better informed about p than the hearer (i.e. Hearer \leq Speaker) and the hearer is less sure about p than the threshold value (i.e. Hearer $< n$). This condition cannot rule out the breaking news contexts like (3). In breaking news contexts, the speaker is more informed than the hearer and the hearer is ignorant about p . Thus, the condition (7b) Speaker \geq Hearer $< n$ is fulfilled, but *ne* is infelicitous. One might argue that the condition of 'obligatory *ne*' as in (7a) must be fulfilled in breaking news contexts, but there is no reason why 'optional *ne*' as in (7b) cannot be used in breaking news contexts. After all, we would have to say that Kamio's (1994) theory does not provide clear and accurate predictions on the distribution of *ne*.

The analysis of *ne* which I would like to review next is McCready's (2009). McCready proposes (9) as the presupposition of *ne*.

- (9) $B_S IV_H(Q, \phi) < d_s$
where B_S is a belief predicate defined for speaker,
 $IV_H(Q, \phi)$ is an informativity value of ϕ with respect to question under discussion

Q , and
 d_s is a contextually specified relevance threshold.

Informally, (9) means that the speaker believes that the informativity value of φ with respect to question under discussion Q for the hearer is lower than the contextually specified relevance threshold d_s . McCready (2009) also proposes the semantics of a Japanese discourse particle *yo* and explains elegantly why the combination of *yo* and *ne* always realizes as *yo ne*, not *ne yo* as shown in (10).

- (10) Kimi ashita kuru {yo ne / *ne yo}.
 you tomorrow come PRT PRT PRT PRT
 ‘You’ll come tomorrow, won’t you?’

McCready’s analysis of *ne* does not face a problem insofar we consider breaking news contexts and questions. In breaking news contexts like (3), the speaker seems to assume that the informativity value of *ne(p)* is high and it is correctly predicted that *ne* is infelicitous. Questions are not informative and thus *ne(p)* has no informativity value if p is a question. Then (9) is fulfilled and the question with *ne* like (4) is felicitous as predicted.

However, *ne* in answers and denial contexts are problematic for (9). In (5), the speaker answers to a question and thus the informativity value of *ne(p)* should be high. Then it is predicted that *ne* is infelicitous, which is not the case. In denial contexts like (6), the informativity value of *ne(p)* should be high, because the hearer believes $\neg p$ and the speaker corrects it by uttering *ne(p)*. Then (9) predicts that *ne* is infelicitous, which is contrary to fact.

The discussions in this section revealed that Kamio’s (1994) as well as McCready’s (2009) analyses of *ne* have empirical problems. In the rest of this paper, I pursue a semantics of *ne* which can predict the behavior of *ne* observed in (3)–(6).

3. *Ne* as a use-conditional item

In this section, we discuss the semantic level to which *ne* contributes, introducing the difference between truth-conditional meanings and use-conditional meanings. It is suggested that *ne* contributes to use-conditional meanings, not to truth-conditional meanings.

According to Gutzmann (2015), sentences have truth-conditional meanings and use-conditional meanings. For example, the truth condition and use condition of *this damn dog howled the whole night* are illustrated in (11) (cf. Gutzmann 2015:4).

- (11) This **damn** dog howled the whole night.
 truth condition: The dog howled the whole night.
 use condition: The speaker feels negatively about the dog.

If the truth condition is fulfilled, the sentence is true. If the use condition is fulfilled, the sentence is felicitously used. The expressions that contribute to use-conditional meanings are called use-conditional items. In (11), an epithet *damn* is a use-conditional item.

Use-conditional items take the widest scope. This is also the case for *ne*. *Ne* does not come into the scope of the negation nor modality, as shown in (12). This fact suggests that *ne* is a use-conditional item.

- (12) a. Kono keeki oishiku nai ne.
 this cake tasty not PRT
 (ne > not) ‘This cake is not tasty (and you may think so, too).’
 (*not > ne) *‘It is not the case that you may also think this cake is tasty.’
- b. Kyoo Peter kuru kamō ne.
 today Peter come might PRT
 (ne > might) ‘Peter might come today (and you know it, too).’
 (*might > ne) *‘It might be the case that you know that Peter comes today.’

One might argue that the semantic contribution of *ne* is a presupposition. However, a presupposition account does not explain why the sentence with *ne* becomes ungrammatical when an attitude holder intervenes, as shown in (13) and (14). In (13), Peter is an attitude holder because he is the subject of the attitude verb *omotta* ‘thought’. In (14), *iwaku* ‘according to’ expresses that Peter is the reporter, which means Peter is an attitude holder.

- (13) Peter-wa [sono keshiki-ga kirei da (*ne)] -to omotta
 Peter-TOP the scenery-NOM beautiful is PRT COMP thought
 ‘Peter thought that the scenery is beautiful.’
- (14) Peter-iwaku sono keshiki-wa kirei da (*ne).
 Peter-according.to the scenery-TOP beautiful is PRT
 ‘According to Peter, the scenery is beautiful.’

As is well known, an attitude holder blocks the projection of presuppositions. If the meaning of *ne* were a presupposition, it would express Peter’s presupposition in (13) and (14); and there would be no reason why the sentences are ungrammatical.

Then, would the ungrammaticality of (13) and (14) be accounted for if we assume that *ne* is a use-conditional item? At first sight, there seems to be no reason for the ungrammaticality even if we accept a use-conditional account, either. In section 5.3., however, I return to this point and show that my use-conditional analysis of *ne* can account for the data (13) and (14). In the meantime, I set this issue aside and assume *ne* to be a use-conditional item without further justification. In the next section, I introduce the framework of Gutzmann (2015) in order to analyze *ne* formally.

4. The framework: Multidimensional semantics

As an analysis of use-conditional items, Gutzmann (2015) adopts Kaplan’s (1999) idea by assuming that a use condition is represented by **a set of contexts**. This analysis is parallel to the standard view of a truth condition, which assumes that a truth condition is represented by **a set of worlds**. Using Kaplan’s example *that damn Kaplan was promoted*, Gutzmann (2015:20) presents how the truth condition and use condition of this sentence are represented, as in (15).

- (15) a. $\llbracket \text{That damn Kaplan was promoted} \rrbracket^t = \{w: \text{Kaplan was promoted in } w\}$
 b. $\llbracket \text{That damn Kaplan was promoted} \rrbracket^u$
 $= \{c: c_s \text{ has a derogatory attitude toward Kaplan in } c_w\}$
 $\quad \text{where } c_s \text{ is the speaker of } c \text{ and } c_w \text{ is the world of}$
 c
 (Gutzmann 2015:20)

When we adopt the idea that a sentence has not only truth-conditional meanings but also use-conditional meanings, we need (at least) two dimensions for the semantics. Based on Potts' (2005) and McCready's (2010) theory of conventional implicatures, Gutzmann (2015) proposes 'multidimensional semantics'. This framework enables us to calculate the truth-conditional meanings and use-conditional meanings at the same time. Since space restrictions do not permit a description of the entire sketch of multidimensional semantics, I limit the discussion to the use-conditional dimension. In the rest of this section, I introduce Gutzmann's (2015) analysis of sentence moods, which plays a crucial role in my analysis of *ne*.

Gutzmann (2015:166ff) discusses the nature of sentence mood carefully and shows that sentence mood operators are use-conditional items. He develops Truckenbrodt's (2006) theory of sentence moods and analyzes German V2 declarative clauses like (16). In (16b), c_w is the world of c , c_s is the speaker of c , and c_A is the addressee of c .

- (16) a. $\llbracket \text{V2-DECL} \rrbracket^t = \llbracket \text{prop} \rrbracket = \{w: \text{PROP}(w) = 1 \text{ in } w\}$
 b. $\llbracket \text{V2-DECL} \rrbracket^u = \llbracket \text{DEONT}(\text{EPIST}(\text{prop})) \rrbracket$
 $= \{c: \text{there is a } d \in D \text{ such that } d \text{ is suitable for } p \text{ in } c \text{ and}$
 $d(p)(c_w) = 1 \text{ and } p = \{w: \text{there is an } e \in E \text{ such that}$
 $e \text{ is suitable for } p \text{ in } c \text{ and } e(p)(w) = 1\}\}$
 where D is a set of use-conditional deontic speaker-predicates,
 $D = \{\lambda p. c_s \text{ wants } p \text{ to be true}, \lambda p. c_s \text{ wishes } p \text{ to be true},$
 $\lambda p. c_s \text{ orders } p \text{ to be true}, \dots\}$
 E is a set of use-conditional epistemic predicates,
 $E = \{c_s \text{ knows}, c_A \text{ believes} \dots\}$
 (cf. Gutzmann 2015:207-211)

As in (16a), the truth condition of a German V2 declarative clause is represented by the set of worlds in which the proposition is true. On the other hand, the use condition of the clause is $\text{DEONT}(\text{EPIST}(\text{prop}))$ as in (16b). DEONT and EPIST are sentence mood operators. Roughly speaking, DEONT expresses the speaker's deontic attitude and EPIST expresses the epistemic status of the speaker or hearer. The use-conditional epistemic predicate $c_s \text{ knows}$ is for a question and $c_A \text{ believes}$ is for an assertion. In a question, the speaker wants the epistemic state where the speaker knows whether p . In an assertion, the speaker wants the epistemic state where the addressee believes p .

In order to simplify the discussion, this paper treats $\text{DEONT}(\text{EPIST})$ as in (17). In the logic of multidimensional semantics, the powerset of the set of contexts is the domain of type u (cf. Gutzmann 2010:277ff). The type of $\text{DEONT}(\text{EPIST})$ is thus $\langle \text{st}, u \rangle$. In (17), the notation DEONTS is used instead of DEONT , because it can explicitly express that it is the speaker's deontic

attitude. Note that the left disjunct of (17) is for an assertion and the right disjunct of (17) is for a question.

- (17) $\llbracket \text{DEONT}(\text{EPIST}) \rrbracket = \llbracket \text{DEONT}_S(\text{EPIST}) \rrbracket$
 $= \lambda p_{st.} \text{ the speaker wants to share } p \sqcup \text{ the speaker wants to know whether } p$

In addition, I define DEONT_H as a hearer's version of DEONT . This operator expresses the hearer's deontic attitude. The (simplified version of) semantics of $\text{DEONT}_H(\text{EPIST})$ is (18). Note that $\text{DEONT}_H(\text{EPIST})$ is also of type $\langle st, u \rangle$.

- (18) $\llbracket \text{DEONT}_H(\text{EPIST}) \rrbracket$
 $= \lambda p_{st.} \text{ the hearer wants to share } p \sqcup \text{ the hearer wants to know whether } p$

Now we are ready to analyze *ne* formally. In the next section, I propose a formal semantics of Japanese discourse particle *ne*.

5. Analysis: A semantics of *ne*

5.1. Proposal

As a semantics of *ne*, I propose (19).⁵ The particle *ne*, which is of type $\langle\langle st, u \rangle, \langle st, u \rangle\rangle$, takes a sentence mood operator as well as a proposition as its arguments. In other words, *ne* modifies a sentence mood operator.⁶

- (19) $\llbracket \text{ne} \rrbracket^u = \lambda D_{\langle st, u \rangle} \lambda p_{st.} D(p) \wedge \text{DEONT}_H(\text{EPIST})(p)$

The composition of the particle *ne* and the sentence mood operator $\text{DEONT}_S(\text{EPIST})$ proceeds as in (20).

- (20) $\llbracket \text{ne} \rrbracket^u (\llbracket \text{DEONT}_S(\text{EPIST}) \rrbracket)$
 $= \lambda D_{\langle st, u \rangle} \lambda p_{st.} [D(p) \wedge \text{DEONT}_H(\text{EPIST})(p)] (\llbracket \text{DEONT}_S(\text{EPIST}) \rrbracket)$
 $= \lambda p_{st.} [\text{DEONT}_S(\text{EPIST})(p) \wedge \text{DEONT}_H(\text{EPIST})(p)]$
 $= \lambda p_{st.} [\text{the speaker wants to share } p \vee \text{ the speaker wants to know whether } p] \wedge$
 $[\text{the hearer wants to share } p \vee \text{ the hearer wants to know whether } p]$
 $= \lambda p_{st.} [\text{the speaker wants to share } p \wedge \text{ the hearer wants to share } p] \vee$

⁵An anonymous reviewer pointed me out that the semantics in (19) may be problematic in monologue contexts. As in (i), *ne* can be used in a monologue.

(i) [as a monologue] Oya, ame-ga hutteiru ne.
 oh rain-NOM be.falling PRT
 ‘Oh, it’s raining.’

In monologue contexts, there is no apparent hearer and it is not clear whose attitude DEONT_H expresses. The reviewer suggests that (i) may be a *pseudo-monologue* that the speaker in (i) is speaking to him/herself as if (s)he were the hearer. I believe that this idea is on the right track: The condition (21a) seems to be fulfilled in (i), because the speaker wants to confirm the information by him/herself in this example.

⁶I owe the idea that discourse particles may take sentence mood operators as its argument to Gutzmann (2015:258ff, 2017:168). He proposes that a German discourse particle *wohl* takes sentence mood operators as its argument, though the use condition of *wohl* is completely different from that of *ne* I proposed here.

- [the speaker wants to share p \wedge the hearer wants to know whether p] \vee
- [the speaker wants to know whether p \wedge the hearer wants to know whether p] \vee
- [the speaker wants to know whether p \wedge the hearer wants to share p]

This analysis predicts that *ne(p)* is felicitous if one of the following conditions is fulfilled.

- (21) a. The speaker wants to share p and the hearer wants to share p.
 b. The speaker wants to share p and the hearer wants to know whether p.
 c. The speaker wants to know whether p and the hearer wants to know whether p.
 d. The speaker wants to know whether p and the hearer wants to share p.

In what follows, I show that this analysis predicts the distribution of *ne* correctly. Firstly, the breaking news context we saw in (3) in section 1 is discussed. For ease of reference, the Japanese example in (3) is repeated as (22).

- (22) *Breaking News Context*
(Happy young dad to passer-by:)
 #Musume-ga umareta **ne**.
 daughter-NOM was.born PRT
 'I have a daughter, y'know.'

In breaking news contexts, the speaker wants to share *p*. However, the hearer neither wants to share *p* nor wants to know whether *p*, because the news is unexpected. Thus, none of the conditions in (21) is fulfilled and it is correctly predicted that *ne* is incompatible with breaking news contexts.

In (5), we observed that *ne* can be used when one answers. The Japanese data in (5) is repeated as in (23).

- (23) *Answer*
 Homes: Where are you at the time of the murder?
 Moriarty: [Sono toki]-wa ie-ni imashita **ne**.
 that time-TOP home-at was PRT
 'I was at home at that time. (I'm pretty sure of it.)'

When one answers, the speaker wants to share *p*. It is natural to assume this because if the speaker did not want to share *p*, he or she would not answer. On the other hand, the hearer wants to know whether *p*, because he asks whether *p*. Thus, the condition (21b) *the speaker wants to share p and the hearer wants to know whether p* is fulfilled, and it is correctly predicted that *ne* is felicitous in (23).

How about in denial contexts? As we saw in (6), *ne* is felicitous in denial contexts. I repeat (6) as (24) for convenience.

- (24) *Denial Context*
 Watson: Well, then, Prof. Moriarty was at home at the time of the murder, wasn't he?
 Homes: Iya, chigau **ne**.

- no differ PRT
 ‘No, it’s not the case. (I’m pretty sure of it.)’

In denial contexts, the speaker wants to share p , because the hearer assumes $\neg p$ and the speaker corrects it by asserting p . At the same time, the speaker believes that the hearer wants to know whether p — A rational speaker would refrain from conveying the information, if he or she believed that the hearer does not want to know whether p . The condition (21b) *the speaker wants to share p and the hearer wants to know whether p* is thus fulfilled, and it is correctly predicted that *ne* is felicitous in (24).

Lastly, I discuss questions with *ne*. For ease of reference, (4) is presented again as in (25).

(25) *Question*

- Peter-wa sugu kuru ka **ne**?
 Peter-TOP soon come Q PRT
 (with a falling intonation:) ‘I wonder whether Peter will come soon.’
 (with a raising intonation:) ‘Will Peter come soon?’

When one asks, he or she wants to know whether p . Thus, our theory predicts that a question with *ne* is felicitous if either (21c) *the speaker wants to know whether p and the hearer wants to know whether p* or (21d) *the speaker wants to know whether p and the hearer wants to share p* is fulfilled. This may suggest that the conditions (21c) and (21d) correspond to the two interpretations of (25). As the translations show, a question with *ne* is ambiguous between two interpretations depending on the intonation. The next subsection proposes that (21c) is a use condition for a question with *ne* with a falling intonation and that (21d) is a use condition for a question with *ne* with a raising intonation.

5.2. Intonations of *ka ne*

According to Hashimoto (1993:714), *ka ne* with a large fall typically appears in ‘wondering’ (*utagai* in Japanese), while *ka ne* with a raising intonation can be used in a ‘change of style’ (*buntai-henka* in Japanese).⁷ A typical example of ‘wondering’ is (26a) and that of a ‘change of style’ is (26b). The symbols ↓ and □ represent a falling intonation and raising intonation respectively.

- (26) a. kyou-wa dare-ga kuru no ka ne↓
 today-TOP who-NOM come COMP Q PRT
 ‘I wonder who will come today.’
 b. koko-ga itamu no ka ne□
 here-NOM hurt COMP Q PRT
 ‘Does it hurt here?’

⁷Hashimoto (1993) divides a falling intonation into a large fall and a normal fall. The term ‘a falling intonation’ in this paper corresponds to ‘a large fall’ in Hashimoto’s term. Oshima (2016) investigates the intonation of *ne* with the software Praat and shows there are three contours for *ne*: A rise-fall contour, question-rise contour, and insisting-rise contour. The ‘falling intonation’ in this paper corresponds to the rise-fall contour, and the ‘raising intonation’ is same with the question-rise contour. I do not discuss *ka ne* with an insisting-rise contour, because this countour does not disambiguate the interpretation. I leave this issue for future research.

It seems safe to say that (26a) fulfills the condition (21c) *the speaker wants to know whether p and the hearer wants to know whether p* and that (26b) fulfills the condition (21d) *the speaker wants to know whether p and the hearer wants to share p*. In (26a), the speaker does not require the hearer to answer, because the speaker knows that the hearer also wants to know whether *p*. The typical situation for (26b) is a consultation with a doctor. It is natural for a doctor (i.e. speaker) to assume that his or her patient (i.e. hearer) wants to share *p*.

Thus, I propose that the use condition for *ka ne*↓ is (21c) and that for *ka ne*□ is (21d).⁸ This analysis is supported by the data (27) and (28).

- (27) Oshiete kure. Kyoo-wa dare-ga kuru no ka {#ne↓ / ^{ok}ne□}?
 tell give.IMP today-TOP who-NOM come COMP Q PRT PRT
 'Please tell me. #I wonder who will come today.'
 'Please tell me. Who will come today?'

- (28) Suspect: Mokuhiken-o koushishimasu.
 right.to.silence-ACC use.HONORIFIC
 'I use the right to silence.'
 Detective: Iikara ie! Omae-wa yatu-o mita no ka {#ne↓ / #ne□}?
 whatever say.IMP you-TOP guy-ACC saw COMP Q PRT PRT
 'Just tell me! Did you see that guy?'

In (27), *ka ne*↓ is infelicitous because the speaker believes that the hearer knows the answer and thus the condition (21c) *the speaker wants to know whether p and the hearer wants to know whether p* is not fulfilled. On the other hand, *ka ne*□ is felicitous because the speaker expects the hearer to answer and thus the condition (21d) *the speaker wants to know whether p and the hearer wants to share p* is fulfilled. Interestingly, if the hearer knows the answer but is reluctant to tell it to the speaker, neither *ka ne*↓ nor *ka ne*□ is felicitous, as shown in (28). In this context, the hearer neither wants to know *p* nor wants to share *p* and thus (21c) nor (21d) is not fulfilled.

If the detective speaks politely, *ka ne*↗ sounds better, even if the hearer is reluctant to answer, as shown in (29).

- (29) Suspect: Mokuhiken-o koushishimasu.
 right.to.silence-ACC use.HONORIFIC
 'I use the right to silence.'
 Detective: Tanomu, oshiete kure. Yatu-o mita no ka (?ne□)?
 please tell give.IMP guy-ACC saw COMP Q PRT
 'Please tell me. Did you see that guy?'

⁸As Hashimoto (1993:704) points out, *ka ne*□ is typically used by an older man and can be infelicitous when used by children. An anonymous reviewer suggests that *ka ne*□ may be a single discourse particle which conveys a sort of masculinity as a conventional implicature (CI). Though this is an interesting idea, it is questionable whether we should treat such a socio-pragmatic property as a CI. According to Potts (2005:7), CIs are 'used to guide the discourse in a particular direction or to help the hearer to better understand why the at-issue content is important at that stage,' but a sort of masculinity does not seem to play such a role. For this reason, I do not assume that *ka ne*□ is a single discourse particle which conveys a sort of masculinity as a CI.

In this example, the detective tries to make the suspect want to answer the question by behaving himself politely. The detective can thus assume that the suspect wants to share *p*, and the condition (21d) *the speaker wants to know whether p and the hearer wants to share p* is fulfilled.

This subsection showed that the conditions (21c) and (21d) reflect the intonation of *ne* in questions. Moreover, this analysis correctly predicts that *ka ne* is infelicitous when the hearer is reluctant to answer.

5.3. Intervention of attitude holder

In section 3, we saw that a clause with *ne* becomes ungrammatical when an attitude holder intervenes. I repeat the examples for convenience.⁹

- (30) Peter-wa [sono keshiki-ga kirei da (*ne)] -to omotta
Peter-TOP the scenery-NOM beautiful is PRT COMP thought
'Peter thought that the scenery is beautiful.'
- (31) Peter-iwaku sono keshiki-wa kirei da (*ne).
Peter-according.to the scenery-TOP beautiful is PRT
'According to Peter, the scenery is beautiful.'

A typical use-conditional item like *damn* in English can be used even if an attitude holder intervenes. In (32), *damn* takes the widest scope and it expresses the speaker's attitude, as shown in (33).

- (32) Bush says the damn Republicans deserve public support.

(Potts 2005:59)

- (33) Truth condition: Bush says the Republicans deserve public support.
Use condition: The speaker who uttered (32) feels negatively about Republicans.

Then, why is *ne* unacceptable in (30) and (31)? The analysis of *ne* proposed in this paper can give the reason for this. In (30), *ne* is ungrammatical because of a type clash. A complement clause does not have its own speech act and thus there is no sentence mood operator which *ne* can take as its argument. As a result, the composition of *ne* cannot proceed and the sentence becomes ungrammatical. (31) is unacceptable for pragmatic reasons: Due to the presence of *iwaku* 'according to', it cannot be judged whether Peter or the speaker is *c_s* (the speaker of the context) and thus the sentence is unacceptable. This analysis is supported by the fact that the presence of hearsay evidential marker *rashii* rescues the sentence, as shown in (34).

⁹Note that Japanese *-to* is ambiguous between a complementizer and a quotation marker. As shown in (i), *ne* can appear in a direct quotation. If the clause cannot be interpreted as a direct quotation due to the presence of a coindexed pronoun, *ne* becomes unacceptable as shown in (ii).

- (i) Peter-wa [sono keshiki-wa kirei da **ne**] -to itta
Peter-TOP the scenery-TOP beautiful is PRT QUAT said
'Peter said, "The scenery is beautiful."'
- (ii) Peter_i-wa [kare_i-wa tensai da (***ne**)] -to itta
Peter-TOP he-TOP genius is PRT COMP said
'Peter_i said that he_i is a genius.'

- (34) Peter-iwaku sono keshiki-wa kirei rashii ne.
 Peter-according.to the scenery-TOP beautiful HEARSAY PRT
 'According to Peter, the scenery is beautiful (and you may know Peter said that).'

The hearsay evidential marker *rashii* indicates that c_s for *ne* is the speaker who utters (34), because the one who evaluates the proposition as a hearsay is evidently the speaker of the whole sentence. Thus, it can be judged that c_s for *ne* is not Peter but the speaker, and the sentence becomes acceptable.

6. Conclusion

This paper investigated a Japanese discourse particle *ne* and proposed a formal semantics which can predict its distribution. It is shown that *ne* is a use-conditional item in terms of Gutzmann (2015) and that *ne* modifies not a proposition but a sentence mood operator.

The German discourse particle *ja* and the Japanese discourse particle *ne* are both incompatible with breaking news contexts, but *ne* is different from *ja* in that *ne* is compatible with questions, answers and denial contexts. Gutzmann (2015, 2017) analyzes *ja* as a proposition modifier, which takes a proposition as its argument. This paper showed that *ne* is a sentence mood modifier, which takes sentence mood operators as its argument. It is thus natural that the distributions of *ja* and *ne* differ from each other, even though both particles are incompatible with breaking news contexts.

Before closing this paper, it should be noted that the proposed analysis has a potential overgeneration problem. As shown in (35), *ne* is infelicitous in a breaking news context in which the hearer wants to know whether *p*. However, our theory wrongly predicts that *ne* is felicitous because the condition (21b) *the speaker wants to share p and the hearer wants to know whether p* is fulfilled in this context.¹⁰

- (35) *Context: An expecting father is sitting in a waiting room of a hospital, waiting for the news of his wife's childbirth. The doctor comes in and tells him:*
 #Genkina onnanoko desu ne.
 healthy girl is PRT
 'It's a healthy girl.'

There are various possibilities for why (35) is unacceptable. It might be the case that the semantics of *ne* proposed in this paper needs to be modified. Another possibility is that the condition *the hearer wants to know whether p* has a constraint such that this condition must be fulfilled by linguistic evidence. If the father asks the doctor to tell whether *p*, *ne* sounds much better as shown in (36). In this context, the father's question is linguistic evidence, which suggests that the hearer wants to know whether *p*.

- (36) Father: Otokonoko desu ka, onnanoko desu ka?
 boy is Q girl is Q
 'Is it a boy or girl?'
 Doctor: ^{ok/?}Onnanoko desu ne.
 girl is Q
 'It's a girl.'

¹⁰I would like to thank Daniel Gutzmann for suggesting this context.

It may be also possible to assume a blocking effect. In the context of (35), the most natural particle is *yo*. According to McCready (2010), *yo* suggests that the information value of the proposition is high. A strong preference to *yo* may block the use of *ne*. In future work, I intend to pursue these possibilities further to overcome the shortcoming of the theory proposed in this paper.

Another interesting topic would be combinations of *ne* and imperative clauses. As an anonymous reviewer points out, *ne* is incompatible with imperative as in (37a), while compatible with requests as in (37b).

- (37) a. Hayaku tabero (**ne*)!
 quickly eat.IMP PRT
 ‘Eat them quickly!’
 b. Hayaku tabete *ne*!
 quickly please.eat PRT
 ‘Please eat them quickly!’

I believe that the analysis of this paper has the potential to explain this asymmetry. Imperatives like (37a) are used more in urgent situations than requests like (37b). In urgent situations, the speaker wants to share *p*, but it seems not to be the case that the hearer wants to share *p*.¹¹ If the hearer wants to share *p*, the situation should not be urgent because the hearer knows what he/she must do. It seems also not to be the case that the hearer wants to know whether *p* in urgent situations: That the hearer wants to know whether *p* implies that he/she already has *p* and $\neg p$ in his/her mind, but in urgent situations, there should be no time for the hearer to think about *p* and $\neg p$. Thus, the condition (21a) *the speaker wants to share p and the hearer wants to share p* nor (21b) *the speaker wants to share p and the hearer wants to know whether p* is not fulfilled. The condition (21c) *the speaker wants to know whether p and the hearer wants to share p* nor (21d) *the speaker wants to know whether p and the hearer wants to know whether p* is also not fulfilled, because the speaker does not want to know whether *p* when he/she orders. As a result, none of the conditions in (21) is fulfilled in imperatives in urgent situations.

In requests like (37b), on the other hand, the conditions (21a) and (21b) can be fulfilled. When the hearer intends to meet the speaker’s request, the condition *the hearer wants to share p* is fulfilled. When the hearer wants to know what to do, the condition *the hearer wants to know whether p* is fulfilled. Thus, *ne* is compatible with requests.

Although more precise semantics of imperatives and requests are needed, I would say that the discussion here revealed that the proposal of this paper is promising in its potential to explain the data in (37). I would like to leave a more detailed analysis for future research.

It would also be interesting to investigate a taxonomy of discourse particles based on the analysis of this paper, which suggests that some discourse particles are not proposition modifiers but sentence mood modifiers. The division of discourse particles into proposition modifiers and sentence mood modifiers may lead us to find the common features of each group, such as syntactic properties and semantic functions.

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¹¹Following Kaufmann (2012), I assume that an imperative clause denotes a modalized proposition. Here, I also assume that a request denotes a modalized proposition.

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Dislocation Types in Emilian

Giovanni Roversi

Dislocated structures in Emilian show a puzzling gradient patterns, where certain preposition can be deleted, certain others can but result in progressively less acceptable sentences, and certain others cannot. This paper explores 3 possible analyses of this phenomenon, based respectively on phonology, morphology and pragmatics. Not only language-internal phenomena are considered, but also sociolinguistic factors and the language contact situation between Emilian and Standard Italian. Despite not being completely unproblematic, the pragmatic hypothesis is shown to make the best predictions.

1. Introduction

Dislocated structures appear to occur in most documented languages in the world (Lambrecht 2001; Westbury 2016). This article explores the relation between two types of dislocation in Emilian (Gallo-Italic¹) and their counterparts in Standard Italian. Emilian is spoken in the western portion of the Emilia-Romagna region (namely Emilia) in Northern Italy, presented in figure 1. All Emilian data presented comes from the variety spoken in Correggio, and is derived from native speakers' intuition (including, but not exclusively, my own). This work assesses dislocation to the left periphery; however, dislocation to the right periphery exists as well.

An example of dislocation is shown by the Emilian sentence in (1b). In (1a) the direct object DP *la Luisa* 'Luisa' is in its standard position, after the verb. In (1b) the same constituent



Figure 1: A map showing the region of Emilia-Romagna (darkened), Correggio and some major cities.

¹For the phylogenetic classification of Emilian within Romance languages, cf. Pellegrini (1977); Loporcaro (2009); Simons & Fennig (2018).

is found at the left periphery of the sentence. The object is resumed in the main clause by a pronominal clitic (*l*=) bearing its case, person, number and (in this case) gender.

- (1) a. A=ð² vést [la Luisa] aiēr.
 1.SBJ=have.1SG seen the Luisa yesterday
 'I saw Luisa yesterday.'
- b. [La Luisa], a=l=ð vésta aiēr.
 The Luisa 1.SBJ=3SG.OBJ.F=have.1SG seen.F yesterday
 '(As for) Luisa, I saw her yesterday.'

There exists a distinction between two dislocation types, originally found in English by Ross (1967). This is most visible on prepositional arguments — therefore, most examples in this work will be of such nature. According to Cinque (1997), when a prepositional argument is dislocated, Hanging Topic Dislocation (henceforth HTD) is always prepositionless and is used for introducing new topics into the discourse. Clitic Left Dislocation (henceforth CILD), on the contrary, is marked by a preposition and restates familiar topics. The Italian examples in (2), adapted from and constructed on the basis of Cinque (1997), show this difference. In (2b) the presence of the preposition *a* 'to' makes the sentence pragmatically unviable; in (2a), on the contrary, the preposition is required. In Standard Italian, given topics can therefore be expressed by CILD, but not by HTD.

- (2) a. CILD; Given Topic Context — Speaker A: 'My brother and I should start packing. We leave tomorrow for Tbilisi.' — Speaker B:
 [(#A) **tuo fratello**], non gli hanno ancora dato il visto.
 To your brother, not 3SG.M.DAT have.3PL yet given the visa
 '(As for) your brother, they haven't given him the visa yet.'
- b. HTD; Topic Shift Context — [Two brothers have planned a travel. The speaker is talking to one of them] 'When did you say you were supposed to leave?'
 [(#A) **tuo fratello**], non gli hanno ancora dato il visto.

In Emilian, CILD appears to behave differently. In the following sentences, the first grammaticality judgement regards the Emilian sentence (as given), whereas the second one regards the equivalent sentence in Standard Italian (not given).

In all sentences the dislocated constituent is a given topic; these contexts should therefore license CILD. The (i) sentences in examples (3)-(5), where the dislocated constituents keep their preposition, are acceptable in all cases (as expected). In contrast, the (ii) sentences, where the prepositions are absent, are unacceptable in Italian³, whereas they show gradient acceptability in Emilian, from the most acceptable (3a-ii) to the least (5a-ii). The prepositionless constituents in (3a-ii), (4a-ii) and (5a-ii) are formally similar to Hanging Topics (HT), but they appear in a CILD context.

- (3) [Maria is speaker A's wife] Speaker A: 'Our house is so empty right now, but my wife says she's got some furniture from some friends' — Speaker B:
- a. Emilian:
- i. [A la Maria], a=g=ð dê la mē tēvla.
 To the Maria, 1.SBJ=3.DAT=have.1SG given the my table
 '(As for) Maria, I gave her my table.'

²Due to the vowel hiatus this is pronounced /a.'jɔ/. This allomorphy will not be noted in the transcription.

³This judgement will be discussed more in depth in section 2.2.

- ii. [La Maria], a=g=ò dê la mē tēvla.
 - b. Italian:
 - i. [A Maria], (le) ho dato la mia tavola.
To Maria 3SG.DAT.F have.1SG given the my table
 - ii. # [Maria], (le) ho dato la mia tavola.
- (4) Speaker A: ‘Do we have any wine? Could you go and pick up a bottle?’ — Speaker B:
- a. Emilian:
 - i. [Ed vèin], a=n=g⁴=n=è mia dimòndi in cà.
Of wine, EXPL=NEG=LOC=PART=is.3SG NEG much in house
(As for) wine, there isn’t a lot of it in the house.’
 - ii. ?[Vèin], a=n=g=n=è mia dimòndi in cà.
 - b. Italian:
 - i. [Di vino], non ce n=è molto in casa.
Of wine, NEG LOC PART=is much in house
 - ii. # [Vino], non ce n’è molto in casa.
- (5) Speaker A: ‘And in the cupboard, what did you find there?’ — Speaker B:
- a. Emilian:
 - i. [In l’ armâri], a=g=èra (dèinter) tót un lavōr ed parpàji.
In the cupboard, EXPL=LOC=was.3SG inside all a thing of moths
(As for) the cupboard, there were a whole lot of moths in there.’
 - ii. ??[L’armâri], a=g=èra (?dèinter) tót un lavōr ed parpàji.
 - b. Italian:
 - i. [Nell’ armadio], c=erano (dentro) tantissime falene.
In.the cupboard LOC=were.3PL inside many moths
 - ii. # [L’armadio], c=erano dentro tantissime falene.

Three hypotheses are formulated to explain this pattern and the nature of these structures: (i) one based on phonology; (ii) one assuming null-exponent case marking; (iii) one related to the information structural roles of the two dislocation types. On the basis of diagnostics developed by Cinque (1997), López (2016) and Poletto & Bocci (2016) I will conclude that hypothesis (iii) produces the most correct predictions.

2. Theoretical background

2.1. Two types of dislocation

In section 1 a difference between two dislocation constructions was introduced. Example (2) is repeated here as (6). The two dislocation types differ both in morphosyntactic aspects (presence vs absence of a preposition) and in pragmatic ones (different discourse contexts license different constructions).

⁴The 3rd person dative clitic and the locative clitic are expressed by a common exponent in all northern Italian varieties (Benincà et al. 2016).

- (6) a. CILD; Given Topic Context — Speaker A: ‘My brother and I should start packing. We leave tomorrow for Tbilisi.’ — Speaker B:
 [#(A) **tuo fratello**], non gli hanno ancora dato il visto.
 To your brother, not 3SG.M.DAT have.3PL yet given the visa
 ‘(As for) your brother, they haven’t given him the visa yet.’
- b. HT; Topic Shift Context — [Two brothers have planned a travel. The speaker is talking to one of them] ‘When did you say you were supposed to leave?’
 [#(A) **tuo fratello**], non gli hanno ancora dato il visto.

The presence or absence of a preposition is only one of the criteria that can tease these two constructions apart. The main criteria used in the literature are summed up in Table 1, based on analyses collected from Cinque (1997), López (2016) and Poletto & Bocci (2016). The terminology I use is Cinque’s (1997); however, the reader should be aware that the terminological variation is abundant. The rest of this section presents examples illustrating criteria (i) to (vi).

Table 1: Differences between the two dislocation constructions

Hanging Topic	Critic Left Dislocation
(i) ‘Unlinked’ to the main clause	‘Linked’ to the main clause
(ii) Caseless/prepositionless	Case marked/preposition marked
(iii) Escapes syntactic islands	Blocked by syntactic islands
(iv) Can be resumpted by clitics and epithets	Can only be resumpted by clitics
(v) Only one per sentence	Can be iterated
(vi) Introduces new/shifting topics	Restates familiar topic

(i) Link to the main clause: The Greek sentences in (7) are from Anagnostopoulou (1997:155; my brackets, boldtype and paraphrases). In (7a), the dislocated constituent is in its original accusative case; the quantifier *kathenäs* ‘everyone’ binds the possessive *tu* ‘his’. Due to this binding relation, *his* is interpreted as referring to *everyone*. In (7b), on the contrary, the dislocated DP is in nominative case. Here, the quantifier in the main clause does not bind the possessive. This creates thus two different interpretations, which I wrote as paraphrases of the original translations for the sake of clearness.

- (7) a. [**Tin mitera tu**], kathenäs tin agapai. (CILD)
 the.ACC mother his everyone her loves
 ‘His mother, everybody loves (her).’ (i.e. everybody loves his/her own mother)
- b. [**I mitera tu**], kathenäs tin agapai. (HTD)
 the.NOM mother his everyone her loves
 ‘His mother, everybody loves (her).’ (i.e. everybody loves the same man’s mother)

(ii) Presence/absence of preposition/case marking: This criterion only applies when the dislocated constituent originates as a prepositional argument. Example (6a) must contain a preposition, whereas (6b) cannot. In (7) one can observe the same phenomenon, this time with case

marking instead of prepositions. Since the function of the two is comparable, I lumped both phenomena under the same criterion.

(iii) Syntactic islands: CILD is sensitive to syntactic islands, whereas HTD is not.⁵ In the Emilian sentences (8), the complex NP ‘that story/rumour that they stole Piero’s car’ constitutes an island. When the constituent *Piero* is a HT, as in (8b), the sentence is grammatical. However, it is not possible to take *Piero* out of the complex NP together with its preposition *a*: (8a), containing CILD, is sharply ungrammatical.

- (8) a. * [A **Piero**], ê=t sintī [cla fôla [ch i=g=ân ciavê la macchina?]]
 To Piero have.2SG=2SG.SBJ heard that story that
 i=g=ân ciavê la macchina?] (CILD)
 3PL.SBJ=3.DAT=have.3PL stolen the car
 ‘(As for) Piero, have you heard that rumour that someone stole his car?’
- b. [**Piero**], ê=t sintī [cla fôla [ch i=g=ân ciavê la macchina]]? (HTD)

(iv) Epithets: Epithets can be defined as DPs with anaphoric reference and a non-literal, ‘emotional’ connotation (Patel-Grosz 2015:1). Consider the following Spanish sentences (slightly adapted from López 2009:220; my brackets, boldtypes and indices). In (9a), the dislocated constituent is case marked and cannot be interpreted as having the same reference as the epithet. In (9b), on the contrary, the dislocated constituent is not case marked, and is resumed by the epithet.

- (9) a. [Al **arbitro**]_i, [el muy tonto]_j dice que el jugador no lo_i vio.
 ACC.the referee the very silly says that the player NEG him saw
 ‘The referee_i, that idiot_j says that the player didn’t see (him_i).’ (CILD)
- b. [**El arbitro**]_i, [el muy tonto]_j dice que el jugador no lo_i vio.
 the referee the very silly says that the player NEG him saw
 ‘The referee_i, that idiot_j, says that the player didn’t see him_i.’ (HTD)

(v) Multiple topics: Cinque (1997) claims that only one HT per sentence is possible, whereas multiple CILDS are allowed. This can be exemplified by the Italian sentences in (10), adapted from French from Delais-Roussarie et al. (2004:505; originals in (12)). In (11) I constructed Emilian counterparts (the arguments were changed in order to make them feel more natural for my native speaker consultants, but the argument is still valid), and they follow the same pattern: (11a) sounds rather deviant, whereas (11b) is grammatical with two CILDS or with one HT and one CILD.

⁵Sensitivity to islands is often used as a diagnostic for detecting the presence of syntactic movement. From this perspective, an example like (8) would imply that CILD-dislocated constituents are generated in their base position and then moved to the periphery, whereas HTs are generated in the periphery to begin with. For such a proposal, cf. López (2016).

(10) Italian:

- a. * [Maria]_{HT}, [questo crimine]_{HT}, penso che non glie ne
 Maria this crime think.1SG that NEG 3SG.DAT PART
 parlerò.
 speak.FUT.1SG
 '(To) Maria, (about) this crime, I think I won't tell her about it.'
- b. [A Maria]_{CILD}, [di questo crimine]_{CILD}, penso che non glie ne parlerò.

(11) Emilian:

- a. ?? [Tō fjōl]_{HT}, [vèin]_{HT}, a=n=g=n=ò
 Your son wine 1.SBJ=NEG=3.DAT=PART=have.1SG NEG given
 dimòndi.
 much
 '(To) your son, (of) wine, I didn't give him a lot of it.'
- b. [(A) tō fjōl]_{HT/CILD}, [ed vèin]_{CILD}, a=n=g=n=ò mia dê dimòndi.

This constraint does not appear to be pan-Romance: in French, in fact, it does not apply. Example (12) shows that both dislocation types can be iterated (Delais-Roussarie et al. 2004:505).

(12) French:

- a. [Marie]_{HT}, [ce crime]_{HT}, je crois que je ne lui en
 Marie this crime 1SG.SBJ think that 1SG.SBJ NEG 3SG.DAT PART
 parlerai pas.
 speak.FUT.1SG NEG
 b. [A Marie]_{CILD}, [de ce crime]_{CILD}, je crois que je ne lui en parlerai pas.
 '(To) Marie, (of) this crime, I think I won't tell her about it.'

(vi) Context type: Dislocated constituents are often topics (but not always, cf. Poletto & Bocci 2016 about focus fronting). Most literature about dislocation in Romance adopts Reinhart's (1981:57) definition of topic as 'the expression whose referent the sentence is about'.⁶ As introduced in section 1, the two dislocation types have different information structural functions. HTD is used to introduce *shifting topics*: 'a newly-introduced, newly-changed or newly-returned [to] topic' (Givón 1983:9).⁷ In contrast, CILD is used to restate *familiar topics*, which are given and accessible (Chafe 1987; Pesetsky 1987).

In (13), the dislocated constituent's referent (the cats) has been mentioned in the discourse; in fact, it has already been the topic of two sentences. Confirming Cinque's (1997) claims, only CILD is allowed in this context. In (14), on the contrary, the cats are part of the speakers' Common Ground (for a definition, cf. Krifka 2008; Rochemont 2016), but have not been mentioned in the discourse. In this context, only HTD is pragmatically viable.

⁶Lambrecht (1994:118) adopts this definition as well: '[t]he topic of a sentence is the thing which the proposition expressed by the sentence is ABOUT' (emphasis in original).

⁷Once again, there is terminological variation. Frascarelli & Hinterhölzl (2007) and Poletto & Bocci (2016) use the term 'aboutness topics' for what I have called here shifting topics. López (2016) calls the whole concept 'topic promotion'.

- (13) Given Topic Context — Speaker A: ‘You haven’t seen my [cats]_{FOC}, have you? I haven’t seen [them]_{TOP} since yesterday. I wonder where [they]_{TOP} are.’ — Speaker B:
- a. Ascolta⁸, [**dei tuo gatti**], ne ho visto uno da me in giardino.
Listen.IMP of.the your cats PART have.1SG seen one at me in garden
(CILD)
‘You know, as for your cats, I saw one of them in my garden.’
 - b. # Ascolta, [**i tuo gatti**], ne ho visto uno da me in giardino. (HTD)
- (14) Shifting Topic Context — [The speaker knows that the interlocutor usually keeps her cats inside, and wants to warn her that one had gone out of the house]
- a. # Ascolta, [**dei tuo gatti**], ne ho visto uno da me in giardino. (CILD)
 - b. Ascolta, [**i tuo gatti**], ne ho visto uno da me in giardino. (HTD)

This distinction does not seem to be made in French (a language where criterion (v) does not apply either). According to De Cat (2007) and López (2016), CILD is used extremely rarely in spoken French, and its pragmatic functions are subsumed by HTD, which can thereby restate given topics. Delais-Roussarie et al. (2004) claim also about spoken French that CILD exists, but that it does not differ phonetically or interpretatively from HTD. This distribution fact will be important as a term of comparison for my analysis of Emilian dislocations (cf. section 3.3.3.).

2.2. *Gradient data*

In the early days, generative approaches abstracted grammaticality to a categorical distinction: there are sentences that are grammatical, and sentences that are not. An exception to this is Ross (1972, 1973a,b), who defined the notion of ‘squish’; moreover, Lakoff (1973) used six different levels of grammaticality. Most native speakers of any language do in fact feel that some (presumably ungrammatical) sentences are ‘better’ than others. Where to draw the line between the two categories is a theoretical problem, and theories of grammar should be able to account for this type of data. Featherston (2005:1548) goes as far as to claim that ‘the standard assumptions about grammaticality [...] are actually blocking progress in syntax’.

Fanselow et al. (2006) problematises how gradient data is to be handled in linguistics. Cornips (2006) argues that in language contact situations or bidialectal/diglossic ones, precise grammaticality and/or acceptability judgements are hard — or even impossible — to obtain from elicitation. This is due to the local variety ‘competing’ with the standard one, creating thus an ‘intermediate speech repertoire’ (Auer, 2000, cited in Cornips 2006). Often, all forms of a given structure heard in the community, whether they are part of the local dialect, of the standard language or of any intermediate variety, will be judged as acceptable. An attempt at controlling these factors can be found at Cornips & Poletto (2005).⁹ Vogel’s (2006) proposal accounts for gradient data through an expanded version of Optimality Theory. On the other hand, Erteschik-Shir’s (2006) proposals gives information structure a more important role regarding acceptability judgements, and argues that syntax cannot account for it alone.

⁸This imperative is a semantically empty discourse particle or ‘interactional cue’ (Bazzanella 1990).

⁹They cite the case of Northern Italian areas (Veneto) where a prestige regional dialect has emerged, making the influence by standard Italian less strong. This is not the case in Emilia-Romagna.

The present work is full of, and in fact based on gradient data. However, the importance of contexts for the acceptability judgements cannot be underestimated. Benincà (2001) presents contextless Standard Italian sentences with structures similar to the ones showed here as grammatical. As shown in examples (13)-(14), HTD are pragmatically deviant when the context is a CILD licensing one. Benincà's claim that 'HT is limited to the colloquial style' (Benincà 2001:44) is confirmed by a corpus study which deems the use of HT as 'sub-standard Italian' (Friulla 2015:63-64). However, Italian does not appear to show the same gradient pattern as Emilian.

3. The three hypotheses

3.1. A phonological approach

The Emilian sentences in (3a), (4a) and (5a) are repeated here as (15), (16) and (17). For reasons of space, the Italian equivalent sentences are not repeated; however, to keep the comparison visible between the two varieties, the Italian acceptability judgements are reported. For every couple of judgements, the first one applies to Emilian, and the second one to Italian. For example, sentence (15b) is acceptable in Emilian, but not in Italian.

By looking at these sentences, a pattern emerges. The most acceptable sentence is the one where the preposition *a* is deleted. At the other end of the spectrum one finds *in*. A phonological rule explaining this phenomenon can be stated as such: an unstressed vowel in word-initial position (or at the beginning of an intonational unit) can be deleted. If this is the case, (15b), (16b) and (17b) show CILD, and not HTD: the prepositions are there, but they are phonologically deleted.

- (15) [Maria is speaker A's wife] Speaker A: 'Our house is so empty right now, but my wife says she's got some furniture from some friends.'
 - a. Speaker B: ✓/✓[**A la Maria**], a=g=ò dê la mē tēvla.
'(As for) Maria, I gave her my table'
 - b. Speaker B: ✓/ # [**La Maria**], a=g=ò dê la mē tēvla.

- (16) Speaker A: 'Do we have any wine? Can you go to the cellar and pick up a bottle?'
 - a. Speaker B: ✓/✓ [**Ed vèin**], a=n=g=n=è mia dimòndi in cà.
'(As for) wine, there isn't a lot of it in the house.'
 - b. Speaker B: ?/ # [**Vèin**], a=n=g=n=è mia dimòndi in cà.

- (17) Speaker A: 'And in the cupboard, what did you find there?'
 - a. Speaker B: ✓/✓ [**In l' armâri**], a=g=èra (dèinter) tót un lavōr ed parpàji.
'(As for) the cupboard, there were a whole lot of moths in there.'
 - b. Speaker B: ??/ # [**L' armâri**], a=g=èra (?/#dèinter) tót un lavōr ed parpàji.

According to this rule, PPs whose preposition begins with a consonant, such as *cun* 'with', cannot be turned into prepositionless HTs such as in (15b), (16b) and (17b). This prediction cannot be confirmed; in fact, (18b) is perfectly grammatical in Emilian.

- (18) a. [Cun al curtêl], a=g=ò tajê al sigòli.
 With the knife, 1.SBJ=LOC¹⁰=have.1SG cut the onions
 ‘With the knife, I cut the onions with it.’
- b. ✓[Al curtêl], a=g=ò tajê al sigòli

There is one more counter-argument to this hypothesis. The phonological approach would allow (15a), (16a) and (17a) to surface as in (15a'), (16a') and (17a'), where the symbol \emptyset stands for a deleted vowel (respectively /a/, /e/ and /i/). Amongst these three, only (15a') is the same as (15b) above. Example (16a') is phonotactically viable whereas (17a') is not; both are unattested.¹¹ In order to generate (16b, 17b), an additional rule of cluster simplification would have to be posited. Moreover, in (19) the deletion of the first vowel would produce an onset /na:/, which is phonotactically unproblematic; however, in this sentence the preposition cannot be deleted in any context.

- (15a') \emptyset la Maria, a=g=ò dê la mē têvla.
 ‘(As for) Maria, I gave her my table.’

- (16a') \emptyset d vèin, a=n=g=n=e mia dimòndi in cà.
 ‘(As for) wine, there isn’t a lot of it in the house.’

- (17a') \emptyset n l’ armâri, a=g=ēra (dèinter) tót un lavōr ed parpàji.
 ‘(As for) the cupboard, there was a whole lot of moths there.’

- (19) [***(In) Africa**], a=g=è sèimper stê dal guêri.
 In Africa EXPL=LOC=is.3SG always been PART.ART wars
 ‘In Africa, there have always been wars.’

In other words, the only sentence this vowel deletion hypothesis explains is (15b). Examples (16b) and (17b) may be explained by an additional rule. However, the grammaticality of (18b) and the ungrammaticality of (19) are a clear counter-argument to the hypothesis.

3.2. A morphological approach

Another possible explanation of (15b), (16b) and (17b) is to assume that the prepositions are present, but they are silent. If this is the case, these sentences would be instances of CILD (matching thus the stated contexts).

Positing \emptyset -allomorph is not uncommon for case inflections; on the other hand, claims of \emptyset -prepositions are rarer. The exact nature of these elements in Romance is debated: while they traditionally have been considered prepositions, analyses that treat them as case markers have been put forward (Elliott 1986 for French; Rizzi 1988 for Italian). In a typologically broader

¹⁰The locative clitic *g*, corresponding to Italian *ci*, can also have instrumental value. I found no evidence that there are two distinct clitics *g_{LOC}* and *g_{INSTR}*.

¹¹Emilian varieties are somewhat known for having a quite liberal phonotactics, allowing for consonant clusters atypical for Romance languages (Loporcaro 1998), such as /dvin'te:r/ ‘to become’, /'tji:r/ ‘to hold’, /'pkoun/ ‘morsel’, /stma'teina/ ‘this morning’, /'ftʃi:n/ ‘little old man’ etc. However, none of these is [nasal stop]+[liquid], as in (17a').

perspective, Spencer (2009:199) claims that how to distinguish adpositions from case markers is an ‘open question’. Another comparison of the two can be found in Blake (2001: chapter 1.2.5).

The similar acceptability of (15a/b) in Emilian can be accounted for if the feature [DAT] can be expressed as $\{a, \emptyset\}$. The case marker *a* can also introduce locative constituents, as shown in (20b). Rizzi (1988) claims for Italian that, while a_{DAT} is a case marker, a_{LOC} — or, more generally, $a_{\text{NON-DAT}}$ — is a preposition. In Emilian, *a* can be deleted also when introducing locatives; this casts doubts on whether this distinction exists in this language. If these two functions of *a* are not distinguished in Emilian, (20) would be supporting the morphological hypothesis presented here; however, further study is needed to confirm this. In addition, the Italian preposition *di* ‘of’, corresponding to Emilian *ed* (cf. (16)) has also been analysed as a genitive case marker (Garzonio & Rossi 2016, following Cinque 2010).

- (20) a. [A Pêrma], $a=g=s\underline{u}n$ st\u00e9 l' \u00e8ter d\u00e9.
 To Parma, 1.SBJ=LOC=am been the other day
 ‘Parma, I’ve been there some days ago.’
- b. ✓[Pêrma], $a=g=s\underline{u}n$ st\u00e9 l' \u00e8ter d\u00e9.

At this point, the present hypothesis explains the similar acceptability of (15a/b), but it fails to explain the gradience. I propose that the sentences examined so far can be placed along the hierarchy in (21). Semantically empty markers licensed by verbs, such as *a*, can be deleted without consequences (cf. (15b), (20b)).¹² The deletion of the case marker results in less acceptable sentences when the case is licensed by what I subsumed under the description ‘phrase-internal elements’: a quantifier (*dimòndi* ‘much’ in (16b)), or an adverb (*dèinter* ‘inside’ in (17b)). At the ends of the hierarchy one finds semantic case markers such as *in* (locative). The instrumental preposition *cun* is deletable without problems (cf. (18)); this makes it align with the syntactically selected case markers. This can be explained if this constituent is not an adjunct, but an argument introduced by a low applicative head (Pylkk\u00e4nen 2008).

	Syntactically selected case:	Case selected by phrase-internal elements:	Semantic case:
(21)	(15b) ✓(a) la Maria	(16b) ?(ed) v\u00e9in, [...] dim\u00f2ndi	(19) *(in) \u00c1frica
	(20b) ✓(a) Pêrma	(17b) ?(in) l'arm\u00e2ri, [...] d\u00e8inter	

So far, there seem to be no strong arguments against this hypothesis. However, three main questions remain open. For the first, postulating null morphemes is something that should be done with carefulness. A claim such as ‘there is something there, but it is invisible’ should have strong evidence. This hypothesis only rests on the assumption that what looks like prepositions actually is inflectional case marking, something there is no scholar agreement on.

For the second, the optionality of these null morphemes is puzzling: it is unclear whether there exist criteria that make speakers choose full morphemes vs. null ones, or if the variation is actually free. Finally, it is unclear why the null allomorphes are only available in dislocated contexts. The fact that these contexts can show unusual phenomena or behaviours is, however, not unheard of: Berretta (1989) found differential object marking in dislocated contexts in Romance languages where no differential object marking was supposed to exist, such as standard

¹²It is unclear whether a_{LOC} has more or less semantic content than a_{DAT} , and whether they are distinct at all (cf. above).

Italian and Northern Italian varieties. These three counterarguments make the morphological approach seem less viable.

3.3. *A pragmatic approach*

The two hypotheses outlined so far predict that the dislocated constituents in (15b), (16b) and (17b) show CILD. The approach presented in this section assumes, on the contrary, that the two dislocation types have different distribution in Italian and Emilian; in other words, the two languages divide the information structural functions of the two structures in two different ways. The prediction is that (15b), (16b) and (17b) in fact display HTD, in the same environments where Italian needs CILD.

In Table 1 (section 2) I summed up six criteria distinguishing HTD from CILD. Some of these can be used to test which of the two dislocation types the sentences in question display. The ones which are more apt to use as diagnostics are criteria (iii) islands, (iv) epithets and (vi) context types.

3.3.1. *Islands*

Only HTD is permitted in sentences with syntactic islands, both in Emilian and in Italian (cf. (8)). I constructed examples where structures similar to (15b), (16b) and (17b), where the dislocated constituents are encapsulated into the complex NP ‘a rumour that ...’, which constitutes an island.¹³ If (15b''), (16b'') and (17b'') sentences contained CILD with a dropped preposition, they would be ungrammatical. The judgements show that they are in fact acceptable. This supports the idea that (15b), (16b) and (17b) show in fact HTD, despite the context.

- (15b'') Given Topic Context — Speaker A: ‘I saw Maria some days ago, she seemed quite down. Did she tell you anything? Has something happened to her?’ — Speaker B:
 [La Maria], a=ò sintī [na fôla [che Primo al=g=à
 The Maria 1.SBJ=have.1SG heard a story that Primo 3SG.M.SBJ=3.DAT=has
 dê un sciâf]].
 given a slap
 ‘(As for) Maria, I’ve heard a rumour that Primo slapped her.’
- (16b'') Given Topic Context — Speaker A: ‘I went to the city fair yesterday. There I met Lini, the wine maker. Have you tasted it, his wine? It’s very good.’ — Speaker B:
 [Vèin], a=ò sintī [na fôla [che t=n=ê mia bvū
 Wine 1.SBJ=have.1SG heard a story that 2SG.SBJ=PART=have.2SG NEG drunk
 pôc]].
 little
 ‘(Regarding) wine, I’ve heard a rumour that you didn’t drink so little.’

¹³To have as natural examples as possible proved important in the elicitation process. Therefore, (15b''), (16b'') and (17b'') are not exactly the same as (15b), (16b) and (17b).

- (17b'') Given Topic Context — Speaker A: ‘I spent all morning cleaning the cupboard, the old one. You have no idea of what I found in it.’ — Speaker B:

[L’ **armâri**], a=ò sintī [na fôla [che a=g=ēra (dèinter) tót
The cupboard 1.SBJ=have.1SG heard a story that EXPL=LOC=was inside all
un lavōr ed parpàji].
a thing of moths
‘(In) the cupboard, I’ve heard a rumour that there was a whole lot of moths.’

3.3.2. *Epithets*

Similarly to what is shown in section 3.3.1, I constructed sentences similar to (15b), (16b) and (17b) in CILD-allowing contexts, where the dislocated constituents are resumed by various epithets.¹⁴ Once again, if (22)-(24) contained CILD with a dropped preposition, they would be ungrammatical (due to the epithet resumption); this would show that (15b), (16b) and (17b) contain CILD. However, sentences (22)-(24) are grammatical. This is another argument for (15b), (16b) and (17b) showing HTD.

- (22) Given Topic Context — Speaker A: ‘You know Maria? She’s always begging for furniture, her son is moving apparently. I mean, I understand her situation, but it’s so annoying.’ — Speaker B:

[La **Maria**], a=ò dê la mē têvla a cla puvrâsa.
The Maria, 1.SBJ=have.1SG given the my table to that old.hag
‘(As for) Maria, I gave my table to that old hag.’

- (23) Given Topic Context — Speaker A: ‘Poor Antonio, with those sons he’s got. Have you seen how they ended up?’ — Speaker B:

[I **fjō ed Antonio**], a=ò vést ûn ed qui delinquèint c
The sons of Antonio 1.SBJ=have.1SG seen one of those punks that
al=fumêva lè da la scôla.
3SG.M.SBJ=smoked there at the school
‘(As for) the sons of Antonio, I’ve seen one of those punks smoking by the school.’

- (24) Given Topic Context — Speaker A: ‘And in the old cupboard, what did you find there?’ — Speaker B:

[L’ **armâri**], a=g=ēra (dèinter) tót un lavōr ed parpàji in cal şavâj
The cupboard EXPL=LOC=was inside all a thing of moths in that old.junk
lè.
there
‘(As for) the cupboard, there was a whole lot of moths in that old piece of junk.’

¹⁴Coming up with examples where ‘wine’ and ‘the cupboard’ were resumpted by epithets resulted in extremely unnatural sentences, which my informants rejected anyway. I preferred to construct other sentences with comparable structure.

3.3.3. Context types

Criterion (vi) in Table 1 states that shifting topics are expressed as HTs, whereas given topics are expressed by means of CILD. Examples (15)-(17) are repeated here and expanded as (25)-(27).

Two contexts have been constructed for each sentence. In the first context, the dislocated constituent's referent has already been mentioned, being thus a given topic; this is supposed to license CILD. In the second context, the dislocated constituent's referent has not been mentioned earlier, and is therefore a shifting topic; this is supposed to license HTD. According to criterion (vi), the most acceptable examples should be the preposition marked ones in given topic contexts (i.e. prototypic CILD) and the prepositionless ones in shifting topic contexts (i.e. prototypic HTD).

However, this does not seem to be the case. All sentences do not appear to be more or less acceptable when the context is changed. In fact, the native speakers consultants did not seem to observe noticeable differences between these sentences themselves, and between them and their Italian equivalents.

- (25) a. Given Topic Context — Speaker A: 'Our house is so empty right now, but my wife says she's got some furniture from some friends' — Speaker B:
 ✓ [(A) **La Maria**], a=g=ò dê la mē tēvla.
 '(As for) Maria, I gave her my table.'
- b. Shifting Topic Context — A: 'I just came by train, I haven't been at home yet. I was in Parma buying furniture. The house looks so empty right now.' [Maria = A's wife] — Speaker B:
 ✓ [(A) **La Maria**], a=g=ò dê la mē tēvla.

- (26) a. Given Topic Context — Speaker A: 'Do we have wine?' — Speaker B:
 [?(Ed) **vèin**], a=n=g=n=è mia dimòndi in cà.
 '(As for) wine, there isn't a lot of it in the house.'
- b. Shifting Topic Context — 'Could you go to the store?'
 [?(Ed) **vèin**], a=n=g=n=è mia dimòndi in cà.

- (27) a. Given Topic Context — Speaker A: 'And in the cupboard, what did you find there?' — Speaker B:
 [??(In) **l'armâri**], a=g=ēra (?dèinter) tót un lavōr ed parpàji.
 '(As for) the cupboard, there was a whole lot of moths in there.'
- b. Shifting Topic Context — (Talking about the kitchen) 'I finished cleaning it this morning. I put away all of your stuff.'
 [??(In) **l'armâri**], a=g=ēra (?dèinter) tót un lavōr ed parpàji.

This pattern may be caused by the presence of an 'intermediate speech repertoire' (Cornips & Poletto 2005; Cornips 2006). It is reasonable to suspect that the mutual influence of Emilian and Italian on each other is confounding the data, making it impossible to discern which construction(s) belong to which variety, and whether there is an actual contextual difference in the use of the two constructions.

The situation presented here may be explained by considering two factors: (i) the speech community itself; (ii) how dislocation works in French. In section 2.1, I discussed how French

almost solely relies on HTD, which has ‘taken over’ CILD’s pragmatic functions. Emilian, on the other hand, seems to be fluctuating on a continuum between Standard Italian and French. The French situation might have been the case in Emilian, if it was spoken by an abstracted, strictly monolingual community which had no contact with Standard Italian. Given the nature of the language contact situation, it is not unreasonable to think that the two dislocation structures can ‘percolate’ from a variety to the other, thereby blurring the distinction. Despite correctly explaining several of the phenomena in consideration, the hypothesis outlined here does not predict the acceptability gradience.

4. Conclusion

Dislocated structures in Emilian show a puzzling gradient pattern: some prepositions can be deleted, some others may be (but result in progressively less acceptable sentences), some others cannot. Three hypotheses have been formulated in order to explain this.

The phonological approach was rejected due to the lack of explanatory power: it failed to predict actual grammatical sentences, and it predicted ungrammatical ones. The pragmatic approach showed the information structural distinction between HTD and CILD in Emilian is not so sharp, if it exists at all. This might be due to the strong intertwine of the local variety and the standard one. However, this approach cannot explain the acceptability gradience.

The morphological approach gave interesting results in explaining the gradience, and opens for more research. A full-fledged morphosyntactic analysis would be needed in order to confirm (or discard) the hypothesis. Moreover, it would be interesting to see if the hierarchy in (21) explains other grammatical phenomena as well.

Abbreviations

1/2/3 1 st /2 nd /3 rd person	LOC locative
ACC accusative	M masculine
ART article	NEG negation
DAT dative	NOM nominative
EXPL expletive	OBJ object
IMP imperative	PART partitive
INSTR instrumental	PL plural
F feminine	SBJ subject
FUT future	SG singular

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Influences on agreement in German hybrid nouns

Distance and syntactic domain

Astrid Gößwein

Hybrid nouns are nouns like German *Mädchen* ‘girl’, which refers to a female person but is specified for neuter gender instead of feminine gender. Such nouns can occur with either syntactic or semantic agreement. In the case of *Mädchen*, syntactic agreement means that the noun triggers neuter gender on a co-referring pronoun (corresponding to the grammatical gender), semantic agreement means feminine (as the natural gender). Two acceptability studies and a production experiment were performed to investigate which factors influence the agreement pattern, focusing on the linear distance between noun and pronoun and the effect of the syntactic domain, i.e. if the pronoun is in a clause subordinated to that of the antecedent or in a new main clause. The results show an effect of linear distance but no effect of syntactic domain.

1. Introduction

Lexical hybrids are an interesting case of conflict between formal and semantic properties. In German, hybrid nouns are subject to different gender assignment rules (cf. Corbett 1991). The most famous case is the noun *Mädchen* ‘girl’, which is grammatically neuter, but always denotes a female person. As example (1) shows, pronouns that agree with this noun can be either neuter, hence have syntactic agreement, or feminine, which would be semantic agreement.

- (1) **Das Mädchen** liest ein Buch. Danach geht **es/sie** spazieren.
the girl reads a book. Afterwards goes it/she for a walk
'The girl is reading a book. Afterwards she goes for a walk.'

In German, the gender assignment rules are rather complex and obscure, as semantic factors like natural gender, but also taxonomic fields, phonological rules and morphology, especially derivational suffixes, play a role (Corbett 1991:50; Köpcke & Zubin 2009). For most nouns, natural gender corresponds to grammatical gender. However, for some nouns, gender assignment rules will assign a gender that does not match with the gender of the semantic reference

of the noun. This applies mainly to nouns that denote human beings.¹ In the case of *Mädchen*, the neuter gender is due to the diminutive suffix *-chen* (Corbett 1991:183), the same accounts for e.g. *Fräulein* ‘miss’.² Another reason for lexical hybrids is the possibility for a noun to refer to both male and female persons, for example *Kind*(NEUT) ‘child’. In this case, the natural gender is determined by context (Nübling 2015:262). Note that mismatches can also occur when the grammatical gender is not neuter: the grammatically feminine noun *Wache* ‘guard’ for instance can also exhibit agreement mismatches, when it denotes a male person (Köpcke & Zubin 2009:141).

As gender is an inherent feature and not overtly marked on the noun in German, the conflict can only be observed when other elements agree with those nouns. In principle, those targets could be articles, adjectives, relative pronouns, personal pronouns, possessives and demonstratives, but in German only personal pronouns and demonstratives and – to some extent – relative pronouns show semantic agreement (Köpcke & Zubin 2009:141).³ The grammaticality of the agreement mismatch distinguishes it from attraction errors that occur when the features of an intervening noun trigger an agreement mismatch (cf. Bock & Miller 1991 for number agreement and Vigliocco & Franck 1999 for gender agreement errors due to local nouns).

The phenomenon is not restricted to German. In Dutch, similar mismatches can be found, because it has the same gender classes. The word *meisje* ‘girl’, for instance, is grammatically neuter and it can occur with feminine pronouns, just like German *Mädchen* (Audring 2013:35). One difference to German is the fact that for articles and demonstratives, feminine and masculine gender share one form, the so-called common gender (cf. Audring 2013). Furthermore, gender agreement mismatches are not restricted to nouns that denote human beings: mass and count nouns occur with a specific semantic gender, independent of their syntactic gender (2) (Audring 2013). Hence, semantic agreement by personal pronouns seems to be the normal case rather than the exception in Dutch.

- (2) a. Het boek, die heb ik al.
 DEF.N.SG book(N).SG DEM.C.SG have I already
 ‘The book, I’ve got it already.’
- b. De benzine, het is op.
 DEF.C.SG fuel(C).SG PRO.N.SG is used_up
 ‘The fuel, it is used up.’
- (Audring 2013:35)

In Russian, gender agreement mismatches can be found with professions (Corbett 1991; 2006). As (3) shows, masculine nouns for professions can trigger feminine agreement in contexts where they refer to female persons. Interestingly, here the possibility to agree with the natural gender is also possible with adjectival agreement.

¹ Nouns that refer to animals can also have a natural gender, which may lead to conflicts under certain circumstances, namely when the animal is close to the speaker and presumably conceptualized as a person (i).

(i) Ich habe eine Katze. Neulich hat er mein Sofa zerstört.
 I have a-FEM cat-FEM. Recently has he my couch destroyed
 ‘I have a cat. Recently, he has destroyed my couch.’

This corresponds to the use of *it* vs. *he/she* while referring to a pet in English. However, speakers vary in the way they refer to animals.

² *-lein* is another diminutive suffix. In modern German, *Fräulein* is not used frequently anymore, contrary to *Mädchen*.

³ In the case of possessive, demonstrative and personal pronouns, semantic agreement is even prescriptively accepted (Wöllstein 2016:1011).

- (3) Ona xoroš-ij/ xoroš-aja vrač.
she good-MASC/ good-FEM doctor
‘She is a good doctor.’ (Corbett 1991:238)

In other languages, like some varieties of English, mismatches can also occur with respect to the number feature, as in example (4).

- (4) a. The committee has decided ...
b. The committee have decided ... (*these committee) (Corbett 2006:158)

Agreement mismatches have also been part of the theoretical discussion of agreement mechanisms in general. Smith (2015) and Wurmbrand (2016) assume that a phi-feature consists of two parts, a semantic feature (iF for interpretable) and a morphological feature (uF for uninterpretable). Depending on the syntactic environment, one of those two parts is possible, or both. Wechsler & Zlatić (2003) also distinguish between concord and index features, the first corresponding to the morphological features and the latter being responsible for semantic agreement.

In order to gain empirical data of hybrid agreement, but also to understand more about the ways in which formal and conceptual aspects of language interact, three experiments were conducted: two acceptability judgment tasks and one production experiment. These experiments investigate factors which might affect the choice or acceptability of semantic or syntactic agreement, namely the linear distance between noun and (relative) pronoun and the occurrence in a subordinate clause as opposed to a new main clause. Section 2 summarizes some of the factors that have been identified or suggested in the literature. The experiments are presented in section 3 and 4. Finally, the results will be discussed in section 5.

2. *Factors that influence the agreement pattern*

Previous research has identified several factors that influence agreement. The research is mainly based on corpus analyses (cf. Thurmail 2006; Köpcke & Zubin 2009) or cross-linguistic comparisons (cf. Corbett 1991; 2006). Furthermore, specific factors have been investigated through sentence completion tasks (cf. Braun & Haig 2010). In this paper, only a subset of those factors will be discussed: the part of speech of the element that agrees with the hybrid noun, the linear distance of noun and target, the influence of different syntactic domains and conceptual factors associated with the referent. For regional differences on agreement with hybrid nouns in German and a historical view on the phenomenon, see Leser-Cronau (2018) and Birkenes et al. (2014).

2.1. *Part of speech - the agreement hierarchy*

Aside from the noun itself, the occurrence of semantic agreement also depends on the target. Corbett (1979) proposes the following hierarchy in (5), which is based on the cross-linguistic occurrence of semantic agreement with lexical hybrids, but also holds for the likelihood of semantic agreement within one language.

(5) **attributive > predicate > relative pronoun > personal pronoun**

'For any controller that permits alternative agreements, as we move rightwards along the Agreement Hierarchy, the likelihood of agreement with greater semantic justification will increase monotonically.' (Corbett 2006:207)

Hence, it is less likely that elements in the attributive domain, like articles and adjectives, exhibit semantic agreement than e.g. personal pronouns. This is in line with the situation in German, where semantic agreement occurs rather often with pronouns, but never with articles or adjectives (Thurmair 2006; Köpcke & Zubin 2009). For hybrid nouns in German, predicates are irrelevant, because neither verbs nor predicatively-used adjectives agree in gender.

Panther (2009) suggests a hierarchy for German that is based on speech act theory. Semantic agreement may also be found more often with pronouns, because they are usually further away from the noun (cf. section 2.2) and due to their deictic properties (Corbett 1991:241ff; cf. Audring 2013).

2.2. *Linear distance between noun and pronoun*

In the literature, there is general consensus about the effect of the linear distance between noun and target, e.g. the number of intervening words. Corbett (1991:241) states that

'[f]or any particular target type, the further it is removed from its controller, the greater the likelihood of semantic agreement.'

Hence, semantic agreement is more likely to occur when there is more distance between the noun and the target. Furthermore, if two elements agree with a hybrid noun and only one exhibits semantic agreement, it will always be the one that is further away, as in (6).

- (6) Und er liebte Henriette Vogel, das Mädchen, das in derselben Nacht wie
 and he loved Henriette Vogel, the-NEUT girl, who-NEUT in the same night as
 er geboren wurde und die mit ihm im Bordell aufwächst.
 he born was and who-FEM with him in the brothel grew up
 'And he loved Henriette Vogel, the girl who was born in the same night as he was and
 who grew up with him in the brothel'

(Köpcke & Zubin (2009):142; gloss added)

This observation is supported by corpus data (cf. Köpcke & Zubin 2009). Thurmair (2006) discusses the effect of the distance, too, but she considers the reference chains in longer texts. She observes that syntactic agreement by pronouns only occurs directly after the hybrid noun is mentioned, but at a certain point, semantic agreement becomes the more natural way of referring, until the referent is again mentioned with a noun. Generally, an effect of linear distance is in line with processing accounts: it is assumed that semantic information lasts longer in memory than syntactic information (Sachs 1967).

2.3. Syntactic domain

Another factor, which is connected to part of speech but also to linear distance, is the syntactic domain. In his agreement hierarchy, Corbett (1979) already refers to domains rather than word classes, for instance when he terms articles and adjectives as ‘attributive’. But especially possessive, personal and demonstrative pronouns can also be closer or further away from the noun with respect to the syntactic domain. In this case, the principle is that the likelihood of semantic agreement increases when the noun and the target are in distinct syntactic domains (Panther 2009). A higher linear distance and ‘syntactic’ distance often co-occur, but there are cases in which both can be teased apart. Example (7) shows such a case: here the pronoun exhibits semantic agreement due to the sentence boundary, although it is adjacent to the noun.

- (7) “Komm”, sagt das Mädchen. Sie beginnt zu laufen.
 “Come”, says the-NEUT girl. She begins to run
 ‘“Come here”, says the girl. She begins to run’
- (Panther 2009:81)

Thurmair (2006:196ff) also distinguishes different types of agreement depending on the domain. The first type, close agreement, is agreement of an element inside the NP, i.e. articles, adjectives and relative pronouns. As mentioned in section 1 and 2.1, for these word classes only syntactic agreement is possible in German — although according to Köpcke & Zubin (2009) this seems to be less strict for relative pronouns. Due to the fact that only those word classes appear in the nominal domain, it is difficult to differentiate the ability of the word class to agree with the semantic feature from the effect of the domain.⁴ The second type of agreement in Thurmair’s account can be observed when a noun and the agreeing element are in the same clause but not in the same NP, which is possible for possessive pronouns, or in a subordinate clause. The third is agreement over a sentence boundary. In both cases, semantic agreement is possible, but for the latter, Thurmair assumes that it occurs more often. This assumption would be in line with processing theories that assume a loss of syntactic information after a sentence boundary: Sachs (1967) and Jarvella (1971) observed that a sentence boundary can lead to the loss of purely syntactic information, which might suggest a preference for agreement with the semantic gender feature. However, it is unclear if this holds for the gender feature as well. Inanimate nouns in German always agree with the grammatical gender of their antecedent, also after sentence boundaries. Scheweppe et al. (2009) also conducted an experiment based on the one used in Jarvella (1971) and discovered that the syntactic gender feature was robust, even after a sentence boundary.

So far, it seems to be unclear if there is an effect of the syntactic domain, independent of other factors such as word class or linear distance. This holds especially for the occurrence of a pronoun in a subordinate clause as opposed to a new clause.

⁴ An interesting case might be a possessive inside an extended prenominal modifier or in a relative clause. To me, phrases like (i) are completely grammatical, which would suggest a distinction based on the properties of the word class, rather than based on the syntactic domain.

- (i) a. das mit **ihrem** Hund spielende **Mädchen**...
 the-NEUT with her dog playing girl
 b. das **Mädchen**, das mit **ihrem** Hund spielt
 the-NEUT girl, who-NEUT with her dog plays
 ‘the girl who plays with her dog...’

2.4. Conceptual factors

Besides structural influences, conceptual factors seem to have an effect as well. Those could be part of the semantics of the noun, but also due to contextual information. Corbett (1991:241) assumes that adjectives like *young* and *old* can lead to a preference for syntactic or semantic agreement respectively. This is supported by a study by Braun & Haig (2010), in which participants had to complete sentences in a way that they needed to refer to the noun *Mädchen* ‘girl’ with a pronoun. The age of the girl varied. They found that participants were more likely to refer to older girls with a feminine pronoun.

In a corpus analysis of Grimm’s fairy tales, Robinson (2010) observes that not only the age has an influence on the way pronouns agree with the nouns *Mädchen* ‘girl’ and *Kind* ‘child’, which are quite often used to refer to female protagonists. A change from syntactic, i.e. neuter agreement to feminine, semantic agreement happens, when the girl becomes a potential candidate for marriage. Furthermore, there seems to be an influence of the behavior of the girl: good behavior is connected with neuter agreement and bad behavior with feminine agreement. It is unclear to which extent this is consciously chosen as a stylistic device.

Additional evidence for conceptual effects on the agreement with lexical hybrids comes from nouns with a conflict concerning their number feature. Humphreys & Bock (2005) tested singular vs. plural agreement with collective nouns like *gang*. They observed that a change from a collective to a distributive noun phrase (*the gang near the motorcycles* or *the gang on the motorcycles*) affected the frequency of semantic agreement.

3. Acceptability judgments: Experiment 1 and 2

The different factors affecting agreement can sometimes hardly be distinguished, if only corpus data are taken into account. Therefore, additional evidence is needed from experiments that investigate only one factor, keeping the rest constant. The current research focuses on the linear distance and the syntactic domain as separate factors. In two questionnaires, participants were asked for the acceptability of sentences including hybrid nouns combined with syntactic or semantic agreement. The method was a 1-7 Likert scale, where 1 is completely unacceptable and 7 is totally acceptable.

In the experiments, five different nouns were used as between-sentence factor: *Mädchen* ‘girl’, *Au-pair-Mädchen* ‘au pair girl’, *It-Girl* ‘it girl’, *Kind* ‘child’ and *Opfer* ‘victim’. All of them are grammatically neuter and can refer to a female person. The use of different nouns leads to some lexical alternation and prevents participants from detecting the aim of the study and settling on one strategy throughout the questionnaire, which was also ensured by filler sentences. Additionally, with nouns as between-sentence factor, item-specific differences in the agreement pattern can be observed: On the one hand, such differences can be due to different concepts. The age of the referent, for instance, a factor that was detected by Braun & Haig (2010) (cf. section 2.4), differs with those five nouns: *Kind* ‘child’ refers to a young person, *Mädchen* ‘girl’ is rather neutral in this respect, whereas *Au-pair-Mädchen* ‘au pair girl’, *Opfer* ‘victim’⁵ and *It-Girl* ‘it girl’ denote teenage or adult persons, which might be perceived more feminine. On the other hand, there is a distinction between nouns that have an inherent semantic

⁵ The lexical semantics of victim is not specified in terms of age. In the material used in the experiments, however, the context suggested an adult.

gender (*Au-pair-Mädchen* ‘au pair girl’, *It-Girl* ‘it girl’) and those which can refer to male or female persons (*Kind* ‘child’ and *Opfer* ‘victim’). Note that in the questionnaires, semantic agreement always meant feminine gender, i.e. the referents were always female.

3.1. Experiment 1 - relative pronouns and linear distance

The first experiment aims to investigate the effect of linear distance, keeping word class and syntactic domain constant. To ensure this, the element that agrees with the hybrid noun is a relative pronoun, hence it is always in the same domain. The linear distance, however, can be varied by means of extraposition. As mentioned in section 2.1 and 2.3, relative pronouns usually exhibit syntactic agreement, although semantic agreement has occasionally been found in corpus studies (cf. Köpcke & Zubin 2009). 24 native speakers of German participated in the study. They were asked to base their judgments on their intuition and not on prescriptive rules.

The material consisted of 30 test items plus 50 fillers, which contained fully acceptable and fully unacceptable sentences. The experiment had a 2x3 design: linear distance was manipulated by extraposition of the relative clause and the factor agreement type had three levels: semantic, syntactic and control, i.e. agreement with a noun that did not have a conflict between grammatical and syntactic gender. The control condition was chosen to test if the conflict of the gender features itself leads to lower acceptability scores with syntactic and semantic agreement. (8) and (9) show an example of the material in the two structural conditions and the different kinds of agreement. Note that the factor structure does not mean that the sentences are the same in the adjacent and the extraposed condition: the distance was created by adding adverbs as additional material.⁶ Each of the five nouns used in the material occurred in six different test items.

(8) Adjacent:

- a. Peter mag **das** **Mädchen, das** ihm bei den Hausaufgaben hilft.
Peter likes **the-NEUT. girl** **who-NEUT.** him with the homework helps
- b. Peter mag **das** **Mädchen, die** ihm bei den Hausaufgaben hilft.
Peter likes **the-NEUT. girl** **who-FEM.** him with the homework helps
'Peter likes the girl who helps him with the homework.'
- c. Peter mag **die** **Mitschülerin, die** ihm bei den Hausaufgaben hilft.
Peter likes **the-FEM. fellow student** **who-FEM.** him with the homework helps
'Peter likes the the fellow student who helps him with the homework.'

(9) Extraposed:

- a. Peter soll **das** **Mädchen** auch wirklich gerne mögen,
Peter is rumoured to **the-NEUT. girl** also really much like
das ihm bei den Hausaufgaben hilft.
who-NEUT. him with the homework helps

⁶ To avoid effects of attraction, no nouns intervened.

- b. Peter soll **das Mädchen** auch wirklich gerne mögen,
Peter is rumoured to **the-NEUT. girl** also really much like,
die ihm bei den Hausaufgaben hilft.
who-FEM. him with the homework helps
'Peter is rumoured to like the girl very much, who helps him with the homework.'
- c. Peter soll **die Mitschülerin** auch wirklich gerne mögen,
Peter is rumoured to **the-FEM. fellow student** also really much like,
die ihm bei den Hausaufgaben hilft.
who-FEM. him with the homework helps
'Peter is rumoured to like the fellow student very much, who helps him with the homework.'

For the statistical analysis, linear mixed effects models were created, using the software R (R Core Team 2017) and the package `lme4` (Bates et al. 2015). The fixed effects were structure, agreement and the noun. Subject and item were defined as random effects, with random intercepts and random slopes — the latter only for structure and agreement to ensure maximal convergence (cf. Barr et al. 2013). The interaction of the factors was also included in the model. However, the model with all interactions did not converge, therefore two models were created: one with the interaction of structure and agreement, and one with the interaction of noun and agreement. The levels of the factors were defined as contrasts.

The results are given in Table 1 and 2. Figure 1 shows the mean of the acceptability judgment scores, depending on the structure and the kind of agreement. The results are in line with former observations: overall, semantic agreement was rated significantly worse than syntactic agreement ($t = -6.93$)⁷ which was expected, because this is the preferred option with relative pronouns. It is interesting, however, that semantic agreement on relative pronouns does not seem to be completely unacceptable, but rather somewhere in the middle. This is also in line with the agreement hierarchy and occasional findings of relative pronouns with semantic agreement in corpora (cf. section 2.1). There is no difference between syntactic agreement and the control condition.

As for the factor structure, the extraposed condition is significantly less acceptable than the one with the relative clause following the noun ($t = 5.16$). This is not surprising, as extraposed relative clauses have turned out to be less acceptable in previous studies (Uszkoreit et al. 1998; Konieczny 2000) and in the questionnaire, the adjacent relative clauses were also shorter. It is interesting, however, that the judgments for semantic agreement do not decrease as much in the extraposed condition as those for syntactic agreement. This interaction of structure and agreement is significant ($t = -4.19$). It is unclear, however, whether the proportionally better ratings for semantic agreement in the extraposed condition could, to some extent, also be due to the fact the scores in this condition are already rather low. Nevertheless, it is evidence in favor of linear distance as a factor, because in the extraposed condition, the relative pronoun is further away from the hybrid noun.

The mean scores for the kinds of agreement by noun can be seen in figure 2. There are no significant differences of the agreement pattern, but there is a tendency for the nouns with a context dependent natural gender (*Kind* 'child' and *Opfer* 'victim') to be rated worse in the semantic agreement condition. To conclude, the results show that for relative pronouns, agreement with

⁷ Following (Barr et al. 2013), a t -value higher than the total value of 2 can be seen as significant. In the cases where a significant value can be found in both models, only the first value will be presented in the text.

	Estimate	Std. Error	t-value
(Intercept)	4.81	0.19	24.83
structure c1 (adjacent – extraposed)	0.96	0.19	5.16
agreement c1 (semantic – syntactic)	-2.37	0.34	-6.93
agreement c2 (control – syntactic)	-0.09	0.12	-0.76
noun c1 (<i>Kind – Opfer</i>)	-0.09	0.12	-0.76
noun c2 (<i>Opfer – Mädchen</i>)	-0.36	0.18	-2.03
noun c3 (<i>Mädchen – It-Girl</i>)	0.14	0.18	0.81
noun c4 (<i>It-Girl – Au-pair-Mädchen</i>)	-0.33	0.18	-1.87
structure c1: agreement c1	-0.90	0.21	-4.19
structure c1: agreement c2	0.38	0.21	1.80

Table 1: Linear mixed effects model 1 – response ~ structure + agreement * noun + (1+structure + agreement|subject) + (1+structure + agreement| item)

	Estimate	Std. Error	t-value
(Intercept)	4.81	0.19	24.82
structure c1 (adjacent – extraposed)	0.96	0.19	5.20
agreement c1 (semantic – syntactic)	-2.37	0.34	-6.98
agreement c2 (control – syntactic)	-0.09	0.12	-0.77
noun c1 (<i>Kind – Opfer</i>)	-0.07	0.18	-0.38
noun c2 (<i>Opfer – Mädchen</i>)	-0.40	0.18	-2.23
noun c3 (<i>Mädchen – It-Girl</i>)	0.17	0.18	0.97
noun c4 (<i>It-Girl – Au-pair-Mädchen</i>)	-0.30	0.18	-1.70
agreement c1: noun c1	0.41	0.39	1.03
agreement c2: noun c1	0.35	0.36	1.00
agreement c1: noun c2	-0.48	0.40	-1.22
agreement c2: noun c2	-0.48	0.36	-1.34
agreement c1: noun c3	0.21	0.40	0.52
agreement c2: noun c3	0.37	0.36	1.05
agreement c1: noun c4	-0.03	0.40	-0.07
agreement c2: noun c4	0.35	0.36	1.00

Table 2: Linear mixed effects model 1 – response ~ structure + agreement * noun + (1+structure + agreement|subject) + (1+structure + agreement| item)

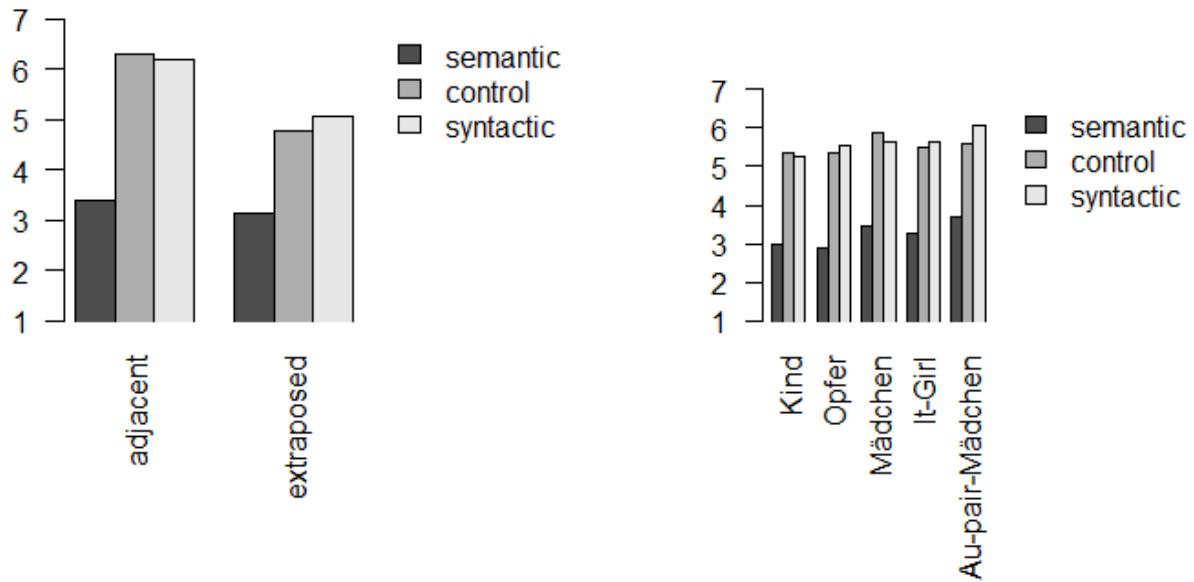


Figure 1: mean scores by agreement and noun structure

Figure 2: mean scores by agreement and noun structure

the syntactic gender of a hybrid noun is preferred. Manipulating the distance between noun and relative pronoun lead to a lower decline of the scores for semantic agreement compared to the syntactic and control condition. This suggests an effect of the linear distance, which was already found in corpus data in the previous literature.

3.2. Experiment 2 - personal pronouns and syntactic domain

While the first experiment investigated linear distance as an influence on the agreement pattern, the second experiment aims at the effect of different syntactic domains, keeping the distance constant. In this study, the type of agreement was manipulated on a personal pronoun: levels were again semantic agreement, syntactic agreement and a control condition with a feminine noun. The syntactic domain was varied by using different sentence structures: the pronoun occurred either in a clause that was subordinated to that containing the hybrid noun, or it was coordinated.⁸ The experiment again had a 2x3 design, 30 experimental items, 6 for each hybrid noun, and 50 fillers. An example of the material with the different levels for agreement is given in (10) for the subordinated condition and in (11) for the coordinated condition. 36 native speakers of German participated in the experiment.

⁸ The variant with coordination instead of a new clause was chosen, because like this, the sentences deviated less from the other condition and also from the filler items, which were partly from other, unrelated experiments.

(10) Subordinate clause:

- a. **Das Mädchen** hat fest zugesagt, dass **es** Peter bei den **The-NEUT. girl** has definitely promised that **it** Peter with the Hausaufgaben hilft.
homework helps
'The girl promised that she will help Peter with the homework.'
- b. **Das Mädchen** hat fest zugesagt, dass **sie** Peter bei den **The-NEUT. girl** has definitely promised that **she** Peter with the Hausaufgaben hilft.
homework helps
'The girl promised that she will help Peter with the homework.'
- c. **Die Studentin** hat fest zugesagt, dass **sie** Peter bei den **The-FEM. student** has definitely promised that **she** Peter with the Hausaufgaben hilft.
homework helps
'The student promised that she will help Peter with the homework.'

(11) Coordinated clause:

- a. **Das Mädchen** lernt selbst viel und **es** hilft Peter bei den **The-NEUT. girl** studies herself much and **it** helps Peter with the Hausaufgaben.
homework
'The girl is studying much by herself and she helps Peter with the homework'
- b. **Das Mädchen** lernt selbst viel und **sie** hilft Peter bei den **The-NEUT. girl** studies herself much and **she** helps Peter with the Hausaufgaben.
homework
'The girl is studying much by herself and she helps Peter with the homework'
- c. **Die Schülerin** lernt selbst viel und **sie** hilft Peter bei den **The-FEM. student** studies herself much and **she** helps Peter with the Hausaufgaben.
homework
'The student is studying much by herself and she helps Peter with the homework'

As in Experiment 1, two linear mixed effects models were used for the statistical analysis. The fixed effects were agreement (syntactic, semantic and control), syntactic domain (subordinated or coordinated), and the different nouns as between-sentence factors. Subjects and items were random effects with random intercepts and random slopes, as in the previous experiment, only for agreement and domain. The models can be found in Tables 3 and 4.

The results show a different pattern with respect to the distribution of semantic and syntactic agreement (cf. figure 3). Overall, syntactic agreement is be rated significantly better ($t = -3.87$) and there is no difference between syntactic agreement and the control condition, like in the previous experiment. However, the significant difference between syntactic and semantic agreement is misleading, as this depends on the hybrid noun in the item. As figure 4 shows, semantic agreement with some nouns is as acceptable as syntactic agreement. The effect of the noun on the contrast between syntactic and semantic agreement is even significant for the nouns *Kind* 'child' and *Opfer* 'victim' compared to those with inherent natural gender ($t = 2.74$ and $t = -6.18$ respectively). Note that these nouns already showed the tendency to be less acceptable

	Estimate	Std. Error	t-value
(Intercept)	5.71	0.16	34.90
domain c1 (subordinated – coordinated)	0.17	0.14	1.21
agreement c1 (semantic – syntactic)	-0.74	0.19	-3.87
agreement c2 (control – syntactic)	-0.04	0.10	-0.43
noun c1 (<i>Kind – Opfer</i>)	-0.52	0.21	-2.45
noun c2 (<i>Opfer – It-Girl</i>)	0.17	0.21	0.78
noun c3 (<i>It-Girl – Au-pair-Mädchen</i>)	-0.06	0.21	-0.28
noun c4 (<i>Au-pair-Mädchen – Mädchen</i>)	-0.05	0.21	-0.24
domain c1: agreement c1	-0.16	0.16	-0.98
domain c1: agreement c2	-0.07	0.16	-0.46

Table 3: Linear mixed effects model 1 – response ~ domain * agreement + noun + (1+domain + agreement|subject) + (1+domain + agreement| item)

	Estimate	Std. Error	t-value
(Intercept)	5.71	0.15	36.85
domain c1 (subordinated – coordinated)	0.17	0.14	1.21
agreement c1 (semantic – syntactic)	-0.74	0.14	-5.33
agreement c2 (control – syntactic)	-0.04	0.10	-0.44
noun c1 (<i>Kind – Opfer</i>)	-0.29	0.23	-1.28
noun c2 (<i>Opfer – It-Girl</i>)	0.38	0.23	-1.67
noun c3 (<i>It-Girl – Au-pair-Mädchen</i>)	-0.11	0.23	-0.48
noun c4 (<i>Au-pair-Mädchen – Mädchen</i>)	-0.05	0.23	-0.21
agreement c1: noun c1	0.75	0.27	2.74
agreement c2: noun c1	-0.09	0.25	0.37
agreement c1: noun c2	-1.69	0.27	-6.18
agreement c2: noun c2	-0.03	0.25	-0.12
agreement c1: noun c3	-0.18	0.27	-0.65
agreement c2: noun c3	-0.06	0.25	-0.23
agreement c1: noun c4	0.32	0.27	1.16
agreement c2: noun c4	0.01	0.25	0.04

Table 4: Linear mixed effects model 1 – response ~ domain + agreement * noun + (1+domain + agreement|subject) + (1+domain + agreement| item)

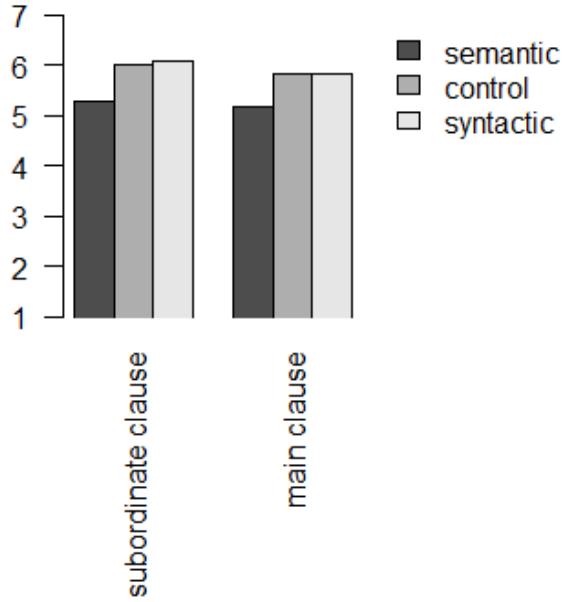


Figure 3: mean scores by agreement and domain

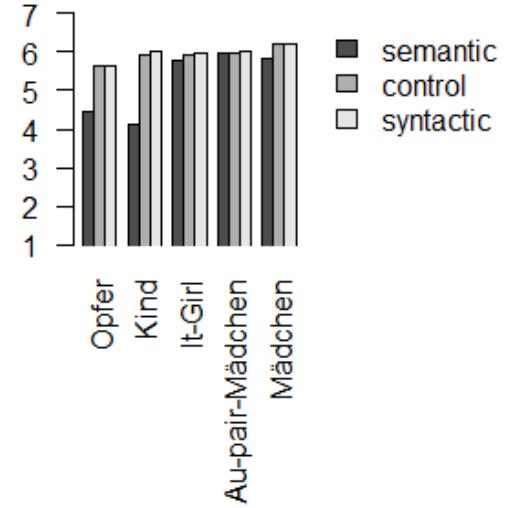


Figure 4: mean scores by agreement and domain

in the semantic condition in Experiment 1. The results also indicate that semantic agreement of personal pronouns is much more acceptable compared to the relative pronouns in Experiment 1. This is predicted by the agreement hierarchy, as personal pronouns are ranked higher and thus more likely to exhibit semantic agreement (Corbett 1979; cf. section 2.1).

As for the factor syntactic domain, there is no significant difference in the agreement pattern, as can be seen in figure 3. This suggests that the difference between a subordinated or coordinated structure with respect to the clause containing the hybrid noun does not influence the preferred kind of agreement. There might be different explanations: (i) The syntactic domain usually goes along with an increased linear distance and therefore this factor can be found in corpus data, but not in controlled experiments. (ii) The change from syntactic to semantic agreement requires longer reference chains, i.e. more context, which is suggested by Thurmail (2006). (iii) The structural difference between coordinated and subordinated clauses is too subtle and therefore does not count as a sentence boundary. (vi) The difference does not surface in the acceptability of the kind of agreement, as semantic agreement is in general mostly acceptable with personal pronouns, but it only influences production. (iii) and (vi) will be tested further in Experiment 3.

4. Production: Experiment 3

Investigating the acceptability of syntactic and semantic agreement with hybrid nouns is interesting, because with this method it is possible to obtain results for combinations that might not occur in production. For subtle effects of factors like different structures, it also helps to test which variant is actually produced: in this case, subjects have to decide online on either semantic or syntactic agreement. As Experiment 2 did not show any results indicating a difference in

the agreement pattern depending on the occurrence of a pronoun in a subordinate or coordinated clause, this factor will be further investigated in Experiment 3. To make sure that the lack of an effect in Experiment 2 was not due to the coordinated structure instead of a completely new sentence (i.e. with a full stop in between), this was changed in the production experiment.

4.1. Method and material

In Experiment 3, personal pronouns that agree with a hybrid noun were elicited in a small picture-based sentence continuation task: subjects were shown a sequence of two pictures with a line of text below. The text described the content of the first picture, introducing the hybrid noun. They were asked to read the text out loud and to continue it, which means to describe the second picture. As the person on the first picture was also in the second one, it was natural to use a personal pronoun as a referential expression. In figures 5 and 6, an example of the material is presented. There were only two conditions: either the pronoun is expected to appear in a subordinate clause of the one containing the noun (5), or to appear in a new clause (6). Besides controlling for the noun subjects use, the text below the picture also ensures that the number of words between the noun and the pronoun remains constant in both conditions: in German, pronouns usually appear directly after the complementizer in a subordinate clause or after the verb in second position in a main clause, if SpecCP is occupied by an adverbial phrase.⁹ The noun in the experiment were the same as in the experiments before: *Mädchen* ‘girl’, *Au-pair-Mädchen* ‘au pair girl’, *It-Girl* ‘it girl’, *Kind* ‘child’ and *Opfer* ‘victim’. There were 10 test items, hence 2 different picture sequences per noun, and 20 fillers. Again, all the referents, i.e. the persons in the pictures of the test items, were female.¹⁰ 20 native speakers of German participated in the experiment.

4.2. Results

The responses were documented and the agreement of the personal pronoun was coded as syntactic or semantic. Only the responses in which a personal pronoun referring to the hybrid noun occurred in the intended distance were taken into account. This was the case in 187 out of 200 possible responses. A generalized linear mixed effects model was created, with syntactic domain and noun as fixed effects and subject and item as random effects. Due to the rather low number of items and participants in this experiment, the model was simpler than in the previous experiments: the random effects only had random intercepts and no interaction between the fixed effects was modeled.

Overall, neuter, i.e. syntactic, agreement is produced slightly more often, in 57,2% of the 187 cases. The results of the statistical analysis can be found in Table 5. There is no significant effect of the syntactic domain, i.e. the contrast between a subordinate and a new clause. In fact,

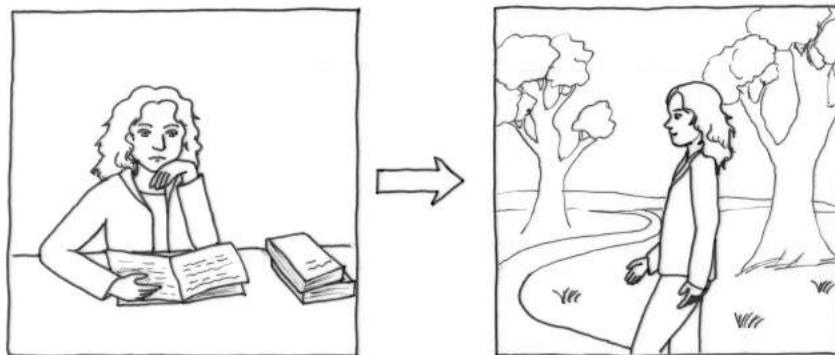
⁹ Note that in the condition with a new clause, only 4 words occur between the noun and the pronoun. This is the case, because German requires a verb in the second position and subjects should be able to choose the verb in order to keep the task more natural.

¹⁰ The appearance and age of the persons on the pictures was kept as neutral as possible, especially in terms of age, as this has been detected as a factor, see section 2.4, Braun & Haig (2010). This should ensure that the influence of the noun itself was measured, rather than an effect of the appearance. The decision, however, was only based on intuition.



Das Mädchen sagt noch schnell Bescheid, dass...

Figure 5: example of the material in Experiment 3: condition a – subordinate clause
 ‘The girl just quickly calls in that...’



Das Mädchen lernt sehr viel. Später...

Figure 6: example of the material in Experiment 3: condition b – new clause
 ‘The girl is studying very much. Later...’

	Estimate	Std. Error	<i>z</i> -value	Pr(> <i>z</i>)
(Intercept)	-0.56	0.29	-1.94	0.05
domain c1 (main clause – subordinate clause)	0.08	0.36	0.24	0.81
noun c1 (<i>Kind</i> – <i>Opfer</i>)	-2.16	0.96	-2.24	0.03 *
noun c2 (<i>Opfer</i> – <i>Au-pair-Mädchen</i>)	-1.16	0.70	-1.65	0.10 .
noun c3 (<i>Au-pair-Mädchen</i> – <i>Mädchen</i>)	-0.43	0.66	-0.65	0.51
noun c4 (<i>Mädchen</i> – <i>It-Girl</i>)	-0.21	0.67	-0.31	0.76

Table 5: General linear mixed effects model (fit by maximum likelihood (laplace approximation)), agreement ~ domain + noun + (1|subject) + (1|item)

Signif. Codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

domain	syntactic agreement (%)	semantic agreement (%)
new main clause	52 (56,5%)	40 (43,5%)
subordinate clause	55 (57,9%)	40 (42,1%)

Table 6: Cases of syntactic and semantic agreement by syntactic domain.

the distribution of syntactic and semantic agreement by syntactic domain (cf. Table 6) reveals that there is no difference at all between the conditions. A small effect can be found with the noun that was used in the item (cf. figure 7): whereas for the nouns *Mädchen* ‘girl’, *Au-pair-Mädchen* ‘au pair girl’ and *It-Girl* ‘it girl’ semantic agreement was frequent, it occurred almost never with *Kind* ‘child’ and seldom with *Opfer* ‘victim’. The difference of these two nouns to the next noun in the ranking was significant ($p = 0.03$) for the contrast from *Kind* to *Opfer* and slightly significant ($p = 0.10$) from *Opfer* to *Au-pair-Mädchen*. As the dataset is quite small, it is difficult to obtain significant results. Therefore, the results can only be seen as a tendency. Compared to the results of the previous experiments, especially Experiment 2, the fact that semantic agreement is always less preferred or less often produced with those two nouns seems to be quite robust. This suggests that there is a difference between nouns with an inherent semantic gender and nouns that can refer to male or female persons. Although there seems to be an effect of the noun, it should also be mentioned that with some nouns (i.e. *Mädchen* ‘girl’ and *It-Girl* ‘it girl’), the distribution of semantic and syntactic agreement varied in the two picture sequences for each noun. Hence, there also seem to be conceptual factors influencing the agreement pattern, which cannot easily be explained.¹¹

5. Discussion

The overall distribution of syntactic and semantic agreement in the experiments is more or less in line with the previous findings for German and the agreement hierarchy (Corbett 1979; Köpcke & Zubin 2009; Thurmair 2006; Panther 2009; cf. section 2.1): semantic agreement is

¹¹ Interestingly, there was one picture sequence for the noun *It-Girl*, in which the second picture depicted her on her wedding. Contrary to the findings of Robinson (2010) in Grimm’s fairy tales, semantic agreement did not occur more often with this item (only in 47,4% of the responses).

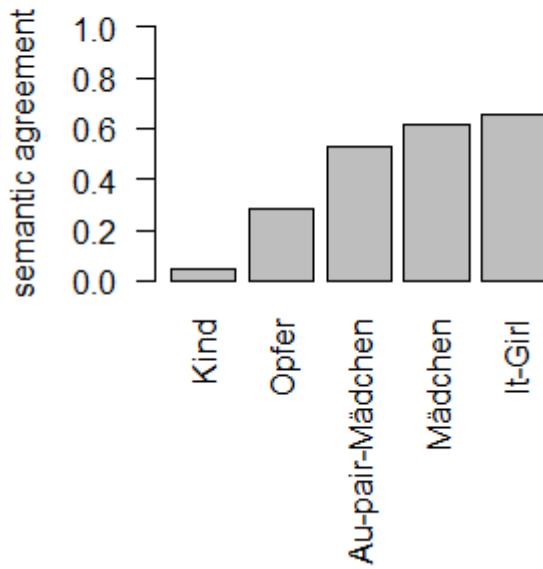


Figure 7: Occurrence of semantic agreement by noun

less acceptable with relative pronouns than with personal pronouns. It is interesting, however, that semantic agreement was not fully unacceptable in Experiment 1. This suggests that occasional instances found by e.g. Köpcke & Zubin (2009:141) are more than simply production errors. To test this more systematically, gender agreement mismatches which are not due to hybrid nouns and therefore ungrammatical could be included in a study as controls. There is another aspect concerning the agreement with relative pronouns, which unfortunately could not be considered in this study: as it is suggested that restrictive and appositive relative clauses have a different structure (Fabricius-Hansen 2009), it would be interesting to compare the effect on agreement with hybrid nouns. A prediction would be that in appositive relative clauses semantic agreement is more acceptable, as it is structurally and semantically less integrated in the DP.

The difference between syntactic and semantic agreement is much smaller when a personal pronoun agrees with a hybrid noun, as in Experiment 2 and 3. For some hybrid nouns, semantic and syntactic agreement were even equally acceptable. Thurmail (2006) claims that semantic agreement is the preferred variant — this was not the case in these experiments. It should be mentioned, however, that the experiments differ from natural speech, especially because the sentences lack context and because only one pronoun that is co-referent with the hybrid noun is considered. Thurmail's reference chains (cf. section 2.2) show that shortly after the noun, syntactic agreement of a personal pronoun can still be found, but the following pronouns will shift to semantic agreement.

Considering experiment 2 and 3, the results show congruency with respect to the agreement pattern in general, the missing effect of the domain and the differences between the nouns. This not only supports the lack of an effect of the domain, but it is also noteworthy that the production reflects the acceptability judgments. Hence, the combination of different methods and the comparison of modalities seems to be a useful way to obtain an overall picture of the

phenomenon.

In Experiment 1, evidence for an effect of linear distance in favor of semantic agreement could be seen (cf. section 3.1). The linear distance already was a robust factor in the literature, based on corpus data, hence the result is not surprising. Additionally, there could also be an effect of the higher complexity of extraposed relative clauses (cf. Uszkoreit et al. 1998; Konieczny 2000). It is likely that higher demands on working memory in general could affect the agreement, leading to a faster decay of the influence of the syntactic gender feature. Such higher working memory demands could also have language external reasons. A study of Vogels et al. (2015) shows that, when distracted, speakers produce often produce explicit referential forms in cases where personal pronouns would be appropriate, which suggests that establishing co-reference with pronouns is in general more difficult. Therefore, it would be interesting to test how distraction affects the agreement of pronouns with hybrid nouns.

An influence of the syntactic domain was not observed in Experiment 2 and 3. There could be several explanations for the lack of an effect of a sentence boundary. First, from a purely syntactic point of view, pronouns are not affected by the operation Agree; the agreement is established by a different mechanism (e.g. Adger 2003:134). Therefore it is possible that syntactic configurations do not influence the agreement pattern, as would be the case e.g. with verbal agreement, like number agreement in some varieties of English (Smith 2015). A second reason could be that memory loss due to a sentence boundary generally does not have any effect on gender features at all. The study by Schweppe et al. (2009) could be considered for this hypothesis. However, this cannot mean a general robustness of the syntactic gender feature, as it apparently decays with linear distance, if a pronoun agrees with a hybrid noun. Thirdly, as the idea of a higher likelihood of semantic agreement in new sentences is based on corpus data, it could be possible that the experimental setting was too unnatural, lacking contextual information. If this was the case, however, it would still prove that there is no structural, but rather a pragmatic influence of the syntactic domain for pronouns.

As opposed to former experiments (cf. Braun & Haig 2010; Leser-Cronau 2018), not only the frequent hybrid noun *Mädchen* ‘girl’ was taken into account, but four additional lexemes. Two of them were closely related to *Mädchen*, as *Au-pair-Mädchen* ‘au pair girl’ is derived from this noun and *It-Girl* ‘it girl’ contains the English translation, but they still denote different concepts (e.g. they are more specified in terms of age). The other two lexemes were particularly interesting, as they can denote male or female referents, depending on the context. And indeed, all experiments show a tendency for those nouns to occur with syntactic agreement. These results suggest that the semantic gender feature is more closely connected to the noun, when it is part of its lexical semantics. However, it still needs to be possible for contextual information to influence the agreement, as semantic agreement was also acceptable with *Kind* ‘child’ and *Opfer* ‘victim’. The preference for syntactic agreement with these two nouns could also be influenced by the fact that a generic use or a use in cases where the gender of the person is not relevant is possible as well. Although this primarily only speaks for a higher acceptance of syntactic agreement in comparison to nouns with unambiguous semantic gender — a finding that could not be observed in the study — the frequency of this combination could also influence the pattern (see e.g. MacDonald 2013 for frequency effects in general). Apparently, the interaction of lexical, semantic and syntactic gender features is rather complex and not every hybrid noun leads to agreement mismatches in the same way. Another interesting observation is that the production study differed slightly from Experiment 2 with respect to the agreement with *Kind* ‘child’: although semantic agreement with *Kind* and *Opfer* was rated approximately

equally acceptable with these two nouns in Experiment 2, semantic agreement was almost never produced in the items with *Kind*, but occasionally with *Opfer*. This could either be due to the fact that variants that are not produced are still acceptable, or it could indicate that the picture reinforces conceptual effects like age of the referent. As the dataset in the third experiment was still rather small, this has to be investigated further. Moreover, to avoid possible effect of the grammatical or natural gender, grammatically neuter nouns that refer to a female person were used in the experiments. A comparison of hybrid nouns with different grammatical or natural gender pose an interesting research area for future studies. Thurmail (2006:201) assumes that semantic agreement occurs more often when the pronoun refers to a male person than when a female person is denoted. Manipulating the natural gender in an experiment could provide reliable data. If such an effect really occurs, an interesting question would be whether this is due to sociolinguistic factors or if there could be other linguistic causes. However, this is up to future research.

6. Conclusion

The experiments on the agreement pattern with hybrid nouns yielded evidence for an effect of linear distance, as predicted in the literature, but no effect of kind of embedding or sentence boundary, which was also expected. The acceptability of syntactic and semantic agreement depends on the part of speech in a way that is predicted by previous work and cross-linguistic observations. Furthermore, hybrid nouns in German can differ with respect to the acceptability and production of semantic agreement, depending on lexical properties.

Although at least in German, the phenomenon of hybrid agreement is restricted to a few lexemes denoting persons, it can still reveal a lot about agreement in general. The existence of agreement with semantic features and especially the conceptual influences on the occurrence of mismatches also show that language is not driven exclusively by abstract syntactic features. The investigation of the processing and production of agreement (mis-)matches with hybrid nouns can also shed light on the effect of memory on syntactic information. The aim of this study was to obtain an overview of the agreement pattern and the effect of several factors in a controlled experimental setting. Future research is still necessary to determine the exact reason for an effect of the linear distance and differences of the lexemes. Furthermore, a comparison of the German data with experiments on the agreement of hybrid nouns in other languages like Dutch and Russian could also be of interest.

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Abbreviations

C	common gender
DEF	definite article
DEM	demonstrative pronoun
FEM	feminine
MASC	masculine
N/NEUT	neuter
PRO	pronoun
SG	singular

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Gapping is not low coordination

Evidence from Russian

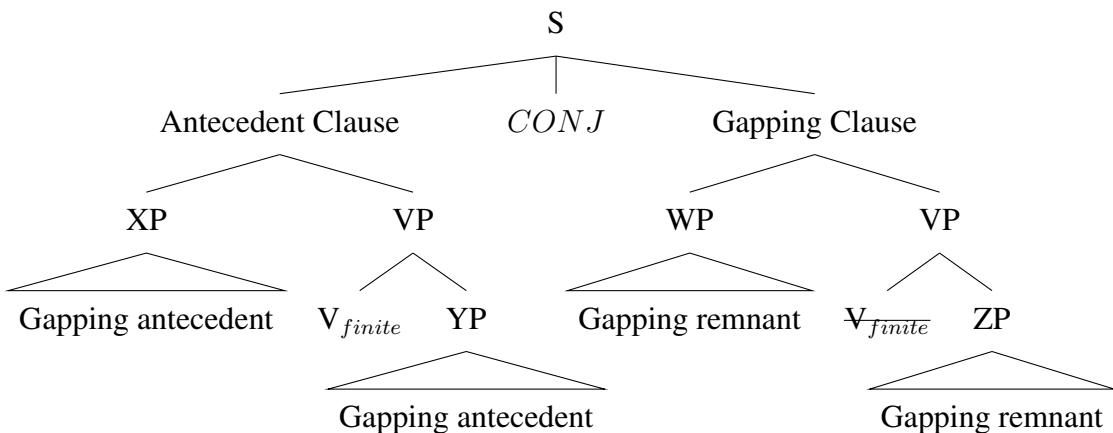
Aleksandr Kalinin

Johnson (2009) analyses Gapping as across-the-board extraction (henceforth referred to as ATB-extraction or ATB-movement) from the coordination of vPs, which is referred to as *low coordination*. The contribution of this article is to present and discuss some problematic data for this approach from Russian. The data include licensing subordinate conjunctions, initial coordinators, a problem for chain reduction, and sentential adverbs.

1. Introduction

Generally speaking, Gapping is a subtype of verbal ellipsis. Schematically, it can be represented in (1), where XP is contrasted with WP, and YP is contrasted with ZP.

(1)



(2) introduces Gapping in English and Russian.

- (2) a. Some ate pizza and others ate soup.
 b. Odni s'eli pizzu, a drugie s'eli sup.
 some.NOM ate pizza.ACC and others.NOM ate soup.ACC
 'Some ate pizza and others ate soup.'

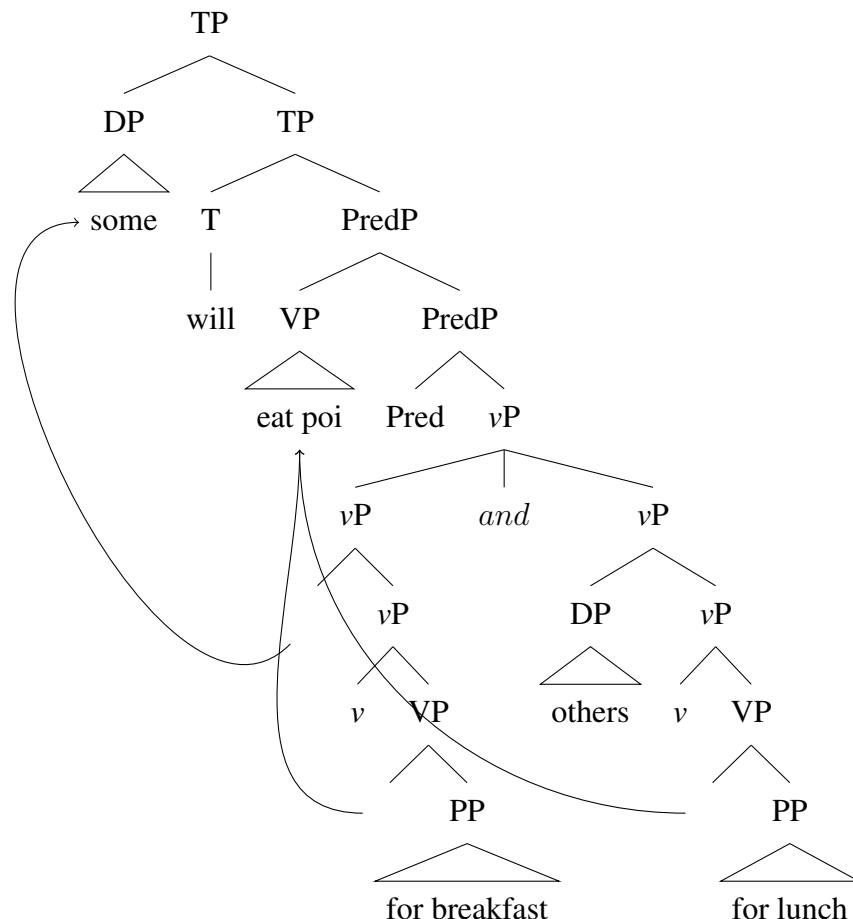
However, it would be more precise to say that Gapping elides not only the finite verb, but also all other elements that can be restored from the antecedent clause, as I demonstrate in (3).

- (3) a. Peter gave a dollar to Alex, and Sam gave a pound to Alex.
 b. Saša est ris po ponedel'nikam, a Petja est ris po pjatnicam.
 Fridays
 'Alex eats rice on Mondays, and Peter eats rice on Fridays.'

It can be said that the remnants of Gapping must introduce new information that was not mentioned in the antecedent clause (see Kuno 1976).

In his paper of 2009, Johnson introduces an analysis based on ATB-movement. He attempts to represent a rule of Gapping as a set of movement operations, which can only take place in low-coordination constructions. Low coordination requires the union of multiple vP under one T-head. Example (4) (see Johnson 2009:23) demonstrates the final version of Johnson's approach, which involves low coordination and ATB-movement.

(4)



(4) represents two key traits of Johnson's concept of Gapping. First of all, Gapping is treated as a special instance of across-the-board movement. The VPs *eat poi* are moved into [Spec, PredP], a position which is specifically reserved for VP-movement. Secondly, Johnson's Gapping operates only within the coordination of vPs rather than TPs. Such coordination is also referred to as low coordination. Thus, low coordination of vPs is a cornerstone of Johnson (2009).

However, Johnson's hypothesis does not seem to be valid for Russian. Gapping in Russian poses a number of challenges to any account of Gapping based on low coordination. We shall consider these issues in detail and see whether they can be properly explained by low coordination.

2. Coordinate structure constraint

In this subsection, we will test the most relevant conjunctions to unravel their subordinate or coordinate nature. This can be achieved on the basis of the coordinate structure constraint (CSC). The essence of the CSC is that applying syntactic operations, e.g. movement, only to one conjunct leads to ungrammatical results. The conjunctions tested below will demonstrate different results once used in a Gapping environment. These discrepancies will provide a challenge for the current approach to Gapping. However, we shall postpone further discussion until the next section.

The conjunction *i* 'and' is used for the coordination of clauses. It is also exploited to indicate that the second clause is an expected consequence of the first one. In (5-a), the proposition *the boss appreciated that* can be regarded as a natural consequence of the proposition *the work was done on time*. This justifies the use of *i* 'and'.

The problem with the wh-movement is that the wh-pronoun *čto* 'what' is extracted only from the first conjunct. In (5), since the same type of extraction does not take place in the second conjunct, the coordinate structure constraint is violated and the sentence is rendered ungrammatical.

- (5) a. Rabota byla vypolnena vovremja, **i** načal'nik èto ocenil.
 work.NOM was done on.time and boss.NOM this appreciated
 'The work was done on time, and the boss appreciated that'
- b. *Čto bylo vypolneno vovremja, **i** načal'nik èto ocenil?
 what.NOM was done on.time and boss.NOM this.ACC appreciated
 'What was done on time, and the boss appreciated that?'

In (6), the conjunction *a* 'and' is used to indicate that the second clause is an unexpected consequence of the first one as it would have been expected to have an umbrella if it had been raining outside.

- (6) a. Na ulice šel dožd', **a** zonta u menja ne bylo.
 on street.LOC went rain.NOM and umbrella.GEN with I.GEN not was
 'It was raining outside, and I did not have an umbrella.'
- b. *Gde šel dožd', **a** zonta u menja ne bylo?
 where went rain.NOM and umbrella.GEN with I.GEN not was
 'Where was it raining, and I did not have an umbrella?'

In (7), the conjunction *no* ‘but’ prohibits the extraction that does not operate in an across-the-board fashion.

- (7) *Gde šel dožd', **no** zonta u menja ne bylo?
 where went rain.NOM but umbrella.GEN with I.GEN not was
 ‘Where was it raining, but I did not have an umbrella?’

In (8), the conjunction *odnako* ‘but’ prohibits the extraction that does not operate in an across-the-board fashion.

- (8) *Gde šel dožd', **odnako** zonta u menja ne bylo?
 where went rain.NOM but umbrella.GEN with I.GEN not was
 ‘Where was it raining, but I did not have an umbrella?’

Extraction from coordinated clauses can only occur in an across-the-board fashion (see Williams 1978). Across-the-board movement simultaneously extracts a constituent from multiple coordinated clauses. Examples (9), (10), (11), and (12) show that the DP *dramy Šekspira* ‘Shakespeare’s tragedies’ can be simultaneously moved from clauses coordinated by various conjunctions to form wh-questions.

- (9) a. Saša nenavidit dramy Šekspira, **i** Petja bogotvorit
 Alex.NOM hates tragedies.ACC Shakespeare.GEN and Peter.NOM adores
 dramy Šekspira.
 tragedies.ACC Shakespeare.GEN
 ‘Alex hates Shakespeare’s tragedies, and Peter adores Shakespeare’s tragedies.’
- b. Čto Saša nenavidit, **i** Petja bogotvorit?
 who.ACC Alex.NOM hates and Peter.NOM adores
 ‘What does Alex hate, and Peter adore?’
- (10) a. Saša nenavidit dramy Šekspira, **a** Petja bogotvorit
 Alex.NOM hates tragedies.ACC Shakespeare.GEN and Peter.NOM adores
 dramy Šekspira.
 tragedies.ACC Shakespeare.GEN
 ‘Alex hates Shakespeare’s tragedies, and Peter adores Shakespeare’s tragedies’
- b. Čto Saša nenavidit, **a** Petja bogotvorit?
 who.ACC Alex.NOM hates and Peter.NOM adores
 ‘What does Alex hate, and Peter adore?’
- (11) a. Saša nenavidit dramy Šekspira, **no** Petja bogotvorit
 Alex.NOM hates tragedies.ACC Shakespeare.GEN but Peter.NOM adores
 dramy Šekspira.
 tragedies.ACC Shakespeare.GEN
 ‘Alex hates Shakespeare’s tragedies, and Peter adores Shakespeare’s tragedies’
- b. Čto Saša nenavidit, **no** Petja bogotvorit?
 who.ACC Alex.NOM hates but Peter.NOM adores
 ‘What does Alex hate, but Peter adore?’

- (12) a. Saša nenavidi dramy Šekspira, **odnako** Petja
 Alex.NOM hates tragedies.ACC Shakespeare.GEN but Peter.NOM
 bogotvorit dramy Šekspira.
 adores tragedies.ACC Shakespeare.GEN
 ‘Alex hates Shakespeare’s tragedies, and Peter adores Shakespeare’s tragedies’
- b. Čto Saša nenavidi, **odnako** Petja bogotvorit?
 who.ACC Alex.NOM hates but Peter.NOM adores
 ‘What does Alex hate, but Peter adore?’

In (13), the subordinate conjunctions *v to vremya kak* ‘while’, on the other hand, is not subject to the Coordinate Structure Constraint. This is due to the fact that subordinated clauses are merged as adjuncts and do not constitute an island with the main clause.

- (13) a. Petja igraet na gitare, **v to vremya kak** Miša poet pesnu.
 Peter.NOM plays on guitar.LOC **at the time when** Mike.NOM sings song.ACC
 ‘Peter plays the guitar, while Mike sings a song’
- b. Na čem igraet Petja, **v to vremya kak** Miša poet pesnu?
 on what.LOC plays Peter.NOM **at the time when** Mike.NOM sings song.ACC
 ‘What does Peter play, while Mike sings a song?’

As demonstrated in (14), ATB-movement is also available for the conjunction *v to vremya kak* ‘while’.

- (14) a. Petja ljubit syr, **v to vremya kak** Miša nenaudit syr.
 Peter.NOM likes cheese.ACC **at the time when** Mike.NOM hates cheese.ACC
 ‘Peter likes the cheese, while Mike hates the cheese’
- b. Čto Petja ljubit, **v to vremya kak** Miša nenaudit?
 what.ACC Peter.NOM likes **at the time when** Mike.NOM hates
 ‘What does Peter like, while Mike hate?’

Finally, we obtain the conjunction distribution in Table 1.

Conjunction	Coordinating
<i>i</i> ‘and’	+
<i>a</i> ‘and’	+
<i>no</i> ‘but’	+
<i>odnako</i> ‘but’	+
<i>v to vremya kak</i> ‘while’	-

Table 1: Coordination and Conjunctions

In the next section, it will be demonstrated that *i* and *a* cannot be interchangeably used with Gapping.

3. *The coordinating nature of conjunctions does not always matter*

Under the low coordination approach, I expect that all coordinate conjunctions can license Gapping since they create low coordination configuration. However, there are coordinate conjunctions which do not follow that rule and are not compatible with Gapping. These conjunctions do not demonstrate remarkable syntactic properties when it comes to the coordination of phrasal categories (for the sake of brevity, I will not discuss these tests here). Such conjunctions are represented by *i* ‘and’ in (15), *no* ‘but’ in (16), *odnako* ‘however’ in (17), which, despite their coordinating nature, cannot be used in Gapping contexts.

- (15) *Ja s”el sup, i Maša s”ela kotletu.
I.NOM ate soup.ACC and Mary.NOM ate chop.ACC
‘I ate the soup, and Mary ate the chop.’
- (16) *Saša napisal stixotvorenie, no Petja napisal rasskaz.
Alex.NOM wrote poem.ACC but Peter.NOM wrote short.story.ACC
‘Alex wrote a poem, but Peter wrote a short story.’
- (17) *Miša poexal na more, odnako ego lučšij drug Vanja poexal na
Michael.NOM went on sea.LOC but his best friend.NOM John.NOM went on
daču.
dacha.LOC
‘Michael went to the sea, but his best friend Vanja went to the dacha.’

Preserving the validity of the ATB-account, I should mention that not all coordinate conjunctions are capable of creating the low coordination environment, which is vital for the existence of Gapping. Consequently, I need to establish a filter to distinguish these two subclasses of coordinate conjunctions, as (18) and (19) differ in grammaticality.

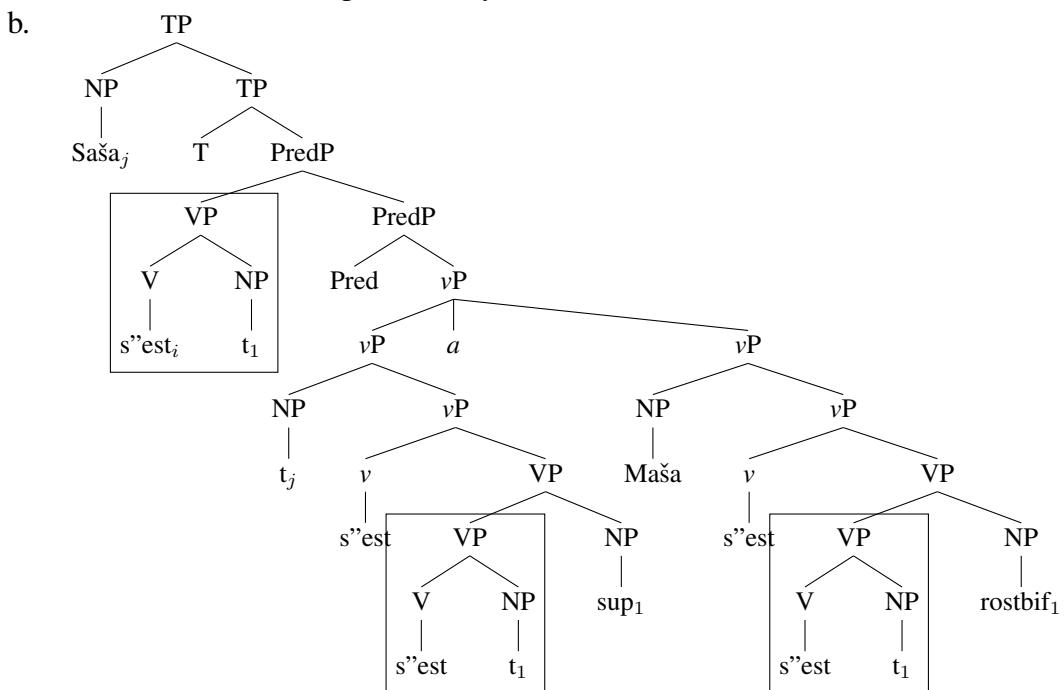
- (18) Saša s”est sup, a Maša s”est rostbif.
Alex.NOM will.eat soup.ACC and Mary will.eat roast.beef.ACC
‘Alex will ate the soup, and Mary will eat the roast beef.’
- (19) *Petja učilsja na filfake, poètomu Saša učilsja na
Peter.NOM studied on philological.department.LOC so Alex.NOM studied on
mexmate.
department.of.mathematics.and.mechanics.LOC
‘Peter attended the philological department, so Alex attended the department of mathematics and mechanics.’

What could be the criterion for sorting these conjunctions into different sets? First of all, let us notice that the semantic relations between conjuncts are obviously not the same. Under the scope of *a* ‘and’, both clauses are of identical informational purpose. Since in example with *a* ‘and’ each clause represents a situation which is contrasted with its counterpart in the neighbouring clause, contrast can be applied forwards and backwards and none of the conjuncts is superior to another. Note that the conjunction *i* ‘and’ cannot be used with Gapping, since it does not imply any contrastive relation between clauses, as demonstrated in (20).

- (20) *Saša s"est sup, i Maša s"est rostbif.
 Alex.NOM will.eat soup.ACC and Mary.NOM will.eat roast.beef.ACC
 'Alex will ate the soup, and Mary will eat the roast beef.'

To put it differently, the relation of contrast presupposes the coincidence of the informational purpose between contrasted clauses. Under the scope of *poètomu* 'so', on the other hand, the first conjunct represents reason and the second one, consequence, thus, not being pragmatically equal. According to this stipulation, sentences (18) and (19) will eventually receive distinct syntactic structures, and only conjunction *a* 'and' creates low coordination of vPs, allowing Gapping to take place. In (21-a), the conjunction *a* 'and' is compatible with Gapping and the syntactic representation of (21-a) is provided in (21-b).

- (21) a. Saša s"est sup, a Maša s"est rostbif.
 Alex.NOM will.eat soup.ACC and Mary.NOM will.eat roast.beef.ACC
 'Alex will ate the soup, and Mary will eat the roast beef.'



4. Subordination that favours Gapping

It seems that now we have the means to subcategorize coordinate conjunctions according to their ability to license Gapping. However, certain subordinating conjunctions are also compatible with Gapping. Russian Gapping, in contrast to its English counterpart, is able to take place in subordinated clauses. For instance, the subordinate conjunction *v to vremja kak* 'while' is perfectly compatible with Gapping. Thus the initial assumption that Gapping requires low coordination is not borne out. *V to vremja kak* 'while' has both temporal and contrastive meaning but the part of the meaning that allows these conjunctions to license Gapping is the contrastive *while*. To put it differently, *v to vremja kak* 'while' emphasizes the differences between clauses.

In (22), *v to vremja kak* 'while' indicates that the arguments of the verbal predicate *learns*

are different in each clause. In the first clause, the agent is *Michael* and the object is *Cicero's speeches*. Obviously, these arguments are not the same as *Alex* and *Icelandic sagas*.

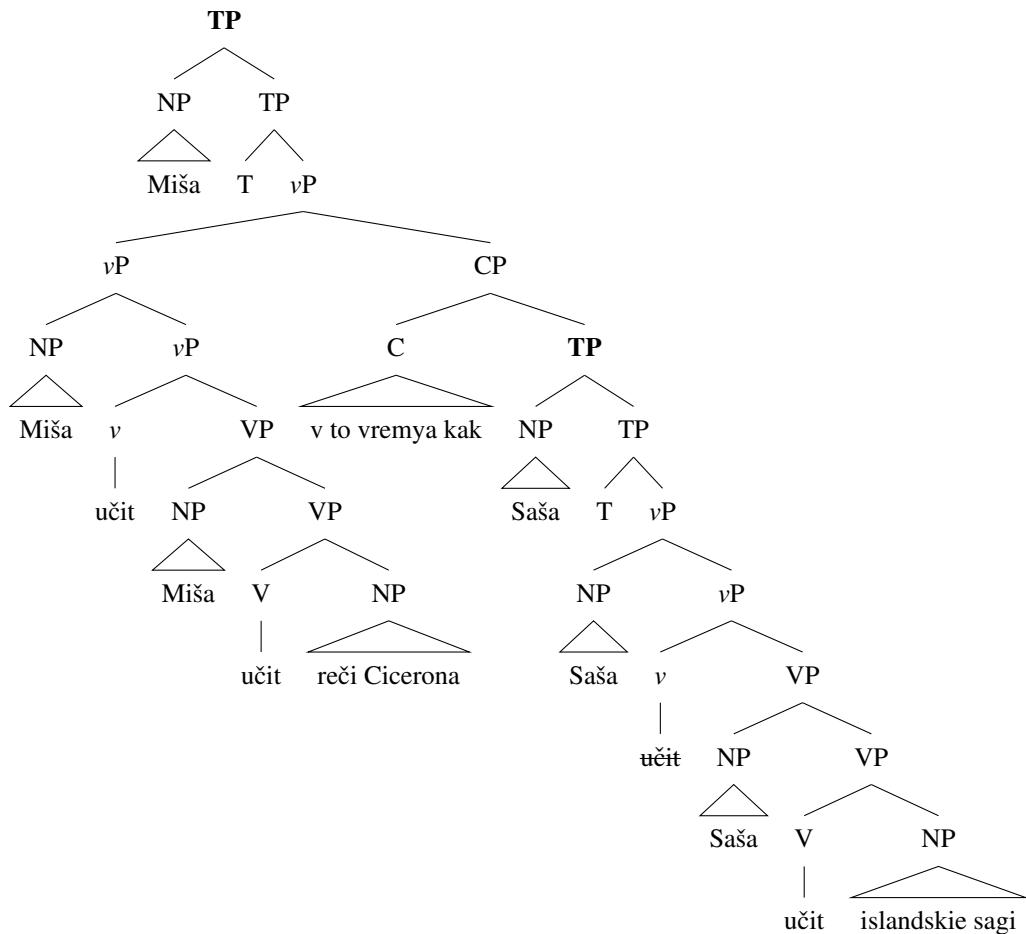
- (22) Miša učit reči Cicerona, v to vremja kak Saša učit
 Michael.NOM learns speeches.ACC Cicero.GEN at the time when Alex.NOM learns
 islandskie sagi.
 Icelandic sagas.ACC
 'Michael learns Cicero's speeches, while Alex learns Icelandic sagas.'

The subordinate conjunction *v to vremja kak* 'while' does not fit into the low coordination paradigm, since this conjunction can be applied only to tensed TPs, not vPs in (23) or tenseless TPs in (24), thus contradicting the definition of low coordination.

- (23) *Petja budet ležat' na divane, v to vremya kak čitat' knigu.
 Peter.NOM will lie.INF on sofa.LOC in that time when read.INF book.ACC
 'Peter will lie on the sofa, while reading a book.'
- (24) *Ja uvidel ležaščego na divane, v to vremya kak čitajuščego
 I.NOM saw lie.PART.ACC on sofa.LOC in that time when read.PART.ACC
 knigu Petju.
 book.ACC Peter.ACC
 'I saw Peter lying on the sofa while reading a book.'

Taking into consideration the application domain of *v to vremya kak* 'while', the sentence in (22) will receive the structural representation in (25).

(25)



The tree in (25) includes two TPs. The deletion takes place in the second TP, while the antecedents are situated in the first TP. Hence, the subordination cannot be considered low under Johnson's (2009) approach.

5. Initial coordinators

Initial coordinators may be defined as focused phrases that mark the beginning of each coordinated phrase. In (26), *either* is merged at the beginning of the first NP and *or* is merged at the beginning of the second NP.

- (26) Either [NP Peter] or [NP Sam] will go to the bank.
COORD XP COORD YP

Initial coordinators can coordinate finite TP. If they can only be merged at the end of the TP derivation (i.e. in the highest [Spec, TP] position), I could use it as a diagnostics of the TP coordination. However, English initial coordinator *either...or* poses a challenge to this diagnostics, as *either* can float, i.e. it can appear in more than one position in a sentence. In (27), *either* can be merged before the T-head *will* or it can occupy the initial position in a sentence.

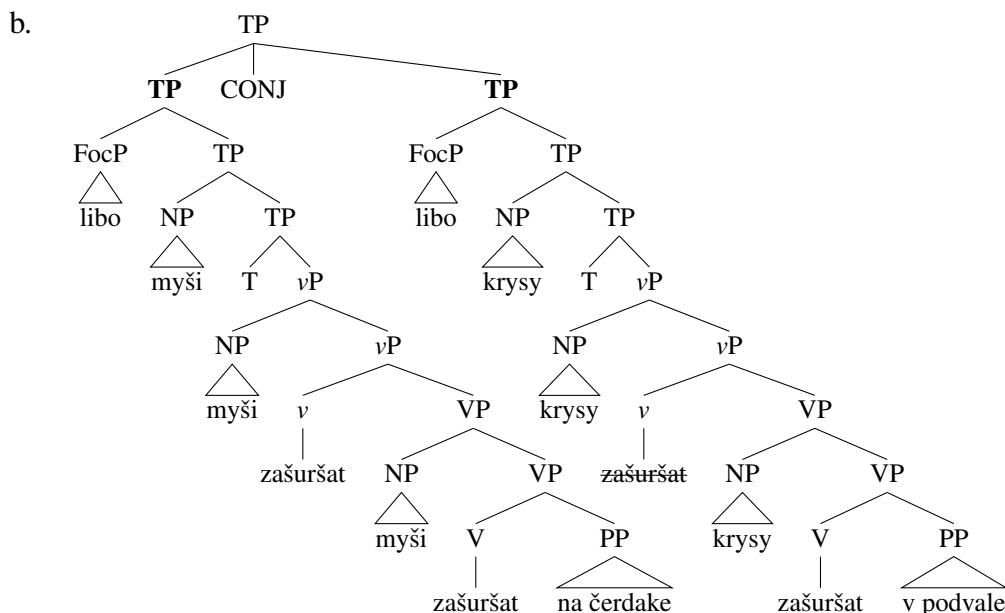
- (27) John will either eat rice or he will eat beans. (Den Dikken 2006:9)

So initial coordinators diagnostics cannot securely determine the height of coordination in English. Nevertheless, initial coordinators can still be exploited to verify the height of coordination, since Russian initial coordinators do not float. It is demonstrated in (28).

- (28) a. **Libo** myši zašuršat na čerdake, **libo** krysy zašuršat v podvale.
 either mice rustle.PRES.3PL on attic.LOC or rats rustle.PRES.3PL in basement.LOC
 ‘Either mice rustle in the attic, or rats **rustle** in the basement.’
- b. *Myši **libo** zašuršat na čerdake, krysy **libo** zašuršat v
 mice either rustle.PRES.3PL on attic.LOC rats or rustle.PRES.3PL in
 podvale.
 basement.LOC
 ‘Either mice rustle in the attic, or rats **rustle** in the basement.’
- c. *Myši **libo** zašuršat na čerdake, **libo** krysy zašuršat v
 mice either rustle.PRES.3PL on attic.LOC or rats rustle.PRES.3PL in
 podvale.
 basement.LOC
 ‘Either mice rustle in the attic, or rats **rustle** in the basement.’

Each of the initially coordinated TP contains an independent T-head, violating the low coordination requirement. Nevertheless, initial coordinators do provide a perfect environment for Gapping in Russian, which is demonstrated in (29).

- (29) a. **Libo** myši zašuršat na čerdake, **libo** krysy zašuršat v
 either mice rustle.PRES.3PL on attic.LOC or rats rustle.PRES.3PL in
 podvale.
 basement.LOC
 ‘Either mice rustle in the attic, or rats **rustle** in the basement.’

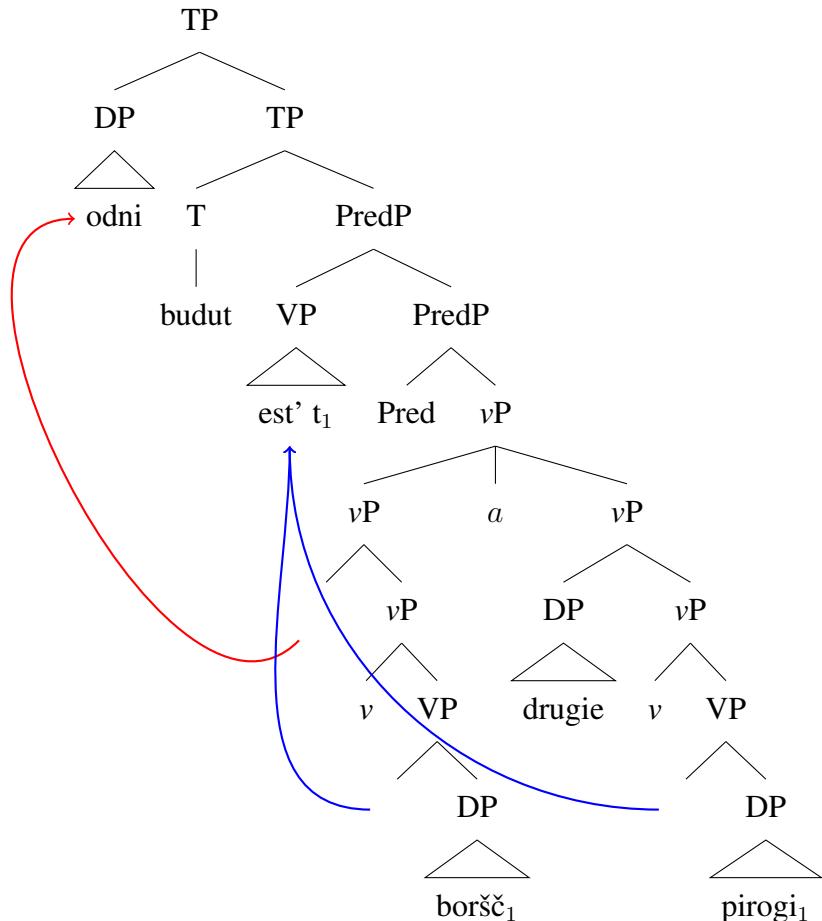


6. Chain reduction and the boršč / pirogi problem

Under the low coordination approach, it is assumed that movement operations involved in Gapping leave indexed traces behind. Hence, according to that design, the sentence in (30-a) will have the tree structure in (30-b).

- (30) a. Odni budut est' boršč, a drugie **budut est'** pirogi.
 some will eat borsh and others will eat pies
 'Some will eat borsh, and others will eat pies.'

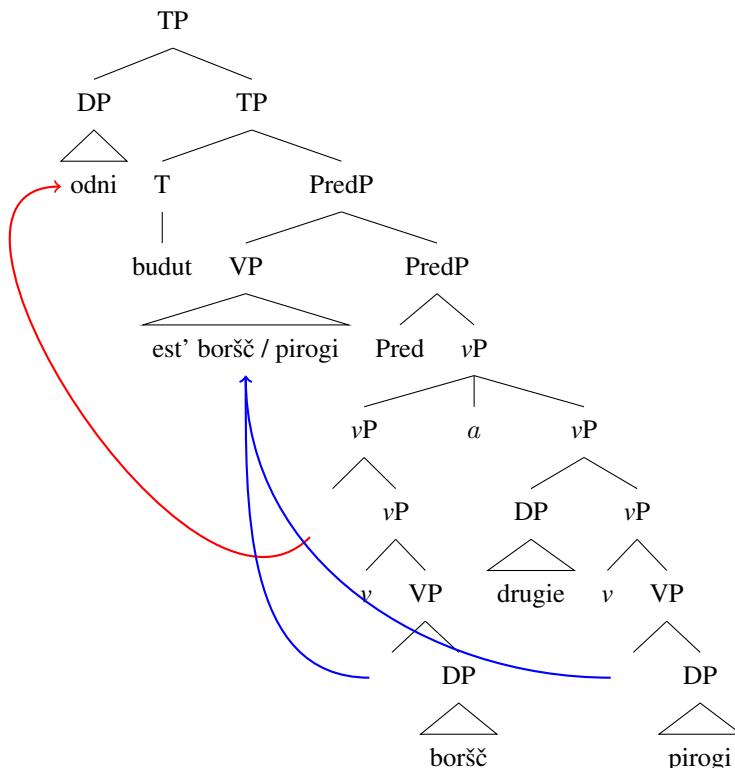
b.



As long as respective traces are co-indexed with the extracted direct objects, the derivation will converge. However, once the Copy theory of Movement is introduced (see Chomsky 1993 and Nunes 2004), the indexed traces can no longer be considered an elementary category. Instead, they are regarded as complex terms that the grammar should dispense with. Under the Copy theory of Movement, the traces are replaced with the respective copies of the moved elements. Hence (30-b) must be altered to comply with this requirement.

In (31), the status of the NP-copy in the highest VP must be clarified. This could be done in the following manner. The VP that is moved to the [Spec, PredP] position contains a complex NP copy *boršč/pirogi* ‘eat borsh/pies’ and has the form of *est’ boršč/pirogi* ‘eat borsh/pies’. This copy is formed during the course of the derivation by amalgamation of the N *boršč* ‘borsh’ and the NP *pirogi* ‘pies’.

(31)



Example (32) would require the highest copy to be an amalgamation of soup and roast-beef, allowing it to eliminate the lower copies properly. However, this innovation would undermine the very Minimalist essence of the Copy Theory of Movement. An apparatus responsible for the amalgamation of copies must be implemented into Narrow Syntax and such theoretical consequence is highly undesirable.

- (32) Odni budut est’ boršč/pirogi, a drugie budut est’ pirogi.
 some will eat borsh/pies and others will eat pies
 ‘Some will eat borsh/pies, and others will eat pies.’

7. Adverbial placement

Russian adverbs differ in their ability to occupy specific places in a clause structure.

- (33) Dom mog byt’ razrušen vragami.
 house.NOM could be destroyed enemies.INSTR
 ‘The house could be destroyed by enemies.’

As I demonstrate in Table 2, there are 6 slots that can host an adverb.

1	Dom	2	mog	3	byt'	4	razrušen	5	vragami	6
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Table 2: Adverbial placement

However, not all slots are available for each adverb. In (34), the epistemic adverb *navernjaka* ‘probably’ can only appear in the first and the second slot.

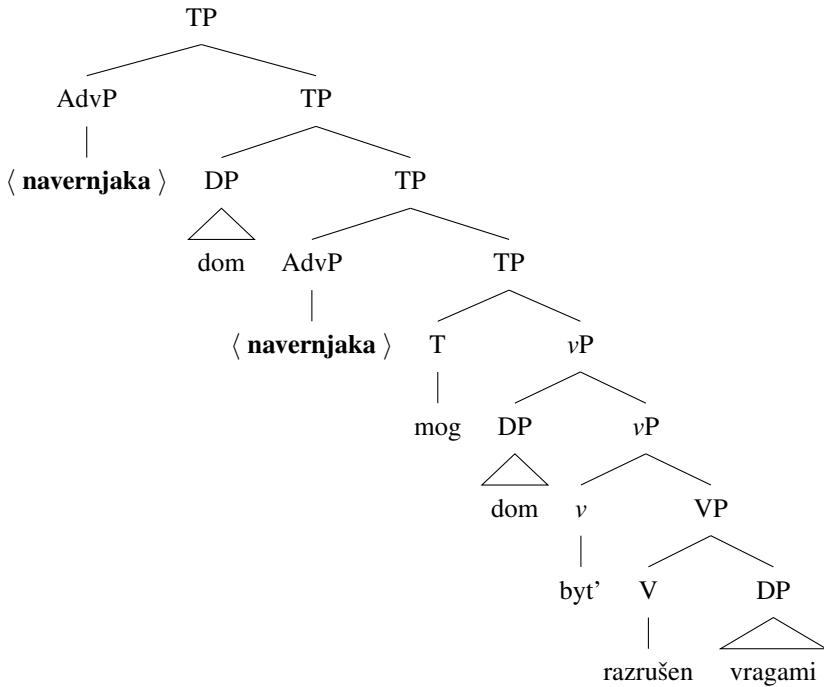
- (34) a. *Navernjaka dom mog byt' razrušen vragami.*
 possibly house could be destroyed enemies
 ‘Possibly, the house could be destroyed by enemies.’
- b. *Dom navernjaka mog byt' razrušen vragami.*
 housecould be destroyed enemies
 ‘The house, possibly, could be destroyed by enemies.’
- c. **Dom mog navernjaka byt' razrušen vragami.*
 house could possibly be destroyed enemies
 ‘The house could possibly be destroyed by enemies.’
- d. **Dom mog byt' navernjaka razrušen vragami.*
 house could be possibly destroyed enemies
 ‘The house could be possibly destroyed by enemies.’
- e. **Dom mog byt' razrušen navernjaka vragami.*
 house could be destroyed possibly enemies
 ‘The house could be destroyed possibly by enemies.’
- f. **Dom mog byt' razrušen vragami navernjaka.*
 house could be destroyed enemies possibly
 ‘The house could be destroyed by enemies possibly.’

In (35), Russian adverb of manner *bystro* ‘quickly’ has a distinct distribution pattern.

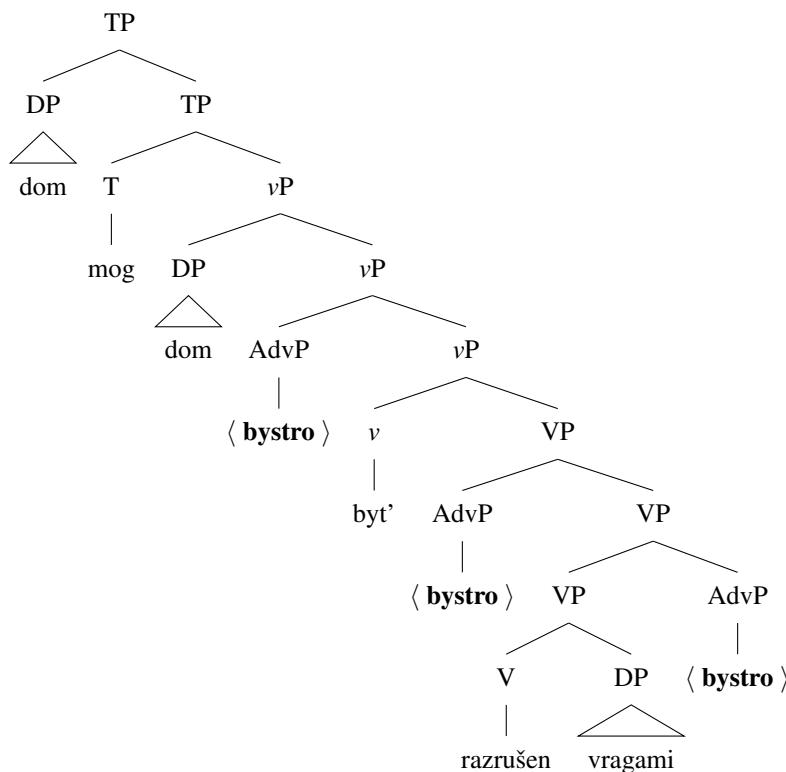
- (35) a. *Bystro* dom mog byt' razrušen vragami.*
 quickly house could be destroyed enemies
 ‘Quickly the house could be destroyed by enemies.’
- b. **Dom bystro mog byt' razrušen vragami.*
 house quickly could be destroyed enemies
 ‘The house quickly could be destroyed by enemies.’
- c. *Dom mog bystro byt' razrušen vragami.*
 house could quickly be destroyed enemies
 ‘The house could quickly be destroyed by enemies.’
- d. *Dom mog byt' bystro razrušen vragami.*
 house could be quickly destroyed enemies
 ‘The house could be quickly destroyed by enemies.’
- e. **Dom mog byt' razrušen bystro vragami.*
 house could be destroyed quickly enemies
 ‘The house could be destroyed quickly by enemies.’
- f. *Dom mog byt' razrušen vragami bystro.*
 house could be destroyed enemies quickly
 ‘The house could be destroyed by enemies quickly.’

In (36), the epistemic adverb *navernjaka* ‘probably’ appears at the TP level and the adverb of manner *bystro* ‘quickly’ appears at the vP/VP level in (37).

(36)



(37)



Since Gapping is perfectly compatible with the epistemic adverb *navernjaka* ‘possibly’, which is obviously a sentential adverb, we can conclude that low coordination cannot account for the cases like (38).

- (38) Saša s"est sup, a Maša navernjaka s"est rostbif.
Alex.NOM will.eat soup.ACC and Mary possibly will.eat roast.beef.ACC
'Alex will ate the soup, and Mary will possibly eat the roast beef.'

8. Conclusion

As demonstrated in the present article, the low coordination account fails to provide a explanation of all the cases of Russian Gapping. Russian Gapping is compatible with specific subordinate conjunctions such as *v to vremya kak* 'while'. Gapping can also occur in conjuncts introduced by initial coordinators like *libo...libo* 'either...or'. The major argument against low coordination is its incompatibility with the Copy theory of Movement (the *boršč / pirogi* problem). To my mind, the proper analysis of Gapping should involve multidominance. However, the formulation of this hypothesis is subject to future research.

Abbreviations

NOM	Nominative
GEN	Genitive
ACC	Accusative
LOC	Locative
INF	Infinitive
INSTR	Instrumental
3PL	Third Person Plural
PART	Participle
PRES	Present

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The role of processing capacity in scope assignment by Mandarin-acquiring children

Shuyan Wang

Children's command of scope knowledge is influenced by many factors, including syntax, pragmatics, and processing capacity (Lidz 2016). This paper uses a covered-box task to investigate Mandarin-acquiring children's interpretation of sentences with a universal quantifier and an indefinite phrase, and a digit-span test to uncover the relation between processing capacity and scope assignments. The results show that Mandarin-speaking children allowed more inverse scope readings than adults, and that a child's acceptance rate of inverse scope readings inversely correlated with his/her scores in backward recalling task. These findings support the proposal of the reference set computation by Reinhart (1999, 2006).

1. Introduction

The interpretation of certain noun phrases generally involves quantification over sets. For example, the quantifier *a* in the DP *a boy* refers to one member in the set of boys available in the context. According to previous studies, sentences with two quantifiers (a universal quantifier and an existential quantifier) in English are ambiguous: they either have the surface scope interpretation or have the inverse scope interpretation, as shown by (1). However, Mandarin has been claimed to exhibit scope rigidity (Huang 1982); it only permits the surface scope reading (see example (2)).

- (1) A dog is chasing every cat.
 - a. There is one dog that is chasing every cat. (Surface scope reading: $\exists > \forall$)
 - b. For each cat, there is a dog chasing it. (Inverse scope reading: $\forall > \exists$)
- (2) you yi-tiao gou zai zhui mei-zhi mao
have one-cl dog prog chase every-cl cat.
'One/a dog is chasing every cat.' (Surface scope reading: $\exists > \forall$)

Such facts potentially complicate the learning process of children who have to generalize the principles from the notoriously poor input. This inspires many a linguist to investigate the developmental pattern of children's command of quantification. Children's command of scope knowledge is influenced by many factors, including syntax, pragmatics, and processing capacity (Lidz 2016). However, few studies have looked into the role of processing capacity.

This paper employs a covered-box task to investigate Mandarin-acquiring children's interpretation of sentences with a universal quantifier and an indefinite phrase, as in (3), and a digit-span test to uncover the relation between processing capacity and scope assignments.

- (3) a. you yi-pi ma zai zhui mei-zhi tuzi
have one-cl horse prog chase every-cl rabbit
'One/a horse is chasing every rabbit.'
- b. mei-tiao gou dou zai zhui yi-zhi mao
every-cl dog all prog chase one-cl cat
'Every dog is chasing one/a cat.'

Section 2 will focus on the theoretical background, including quantifier raising and reference set computation. Section 3 will discuss the existing acquisition studies of scope assignments. A new experiment will be introduced in Section 4. The general discussion of the new results and the whole paper will be presented in Section 5. Finally, Section 6 will conclude the paper.

2. Theoretical background: quantifier raising and reference set computation

2.1. Quantifier raising is not free

First, let us briefly introduce one covert syntactic operation: Quantifier Raising (QR). Quantifier Raising has long been believed to be responsible for the non-isomorphic scope reading of quantifiers. As May (1977) suggests, QR is essentially a covert movement of quantified DPs to a higher position in the syntactic tree, or to the position of c-commanding Spec, TP, as shown by examples (4) and (5). Sentences (4b) and (5b) demonstrate QR from subject and object positions respectively. Both are derivations at LF (Logical Form).

- (4) a. [TP Every boy [VP played [NP the ball]]].
- b. [TP [NP Every boy]₁ [TP t_1 [VP played [NP the ball]]]].
- (5) a. [TP John [VP played [NP every ball]]].
- b. [TP [NP Every ball]₁ [TP John [VP played t_1]]].

Since the last century, it has been widely assumed that it is QR (at LF) that gives rise to ambiguity for sentences with two quantifiers. For instance, in (6), there are two distinct logical forms corresponding to the two different interpretations of PF (Phonological Form) derivation. Sentence (6) is ambiguous between two readings: one is that there is only one bear that is chasing every cat; the other says that for each cat, there is a distinct bear chasing it. We thus get a one-to-one relation between derivations and interpretations (May 1977).

- (6) A bear is chasing every cat.
- a. [TP [A bear]₁ [TP [every cat]₂ [TP t_1 is chasing t_2]]].
- b. [TP [every cat]₂ [TP [A bear]₁ [TP t_1 is chasing t_2]]].

According to Reinhart (1999), QR, although it is available in the Computational System (CS), is a marked and costly operation. This idea originated mainly from the intuition that the inverse scope reading resulting from QR is hard to access. Much cross-linguistic data

collected by Gil (1982) offers evidence for this. Gil (1982) noticed that even though the inverse scope reading is permitted, the surface scope is overwhelmingly preferred. However, such findings alone are not convincing enough to establish the claim that QR is a costly operation, distinct from other syntactic operations. Fox (1995) provided more direct evidence by looking at VP-ellipsis construction. He pointed out that the ambiguity of sentence (7) disappears in the VP-ellipsis construal (8). More importantly, in example (9), the ambiguity persists. Why can such little variation (from *Lucie* to *a nurse*) make such a difference? The interpretational variations can be explained by the proposal that QR is a marked operation.

- (7) A doctor will examine every patient. $(\exists > \forall / \forall > \exists)$
- (8) A doctor will examine every patient, and Lucie will too. $(\exists > \forall / * \forall > \exists)$
- (9) A doctor will examine every patient, and a nurse will too. $(\exists > \forall / \forall > \exists)$

According to Chomsky & Lasnik (1993), VP ellipsis is not allowed unless there is an identical antecedent at LF in the first conjunct. This is also known as the ‘parallelism constraint’. In other words, if the elided construction expresses the inverse scope reading, and therefore involves QR, then both conjuncts must undergo the same covert operation. Otherwise, the ellipsis will be ill-formed. So in the example (9), both conjuncts undergo QR at LF (as shown in (10)) and form two identical construals. Therefore, the ellipsis is permitted and the object wide scope reading persists.

- (10) $[\text{TP} \text{ Every patient}_1 [\text{TP} \text{ a doctor will } [\text{VP} \text{ examine } t_1]]] \text{ and } [\text{TP} \text{ every patient}_2 [\text{TP} \text{ a nurse will } [\text{VP} \text{ examine } t_2]]]$.

Why is it inapplicable to example (8)? The key factor, according to Fox (1995), lies in whether QR is a free operation or not. If it is as free as other operations, example (8) is supposed to allow the inverse scope reading, just as (9). This is not the case, however. Fox (1995) argues that (11b) is illicit, because QR here exerts no effect on the interpretation of one of the conjuncts. That is to say, the derived interpretation can be achieved through other derivations without QR. At the same time the ‘parallelism constraint’ prevents VP ellipsis to apply only in the first conjunct. Thus, as for (8), only the surface scope reading is available. Fox (1995) provides support to the claim that QR is a marked and costly operation.

- (11) a. $[\text{TP} \text{ Every patient}_1 [\text{TP} \text{ a doctor will } [\text{VP} \text{ examine } t_1]]]$.
- b. And $[\text{TP} \text{ every patient}_2 [\text{TP} \text{ Lucie will } [\text{VP} \text{ examine } t_2]]]$.

Assuming that QR is not free, Reinhart (2006) argues that the scope shift, although available in Computational System (CS), violates some condition of the CS. However, QR (or the scope shift) can apply at the interface if it is triggered by an interpretational effect at the interface. So far there is no agreement as to what exact condition is violated by QR in the Computational System. Fox (1995) proposes that the violated condition is the Minimal Link Condition (MLC). Following Chomsky’s idea (1995), the MLC states that one derivation will be blocked if there is another derivation of the same interpretation but with a shorter link. In this case, Fox (1995) assumes that all non-subject quantifiers have to undergo QR at LF. If they just move to VP (see (12)), the surface scope reading will be produced. If they travel a longer distance to TP (see (13)), an inverse scope reading will appear. The MLC indicates that only

the movement to VP is allowed, as the link between the moved quantifier and its trace is shorter. Thus the longer movement to TP, caused by QR, violates the MLC in the CS.

- (12) A doctor will [_{VP} every patient₁ [_{VP} examine t_1]].

- (13) Every patient₁ [_{TP} a doctor will [_{VP} examine t_1]].

However, Reinhart (2006) suggests that QR violates a broader economy principle. Essentially, the economy principle, which requires minimizing interpretative options, inhibits covertly expanding the set of interpretations of one PF derivation. According to Reinhart (2006), only when the inverse scope of a certain quantifier is different from the surface scope can it undergo covert movement. In this case, such a covert movement still violates the economy principle. Nevertheless, the violation is allowed, so long as the derived interpretation could not be reached without the QR operation. So far, regardless of what condition violated, QR is assumed to be a costly and constrained operation.

2.2. Reference set computation

Even though scope shift is an ‘illicit’ operation, Reinhart (2006) proposes that the operation is still a part of the CS and can be used to meet the interface needs. She argues that applying QR entails a global comparison of all potential alternatives. In other words, in order to undergo the scope-shifting QR, a given derivation needs to be checked whether the resulting interpretation is unique or not, compared with interpretations derived by QR-less derivations. If there is such a QR-less alternative, the scope shift will be blocked, because derivations without any covert movement are always favored by the economy principle. Reinhart (2006) refers to this set of alternative derivations as a reference set. A reference set is in fact a set of ordered pairs $\langle d, i \rangle$ (d refers to a derivation itself and i is the associated interpretation). For instance, according to Reinhart (2006), if sentence (14) undergoes QR, the following reference set must be constructed and computed. In this example, the interpretation in (14a) is not derivable without QR: the interpretation with QR is not identical to the one without QR, so (14a) does not have to be excluded. Nevertheless, the involved computation is believed to be computationally costly. It involves retrieving alternative derivations, holding them in work memory, and globally comparing them (Reinhart 2006).

- (14) A doctor will examine every patient.

- a. $\langle d, i \rangle = \langle [\text{TP} \text{ Every patient}_1 [\text{TP} \text{ a doctor will } [\text{VP} \text{ examine } t_1]]],$
for each patient, there is a doctor that will examine him/her>
- b. $\langle d, i \rangle = \langle [\text{TP} \text{ A doctor will } [\text{VP} \text{ examine } [\text{every patient}]]],$
there is a doctor that will examine every patient>

As for sentences with universal quantifiers, the associated reference set, according to Reinhart (2006), has only one member. But the computation involved with creating the reference set and looking for potential alternatives is still performed. Here the cross-derivational computation caused by QR is believed to be manageable for adults’ cognitive capacity, but too demanding for children (Reinhart 2006). She suggests that the computation exceeds the processing ability of children, in particular their working memory, which has not fully developed. She also suggested that QR, as an illicit operation, is not available in children’s

grammar. For this reason, she further proposes that children can only access the inverse scope reading under specific contexts. This analysis, however, is inconsistent with Crain's Continuity Assumption (Crain 1991), which states that learners of a given language share the same linguistic principles and representations of the adult grammar.

Szendroi (in press) provides an alternative proposal suggesting that Reinhart's processing account might still be on the right track. As mentioned before, there is no consensus on the exact members of a reference set. Szendroi (in press) suggests that any derivations that are semantically equivalent to the sentence with the inverse scope can be listed in the reference set. Therefore, she proposes that in English, the truth-conditionally equivalent passive counterpart is a member of the reference set. For example, for sentence (15), the interpretation derived by QR is identical to the reading corresponding to the surface scope in (16), which is a passive structure. Since the interpretation of the passive counterpart in (16) does not involve any covert syntactic operation, it will be favored by the global interface economy principle. According to Szendroi (in press), when adults compute the reference set, the passive counterpart blocks the derivation with scope-shifting QR. To support her claim, Szendroi (in press) carried out an offline forced choice task. The collected results indicate that English adult native speakers tend to permit the inverse scope interpretation more frequently in the case of sentences that do not have passive counterparts. This suggests that the existence of a passive counterpart can affect the retrieval of the covert scope reading of the active sentence.

- (15) A boy watered every tree.

$\langle d, i \rangle = \langle [_{TP} \text{Every tree}_1 [_{TP} \text{a boy} [_{VP} \text{watered } t_1]]],$
for each tree in the context, there is a distinct boy that watered it

- (16) Every tree was watered by a boy.

$\langle d, i \rangle = \langle [_{TP} \text{Every tree}_1 [_{TP} t_1 [\text{was watered by a boy}]]],$
for each tree in the context, there is a distinct boy that watered it

In addition, Szendroi (in press) proposes that children have access to QR as adults do. The difference lies either in the availability of potential blockers (passives in English) in the reference set or more generally in their ability to perform the involved reference set computations. It is likely that children's grammar of the blockers is just not mature or stable enough to block the scope shift. This is consistent with Wexler's Maturational Hypothesis (Borer & Wexler 1987). Or, it may due to the general cognitive ability. Based on the processing account by Reinhart (2006), children whose working memory is too limited are unable to undergo the global comparison involved. To sum up, according to Szendroi's (in press) proposal, children, unlike adults, cannot accomplish the comparison or override the inverse scope reading either due to the grammatical factor or the limited cognitive capacity. Children should then be more permissive than adults with regards to the availability of the inverse scope reading derived by the scope-shifting QR.

Following Reinhart (1999, 2006) and Szendroi (in press), I will propose that the inverse scope reading requires the reference set computation, which is manageable for adults but beyond the processing capacity of young children. Reinhart (1999) proposes that when faced with demanding computations, children with limited processing capacity will employ bypassing strategies: always accept the target interpretation, or always reject the target interpretation, or just guess. A 50% range of group performance in children is then expected. However, following Szendroi (in press), I will suggest that children may simply skip the computation and then access the inverse scope reading directly. In other words, instead of a

50% of group performance, a higher percentage of acceptance of inverse scope readings is expected for both English-speaking and Mandarin-speaking children.

3. Children's knowledge of inverse scope interpretations

3.1. Isomorphism or not?

Children's knowledge of quantification has been intensively studied over recent decades. Initially, the so-called isomorphism tendency was proposed: while adults could access the non-isomorphic interpretation (or the inverse scope reading), children entertained only the isomorphic scope reading (or the surface scope reading). This is what Musolino (1998) called 'the observation of isomorphism'. A large number of studies seemed to support this claim. In addition, Lidz & Musolino (2002) extend the Isomorphism Principle to children's command of numerically quantified expressions, like *three balloons*.

As for the underlying reason of this systematical discrepancy, Lidz & Musolino (2002) discussed two possibilities. One is that children's grammar lacks the covert syntactic operation (i.e., QR) which is responsible for the non-isomorphic scope reading. However, by assuming distinct grammar systems for English-speaking adults and children, this explanation violates Continuity Assumption (Pinker 1984; Crain 1991), which states that learners of a given language have access to the same abstract linguistic principles and representations of the adult grammar system. The other possible explanation, mentioned by Lidz & Musolino (2002), focuses on the limitation of children's computational capacity (referred to as the 'processing' account by Grodzinsky & Reinhart 1993). Lidz & Musolino (2002) propose that English-speaking children may have access to both isomorphic and non-isomorphic scope readings. However, during the real-time comprehension, the computation involved for deriving the non-isomorphic scope is too demanding for children to accomplish.

However, further studies found an opposite and more flexible pattern: children actually can access non-isomorphic scope interpretation, while adults do not necessarily permit this interpretation. Musolino (2009) carried out a Truth Value Judgment (TVJ) task to investigate children's knowledge of sentences with two numeralized quantifiers. Both English-speaking adults and English-speaking preschoolers displayed almost 100% acceptance of the collective reading. The results also show that both adults and children could access the subject distributive reading (or subject wide scope reading), 82.8% and 78.1% respectively. Nevertheless, adults seldom permitted the object distributive reading (or object wide scope reading) (7.8%), while children displayed a significantly higher acceptance rate (28.1%).

Goro (2007) tested English-speaking and Japanese-speaking children with sentences like '*Someone ate every food*'. He found that both English-speaking adults and 5-year-old preschoolers allowed about 40% of the inverse scope readings. However, Japanese-speaking adults and children demonstrated systematic differences: adults never accessed the inverse-scope interpretation, but children showed acceptance rates around 40%. This suggests that Japanese learners initially allowed more inverse scope readings than adults.

Goro's (2007) study suggests that children initially access more interpretations than those allowed by the target grammar. One question then arises: how can a child unlearn the inverse-scope interpretation? Due to the lack of negative evidence, it is difficult for preschoolers to know the impossibility of the inverse scope reading. Goro (2007) argues that the scope rigidity in Japanese should be attributed to the properties of a nominative case-marker, which enforces a specific reference when attached to certain indefinites. Goro (2007) suggests that it is the lack of full knowledge of the nominative case marker that leads Japanese-acquiring

children to allow the inverse-scope interpretation. It implies that Japanese-acquiring children initially do not fully acquire the properties of the nominative case marker, and thus they fail to block the inverse scope reading. Children do not have to remove a covert scope raising operation from the grammar. Children just need add the related properties of the nominative case marker to their grammar.

3.2. Studies of Mandarin-acquiring children

Mandarin is typically assumed to be scope-rigorous, but results from an offline judgment task and eye-tracking experiments by Zhou & Gao (2008) show that adults initially accessed the inverse scope reading in parallel with the surface-scope interpretation. Zhou & Gao (2008) suggest that discourse information drove adults to revise the initial analysis. It means that Mandarin-speaking adults use discourse information to reject the inverse scope interpretation. The question is how Mandarin-speaking children assign scope. No matter following the ‘immature processing’ hypothesis, or the immature grammar hypothesis, Mandarin-acquiring children are expected to allow more inverse-scope interpretations than adults.

Zhou & Crain (2009) carried out a TVJ task to investigate Mandarin-speaking children’s interpretation of sentences with a universal quantifier and negation, as in (17). The data shows that children accepted both the surface scope and the inverse scope readings, while adults only permitted the surface scope reading. Essentially, they attributed children’s permissive performance to the lack of focus-sensitive property of *dou*. According to Lee (2005), Mandarin *dou* is a focus-sensitive operator that induces cleft-like constructions (see (17)). According to Zhou & Crian (2009), once children acquire the knowledge of *dou*, they will display adult-like scope rigidity.

- (17) mei-pi ma dou meiyou tiaoguo liba
 every-cl horse all not jump-over fence
 ‘It was every horse that didn’t jump over the fence.’

One problem is that the structure they studied is ungrammatical without *dou*. Furthermore, as suggested by Lee (2005), the sentences with *dou* are cleft structures, but not structures simply involving quantifiers and negation. These factors make it difficult to interpret these results.

In contrast, in sentences with two quantifiers, *dou* is not necessarily present, as shown by (3a), which is repeated here as (18). In order to further investigate the acquisition of quantifiers and verify the role of *dou*, this paper will focus on the structure in (18).

- (18) you yi-pi ma zai zhui mei-zhi tuzi
 have one-cl horse prog chase every-cl rabbit
 ‘One/a horse is chasing every rabbit.’

4. Experiment

4.1. Introduction

Given that the role of processing capacity in the acquisition of scope assignments is unclear and that the knowledge of scope assignments by Mandarin-acquiring children is less studied than that by English-speaking children, this experiment was designed to fill these gaps. A

covered-box task was used to uncover the command of scope assignments by 4-7 year old Mandarin-speaking children. The same group of children also took a digit span test which aimed to reveal their working memory. The two tasks together enabled me to explore the correlation between processing capacity and scope assignments. Following Reinhart (1999, 2006) and Szendroi (in press), I propose that the inverse scope reading requires reference set computation, which is beyond the capacity of young children. Those Mandarin-acquiring children with limited processing capacities may simply skip the computation and then directly access the inverse scope reading. A significant inverse correlation between one's digit span and his/her performance on inverse scope readings is expected.

4.2. Method

I chose to use one experimental technique, the covered-box task (Noveck 2001). The covered-box tasks is particularly effective for investigating the grammar of less preferred interpretations of ambiguous sentences, just like the inverse scope reading of quantifiers (Schmitt & Miller, 2010). The covered-box task (or hidden box task) is a variant of Picture Matching Task (PMT), in which children are asked to choose one picture from a set of pictures. A difference of the covered-box task is that one of the options is hidden in an opaque box, so that children cannot see it. However, children can choose the hidden picture, if they think all the other visible choices are incorrect. This makes a big difference, because it allows participants to deny all the visible pictures. The normal PMT sometimes forces children to choose one even if they do not accept any of the pictures (Schmitt & Miller 2010). For example, the covered-box task allows us to present three pictures: one tested reading (the surface scope reading or the inverse scope reading), one distractor, and one hidden picture. In this case, if children do not allow this interpretation, they are able to go for the box that in their view, should contain the correct picture.

In addition, compared with the act-out task used by Szendroi (in press), the covered-box task displays advantages. The act-out task may underestimate the acceptance rate of inverse scope readings entertained by children (Szendroi in press). For example, as for the test sentence: *A zookeeper is feeding every giraffe*, the subjects might actually allow both the surface scope and the inverse scope readings in mind but just acted out the surface scope interpretation. If children just acted out the surface scope interpretation, experimenters could not rush to conclude that they did not access the inverse scope interpretation (Szendroi in press). In contrast, the covered-box task can effectively avoid this disadvantage by carefully controlling the visible pictures. In other words, I can avoid displaying both the surface scope reading and the inverse scope reading simultaneously; otherwise, if two interpretations are visible at the same time and subjects choose the surface scope reading, I cannot infer that children do not access the inverse scope interpretation.

Digit-span test was used to study working memory. Participants heard a sequence of numerical digits and were asked to recall the sequence correctly, with increasingly longer sequences (from 2 to 8 or 9 digits). The span is the longest number of sequential digits that can accurately be recalled. In this experiment, the digit-span test was given both forwards and backwards. Once the sequence was presented, the participant was asked to either recall the sequence in normal or reverse order. Digit-span test is commonly used test for memory span, partially because the performance on a digit-span task cannot be affected by factors such as semantics, frequency of appearance in daily life, and complexity (Jones & Macken 2015).

4.3 Participants

My experiment involved eighteen Mandarin-speaking children (age range: 4-6;10) and seven Mandarin-speaking adults (age range: 22-33). All participants (adults and children) were monolingual. They did not have any training in linguistics. All the participants were recruited from local communities in Luoyang, China. The children's parents signed consent forms, which have been approved by the University of Connecticut Institutional Review Board.

4.4 Materials

In the covered picture task, each item consisted of a set of three pictures. Test sentences were presented auditorily. In the test conditions, one of the visible pictures is the target picture. In the control conditions, the target picture is the covered one. The key function of the control condition was to test children's knowledge of *mei* 'every' and to keep reminding subjects that the correct choice can be the hidden picture. The fillers involve either a visible target picture, or a hidden target picture.

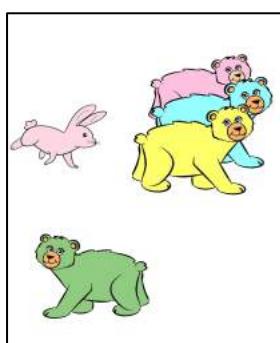
This covered-box task aimed to investigate children's interpretation of the two structures in (3), which are repeated below as (19). Four readings were targeted: the surface scope reading and the inverse scope reading of each structure. In the test conditions, the target pictures represented one of these four readings. If participants allowed the target readings, they would choose the corresponding visible picture. Otherwise, they would choose the covered picture. An example is given in (20). In the control conditions, participants were always expected to choose the covered picture, since both visible pictures were distractors, as in (21).

- (19) a. you yi-pi ma zai zhui mei-zhi tuzi
 Have one-cl horse prog chase every-cl rabbit
 'One/a horse is chasing every rabbit.'

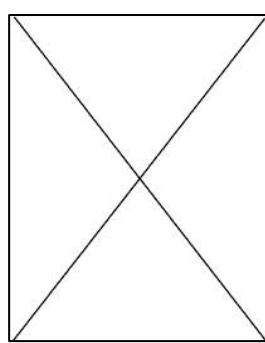
- b. mei-tiao gou dou zai zhui yi-zhi mao
 every-cl dog all prog chase one-cl cat
 'Every dog is chasing one/a cat.'

- (20) Example test condition:

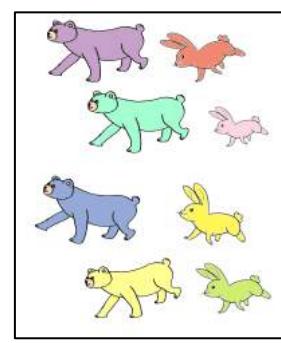
Test sentence: you yi-zhi tuzi zai zhui mei-zhi xiong
 have one-cl rabbit prog chase every-cl bear
 'One/a rabbit is chasing every bear.'



Distractor



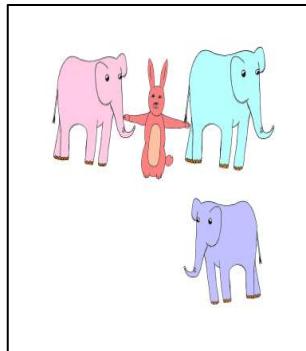
Hidden Picture



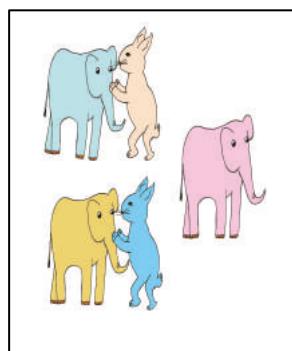
Target Picture

(21) Example control condition:

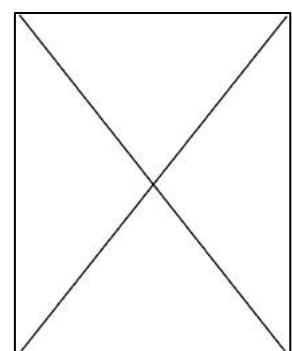
Test sentence: you yi-zhi tuzi zai mo mei-tou daxiang
 have one-cl rabbit prog touch every-cl elephant
 ‘One/a rabbit is touching every elephant.’



Distractor



Distractor



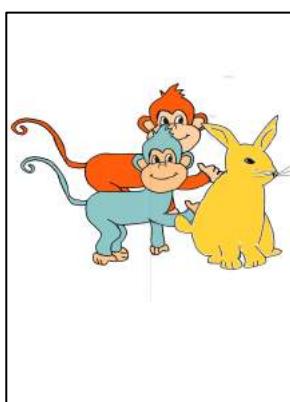
Hidden picture

Three actional verbs were used in the test and control conditions, such as *mo* ‘touch’, *tui* ‘push’, and *zhui* ‘chase’. These verbs are frequently used by children. Each verb was used for all the four target readings, so there were 12 test items. Names of 8 different animals were used as both subjects and objects. The resulting actional predicates were thus reversible.

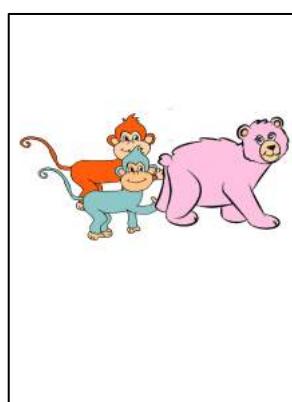
In addition to the 12 test items, there were 6 controls items and 6 fillers. As mentioned above, control items targeted at the hidden picture. They were created to test participants’ knowledge of *mei* ‘every’ and to remind them that the hidden picture could be the correct choice. Fillers used scope-unambiguous sentences. They involved plural morpheme *-men* and a collective adverb *yiqi* ‘together’. The target picture could be visible or hidden. A sample filler is shown in (22).

(22) Example filler:

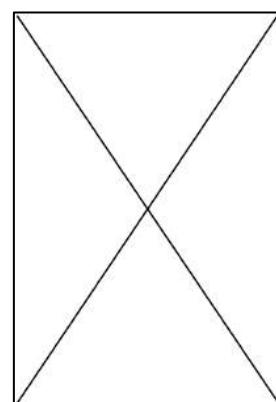
Test sentence: houzi-men yiqi zai mo yi-zhi xiong
 monkey-pl together prog touch one-cl bear
 ‘Monkeys are touch one/a bear together.’



Distractor



Target picture



Hidden picture

The pictures were hand-drawn and digitized by the author. Considering that 4-6 year old kids could not read skillfully, I decided to give oral instructions. In order to control for differences in pronunciation and intonation, I pre-recorded the audio stimuli. It is known that the

intonation of the test items may influence the scope assignments. According to Krifka (1998), with a special intonation contour, the inverse-scope reading of sentences with universal quantifiers is much easier to access. In order to exclude the potential influence of prosody and avoid overestimating the acceptance of inverse scope readings, I chose to employ neutral prosody for every instruction. I decided to perform a pre-test to find the ideal pronunciation for the items. The recording was made by a Mandarin monolingual female speaker. Using female voice is an idea under serious consideration. It is widely assumed that for babies or preschoolers, female recording is more attractive. Finally, all the instructions were recorded twice, so that I could choose the better one for the participants.

The digit-span test consisted of two parts: forward recalling and backward recalling. Each part had 16 lists of number sequences. Given that backward recalling is much more challenging than forward recalling, the longest sequence for the backward recalling consisted of 8 digits, while the longest sequence for the forward recalling had 9 digits.

4.5. Procedure

The covered-box task consisted of 12 test items, 6 control items, and 6 fillers. All the conditions were pseudo-randomized so that no more than two consecutive test items or control items followed one another. The same animals did not occur in consecutive trials. The same verb was not used in more than two consecutive trials. Three other lists were created using the original list in a reverse order to control for order effects. Each participant was randomly assigned to one of the four experimental lists.

Before every test session, I conducted a short training session which involved two parts. Both parts consisted of four practice items: two allowed participants to choose the visible picture; two enabled them to select the covered picture. During the first training period, when subjects chose the covered picture, I allowed them to see that the hidden picture really described the correct reading. The purpose was to teach participants that the covered picture could be the correct choice. During the second part, participants could not check the covered picture to get feedback, just as in the test session. The materials used in the training session were similar to but much easier than those in the trial session. There was only one animal doing something alone. The results showed that all the preschoolers could choose the correct picture, no matter whether the target picture was visible or not.

During the trial session, both children and adults were asked to directly show their choice to the experimenter who recorded it on the answer sheet. As for children, two experimenters worked together. One was responsible for presenting pictures and keeping children involved, while the other played the recording and wrote down the responses. Only one experimenter, however, conducted the study with adults.

Every participant took the digit span test first and then did the covered-box task. Each session run about 30 minutes. Every subject only participated in one session, so that I was able to finish the experiment before they showed any impatience or tiredness.

4.6. Results

In order to be included, participants needed to be over 50% correct for filler items and/or initial answers on practice items. Eighteen children were tested, but four of them failed to meet the inclusion criteria. The results for the other fourteen children and the seven adults are

shown in Table 1. The table shows the acceptance percentage for each target reading and the digit span for both forward recalling and backward recalling. The structure with ‘one’ in subject and ‘every’ in object (i.e., (3a)) is represented as OE, while the structure with ‘every’ in the subject and ‘one’ in object (see (3b)) is represented as EO.

As shown by Table 1, for both target structures (OE and EO), all the three age groups clearly allowed the surface scope readings. To be specific, older children as well as adults displayed 100% acceptance rate of the surface scope reading of the OE structure, while the group of younger children (4;06-5;07) showed 95.24% acceptance rate. In terms of the surface scope readings of the EO structure, both older children and adults did not perform perfectly, but they still showed high acceptance rate (71.43% and 83.34% respectively). The group of younger children all accepted the surface scope reading of the EO structure (100%).

All the three groups of participants permitted the inverse scope reading of the EO structure. This is not surprising, since the object contains *yi* ‘one’ that is an indefinite numeral. The results cannot clearly tell whether the speakers really accessed the inverse scope reading or just interpreted the object as a quantity expression.

In terms of the inverse scope reading of the OE structure, the three groups differed systematically. As expected, adults seldom allowed it (5.50%). In contrast, the 6-7 year old children allowed more inverse scope readings (28.57%) and the youngest group accepted the inverse scope reading much higher (76.19%).

As for the digit span task, differences across the three groups were found. As for both the forward recalling test and the backward recalling test, the older children performed better than the younger children, and adults performed the best. Furthermore, children’s span of forward recalling (6 for younger children and 8.14 for older children) are much higher than their span of backward recalling (1.71 for younger children and 3.79 for older children). This is not surprising, given that the backward recalling test is much more challenging than the forward recalling test.

	4;06-5;07 (n=7)	6-6;10 (n=7)	adults (n=6)
Acceptance percentage of surface_OE	95.24%	100.00%	100%
Acceptance percentage of inverse_OE	76.19%	28.57%	5.50%
Acceptance percentage of surface_EO	100.00%	71.43%	83.34%
Acceptance percentage of inverse_EO	80.95%	95.24%	83.34%
Digit span of forward recalling	6	8.14	9
Digit span of backward recalling	1.71	3.79	7.67

Table 1: Acceptance percentage of target readings and the scores for digit span task

More importantly, a significant inverse correlation has been found between a child’s digit span for backward recalling test and his/her acceptance rate of the inverse scope reading of the OE structure ($p = 0.0026 < 0.05$, $r = -0.738$, $r^2 = 0.545$). As shown in Figure 1, if a child achieved less in the backward recalling test, s/he will allow more inverse scope readings of the OE structure. No other significant correlation was found. In other words, there was no significant correlation found between the digit span of the backward recalling test and the acceptance rate of the surface reading of the OE structure. There was no significant correlation between the digit span of the backward recalling test and the acceptance rate of the surface/inverse scope readings of the EO structure. Furthermore, there was no significant correlation between the digit span of the forward recalling test and the scope assignments, including the acceptance rate of the surface/inverse scope readings for both target structures.

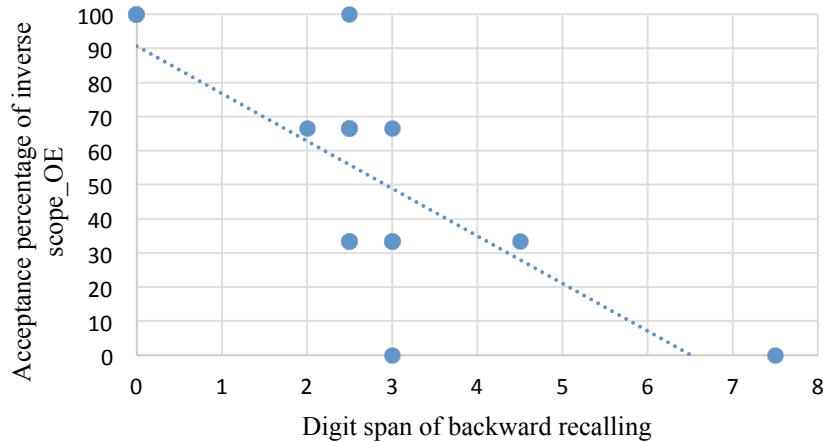


Figure 1: Correlation between backward recalling and the acceptance percentage of inverse scope reading

5. Discussion

The results of the covered-box task showed that Mandarin-speaking adults seldom permitted the inverse scope reading for the OE structure, but Mandarin-speaking children were more permissive towards the inverse scope reading of this structure. Moreover, the group of younger children (4;06-5;07) accepted more inverse scope readings than the older children group (6-6;10). In addition, a significant correlation was found between a child's backward recalling scores and his/her acceptance rate of the inverse scope reading of the OE structure. When a child performed worse in the backward recalling test (or had a short span), s/he was more likely to allow the inverse scope reading of the OE structure in the covered-box task. This provides supportive evidence for the proposal that the reference set computation involved by the application of QR is too demanding for children to accomplish. Children with limited processing capacities would simply skip the relevant reference set computation and directly access the inverse scope reading. When a child's processing capacity further develops, s/he will be more adult-like in scope assignments. By that time, s/he will reject the inverse scope reading of the OE structure, just as Mandarin-speaking adults.

As mentioned before, Reinhart (1999, 2006) suggests that due to the demanding reference set computation, children with limited processing resources may use bypassing strategies: always accept or always reject the inverse scope readings, or simply guess. According to Reinhart, a 50% range of group performance is expected. The results obtained, however, do not provide clear support for this proposal.

Furthermore, Zhou & Crain (2009) attributed Mandarin-learning children's permissive attitude towards the inverse scope reading to the lack of knowledge of *dou* 'all'. They propose that children have not acquired the focus sensitivity of *dou* 'all'. That is why children allowed the inverse scope reading for *mei-pi ma dou meiyou tiaoguo liba* 'every horse didn't jump over the fence' (Zhou & Crain 2009). Nevertheless, in my experiment, the OE structure does not involve *dou* 'all' at all, as shown by (3a). Young children, however, still allowed more inverse scope readings than adults. Therefore, the current results suggest that the lack of knowledge of *dou* 'all' alone cannot explain the whole picture.

In addition, the more permissive performance by Mandarin-speaking children indicates that there is no ‘Universal Chinese Grammar’ stage for language development. Musolino (1998) suggests that English-speaking children entertained only the isomorphic scope reading (or the surface scope reading) because they initially had a Chinese-type grammar (scope-rigorous grammar). However, if Mandarin-speaking children even do not begin with a scope-rigorous grammar, how can English-speaking children initially adopt a Chinese-type (or scope-rigorous) grammar? In contrast, I would like to suggest that due to the immature processing capacity, Mandarin-speaking children, or young children in general, would initially access inverse scope readings.

The results may also be compatible with the ‘soft constraint’ analysis by Bobaljik & Wurmbrand (2012). They propose that *Scope Transparency* prevents scope reversal at LF by QR, as in (23). It is, however, a soft constraint which can be overridden by economy considerations (Bobaljik & Wurmbrand 2012). According to this constraint, utterances with the surface scope reading are favored over those with the inverse scope reading. They argue that German, unlike English, allows objects to scramble over subjects. The structure with scrambling expresses the inverse scope reading of the structure without scrambling. It also shares the same numeration as the structure without scrambling. Therefore, the availability of scrambling in German blocks the application of QR. This analysis is essentially compatible with Reinhart’s reference set computation.

(23) *Scope Transparency*:

If the order of A and B is A > B at LF, then A > B at PF.

Bobaljik & Wurmbrand (2012) further argue that topic structures and passive counterparts in English cannot function as a blocker for inverse scope readings. They suggest that information structure is also part of LF, and that topicalization structures have a different LF than those without topicalization. Passives in English are morphologically different from the active counterparts, so they do not share the same numerations. Therefore, Bobaljik & Wurmbrand (2012) argue that topic structures and passives in English cannot block inverse scope readings. However, Szendroi et al. (2017) suggest that passives in English can be blockers for inverse scope readings. Szendroi (in press) found that English-speaking adults were reluctant to permit the inverse scope readings, but they were much more permissive to the inverse scope readings for non-passivizing verbs. Similarly, I would like to suggest that topic structures can be blockers for inverse scope readings in Mandarin. Mandarin is a topic-prominent language. Topic structures are widespread in Mandarin. However, in order to verify the effect of topic structures on scope assignments by Mandarin-speaking children, more studies are required.

6. Conclusion

The main goal of this paper was to investigate Mandarin-speaking children’s grammar of scope assignments, and to explore the role of processing capacity in their scope assignments. The results showed that Mandarin-speaking children allowed more inverse scope readings than adults, and that a child’s acceptance rate of the inverse scope reading of the OE structure inversely correlated with his/her digit span in the backward recalling test. These results support the proposal that the reference set computation involved by the application of QR is beyond the processing capacity of young children. The results also indicate that children with limited processing capacities may simply skip the relevant reference set computation and

directly access the inverse scope readings. Although blockers for the inverse scope reading in Mandarin are not clear, topic structures may play a role here. Further studies are necessary to verify the role of topic structures in children's scope assignments. These will be left for the future research.

Abbreviations

NP = Nominal Phrase
 VP = Verbal Phrase
 TP = Tsense Phrase
 MLC = Minimal Link Condition
 prog = progressive
 cl = classifier
 QR = Quantifier Raising
 $\exists > \forall$ = the existential quantifier takes scope over the universal quantifier
 $\forall > \exists$ = the universal quantifier takes scope over the universal quantifier
 OE = the sentences with 'one' in subject and 'every' in object
 EO = the sentences with 'every' in subject and 'one' in object

LF = Logical Form
 PF = Phonological Form
 CS = Computation System
 PMT = Picture Matching Task
 i = interpretation
 d = derivation

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Subject-object reversal in Igbo

Mary Amaechi

This paper investigates the reversal construction involving some experiencer psych verbs in Igbo. These are often expressed with inherent complement verbs. The paper argues that the reversal construction is an instance of A-movement and changes grammatical functions as indicated by case distinction and other subject/object tests. I also show that there is no (inherent) quirky case or preposition licensing the experiencers in the constructions. An interesting observation made is the blocking of this reversal when an applied argument is merged in the structure. The analysis assumes that inversion is possible as both experiencer and the complement of the verb are contained in the same VP domain. The applicative has an EPP-feature (McGinnis 2001) that allows only the higher experiencer argument within the VP domain to move to its specifier position accounting for the unavailability of inversion when an applied argument is present.

1. Introduction

This paper describes and analyzes subject-object inversion involving experiencers in Igbo, a Benue-Kwa language spoken in southeastern Nigeria. Cross-linguistically, experiencers have been shown to be special in allowing for inversion of the experiencer subject and the theme (Belletti & Rizzi 1988; Grimshaw 1990; Dowty 1991; Anagnostopoulou 1999; Barðdal 2001; Landau 2010). Many analyses of this construction have argued for a structure where both arguments are contained within the same VP domain, thus making both arguments equidistant and accessible goals to the probe (Chomsky 2001; Longenbaugh & Polinsky 2017). This means that the experiencer and the theme argument can both move to Spec-TP, assuming that subjects are in the Spec-TP position. So, whichever argument gets to fill this position behaves like a canonical subject. There is a restriction to this reversal in Igbo. The presence of an applied object makes inversion impossible. The postverbal complement can no longer move over the experiencer to occupy Spec-TP position. Hence, the two arguments in the VP domain no longer count as equidistant, but only the structurally higher experiencer argument can move to the Spec-TP; the theme argument is no longer able to move to this position but remains in its base position.

Regarding the nature of psych predicates that allow for inversion, the structure of these verbs in Igbo are special, as they are often inherent complement verbs that form a semantic unit with their (obligatory) inherent complements (Nwachukwu 1987).

This paper is organized as follows: Section 2 presents background information on Igbo. Section 3 gives an overview of subject-object reversal and the experiencer psych verbs that are involved in the construction. The section also presents evidence for the subject status of the preverbal element, as well as evidence for objecthood of the postverbal element. Crucially, the preverbal experiencer behaves like a canonical subject when in preverbal position and patterns as an object when it occurs in the postverbal position. Section 4 presents the analysis, and section 5 summarizes and concludes the paper.

2. *Background information on Igbo*

Igbo is a Benue-Kwa language spoken in Southeastern Nigeria (Blench 1989). The language is rigidly SVO (1-a) and there is no overt morphological case marking on nouns except for the case distinction seen in the 2nd and 3rd person singular pronouns. The language is a tone language with three tones - high (*á*), low (*à*) and downstep (*ā*). Even though the language has rich verbal morphology (Green & Igwe 1963; Carrel 1970; Manfredi 1991; Déchaine 1993; Mbah 2006; Emenanjo 1978, 2015), there is a lack of subject or object agreement on the verb. In ditransitive constructions, the indirect object always occurs before the direct object; and when adjuncts are present, they occur in clause-final position (1-b). Thus, the word order is S-V-IO-DO-ADJ.

- (1) a. Úchè rìrì jí.
Uche ate yam
'Uche ate yam.'
- b. Òbí nyè-rè Àdá égō nà m̄gbèdè.
Obi give-PST Ada money P evening
'In the evening Obi gave Ada money.'

The nominative-accusative case distinction detectable in the 2nd and 3rd persons singular pronoun is shown in table (2) below.

- (2) Personal pronouns:

	Nom	Acc
1sg	mí	mí
2sg	í/í	gí
3sg	ó/ó	yá
1pl	ànyí	ànyí
2pl	únú	únú
3pl	há	há

Igbo is a head-initial language with complements occurring to the left. Subject DPs (often the external argument, but not always) raise to the Spec-TP position to receive nominative case. This EPP-movement is assumed because the subject precedes the finite verb (which can be an auxiliary) and negation. This particular obligatory EPP-movement of the subject to Spec-TP and the Nom-Acc case distinction found in the reversal constructions are clear evidence for the

fact that there is no inherent case borne by the experiencer subjects, as will be shown in the next section. The order of the subject and the object with a regular transitive verb cannot be switched — at least not without a change in meaning. Hence, inversion is not freely available in the language.

3. The reversal construction

The inversion construction is found in quite many diverse languages.¹ The construction in Igbo is a non-canonical word order that fronts the complement of some psych verbs, thereby making the subject the object in the inverted sentence. This inversion is accompanied by a reversal of the grammatical functions but still maintains the canonical SVO word order. But the reversal of the arguments does not in any way reverse their thematic roles since the experiencer role is being maintained by the experiencer argument irrespective of its position in the sentence. This inversion does not lead to any change in meaning of the sentence, as pointed out by Nwachukwu (1987); Uwalaka (1988); Manfredi (1991).²

- | | |
|--|---|
| (3) a. Úchè nà-àtú újo.
Uche HAB-ICV fear
'Uche is afraid.' | (5) a. Àdá kpù-rù ìsì.
Ada put.on-PST blindness
'Ada is blind.' |
| b. Újo nà-àtú Úchè.
fear HAB-ICV Uche
'Uche is afraid.' | b. Ìsì kpù-rù Àdá.
blindness put.on-PST Ada
'Ada is blind.' |
| (4) a. Úchè nà-àkwá úkwárà.
Uche HAB-ICV cough
'Uche is coughing.' | (6) a. Àdá wè-rè íwé.
Ada ICV-PST anger
'Ada was angry.' |
| b. Úkwárà nà-àkwá Úchè.
cough HAB-ICV Uche
'Uche is coughing.' | b. Íwé wè-rè Àdá.
anger ICV-PST Ada
'Ada was angry.' |

¹Terms such as symmetrical verb constructions, and subject-object switching/alternation have been used to describe this phenomena in West African languages (Awobuluyi 1978; Nwachukwu 1987; Uwalaka 1988).

²The subject inversion discussed here is different from the inversion found with the 1sg and 3pl pronouns in Igbo where there is no restriction on verb type (Manfredi 1991; Eze 1995; Goldsmith 1981a,b). The following examples illustrate this.

- | | |
|---|--|
| (i) a. M̄ bìà-rà.
1SG come-PST
'I came.' | (ii) a. H̄á bìà-rà.
3PL come-PST
'They came.' |
| b. Á-bìà-rà m.
PFX-come-PST 1SG
'I came.' | b. Á-bìà-rà h̄á.
PFX-come-PST 3PL
'They came.' |

The reversal in (i) and (ii) above is banned in embedded clauses and it is impossible with all other pronouns and with full DPs as shown in (iii).

- | | |
|---|--|
| (iii) a. Ádá bìà-rà.
Ada come-PST
'Ada came.' | |
| b. *Á-bìà-rà Ádá.
PFX-come-PST Ada | |

The reversal of the experiencer and the complement of the verb is only possible with a small subset of verbs in the language. For the uninverted structures in the (a) sentences in (3)-(6) above, the experiencers appear preverbally, and function as the subjects of the sentences, and the complements of the verbs are in their canonical postverbal position. In the inverted structure, the (b) sentences, the complements occur preverbally and behave like subjects, and the experiencers are in the postverbal position. It is important to note that this kind of reversal is only found with a few experiencer psych predicates. With regular transitive verbs, reversal is not possible, and with the strict SVO word order, interchanging subject and object of a sentence results in a change in meaning. See (7)-(8).

- | | | | |
|-----|--|-----|---|
| (7) | a. Àdá hùrù Úchè.
Ada saw Uche
'Ada saw Uche.' | (8) | a. Àdá rìrì jí.
Ada ate yam
'Ada ate yam.' |
| | b. Úchè hùrù Àdá.
Uche saw Ada
'Uche saw Ada.' | | b. #Jí rìrì Àdá.
yam ate Ada
intended: 'Ada ate yam.' |

In the next subsection, we consider the nature of the psych verbs and their properties that make inversion possible.

3.1. Verbs that allow subject-object reversal

The few experiential psych verbs that allow for subject-object reversal can be grouped into two classes (Uwalaka 1988). These are the so-called inherent complement verbs (ICVs) found in some West African languages, and the process verbs.

3.1.1. Inherent complement verbs

Inherent complement verbs (ICVs) are verbs that obligatorily take a complement, often referred to as the verb's inherent complement (IC). The verbs alone are not meaningful without the IC. It is the case that the IC specifies the meaning of the verb as they have specific meaning. The ICV-IC is often viewed as forming a semantic unit with an idiom-like interpretation (Nwachukwu 1987; Manfredi 1991; Ihionu 1992; Essegbe 1999; Aboh 2015; Korsah 2015). A single ICV can take different ICs with different meaning (9)-(10), and the same DP complement can occur with different ICVs (11) (Nwachukwu 1987). The meaning of the IC is in parentheses in the examples below.

- (9) a. kpá àgwà (behaviour) 'to behave'
 - b. kpá ñgàgà (arrogance) 'to be arrogant'
 - c. kpá àkù (wealth) 'to amass wealth'
- (10) a. tú ányá (eye) 'expect'
 - b. tú àsí (lie) 'to tell a lie'
 - c. tú ụtú (levy) 'to pay levy'
- (11) a. tú áká (hand) 'to point at'
 - b. kpá áká (hand) 'to touch'

- c. gbá áká (hand) ‘to be empty-handed’

The ICs are often bare noun phrases and can be cognate (12) or non-cognate with the the ICV. ICVs also have features of regular verbs in the language. Like regular verbs, they can be inflected for tense, aspect as well as occur with negation (12-a-c). Other derivational and extensional affixes that are attached to the verb in the language can also be attached to the ICV.

- (12) a. Àdá wè-rè íwé.
 Ada ICV-PST anger
 ‘Ada was angry.’
 b. Àdá gà-èwé íwe.
 Ada FUT-ICV anger
 ‘Ada will be angry.’
 c. Àdá é-we-ghi íwé.
 Ada PFX-ICV-NEG anger
 ‘Ada was not angry.’

Unlike regular verbs, ICVs can not be focused independently (13-c). Often focusing of the ICVs entails focusing its IC rather than the ICV itself, but this focus only results in a verb focus reading as opposed to a DP focus interpretation (Aboh 2015; Korsah 2015).

- (13) a. Àdá wè-rè íwé.
 Ada ICV-PST anger
 ‘Ada was angry.’
 b. Íwé kà Àdá wè-rè.
 anger FOC Ada ICV-PST
 ‘Ada was ANGRY.’
 c. *Òwéwé kà Àdá wè-rè íwé.
 ICV.NOM FOC Ada ICV-PST anger

For most ICs that are cognate with the ICV, they are often abstract and cannot be replaced with pronouns. See (14) below. The ICs in inversion constructions behave in this manner.

- (14) a. Àdá wèrè íwé.
 Ada ICV anger
 ‘Ada was angry.’
 b. *Àdá wèrè yá.
 Ada ICV 3SG
 ‘Ada was angry.’

Apart from the ICV occurring with its IC and the experiencer in the sentences considered so far, it is possible to have additional arguments, such as applied arguments. The new argument always occurs in between the ICV and its IC, just like in a double object construction where the indirect object occurs before the direct object, as shown with regards to word order in section 2.

- (15) a. Úchè nà-àtú Àdá újo.
 Uche HAB-ICV Ada fear
 ‘Uche is afraid of Ada.’

- b. Úchè gbà-à-rà mí Àdá àmà.
 Uche ICV-APPL-PST 1SG Ada betrayal
 ‘Uche betrayed Ada for me.’

The examples in (16)-(17) below show that the reversal construction is not a property of every experiencer psych verb in the language, and that not every ICV allow for its IC to be flipped with the subject in a sentence.

- (16) a. Ólú ya nà-àmásí Àdá.
voice 3SG HAB-please Ada
'Her/His voice pleases to Ada.'

b. *Àdá nà-àmásí ólú ya.
Ada HAB-please voice 3SG
Intended: 'Her/His voice pleases
to Ada.'

(17) a. Àdá gbà-rà ósó.
Ada ICV-PST race
'Ada ran.'

b. *Ósó gbà-rà Àdá.
race ICV-PST Ada
Intended: 'Ada ran.'

3.1.2. *The process verbs*

The other kind of verb that allows for inversion process verbs (Uwalaka 1988). Here, the actions expressed by these verbs are understood as being reflexive and are unintentional. Consider the examples in (18)-(19) below.

- (18) a. Àdá kù-jà-rì áká.
Ada hit-snap-PST hand
'Ada broke her hand (accidentally).'
b. Áká kù-jà-rì Àdá.
hand hit-snap-PST Ada
'Ada broke her hand (accidentally).'

- (19) a. Òbí gbù-rù ímmà.
Obi cut-PST knife
'Obi cut himself accidentally with a knife.'
b. Mmà gbù-rù Òbí.
knife cut-PST Obi
'Obi cut himself accidentally with a knife.'

The verbs in (18)-(19) are not ICVs. They are verbs with independent meaning, and do not require obligatory complements. The complements of the process verbs in the above examples appear to be concrete, and can be replaced with a pronoun. But replacing the complements with a pronoun changes the meaning of the sentences, as they are no longer perceived as being reflexive and unintentional. For instance, in comparing the sentences in (18)-(19) with the ones in (21)-(20) respectively, the meaning of the sentences does not change in the former while the meaning difference is observable in the latter examples.

- | | |
|---|---|
| (20) a. Àdá kù-jì-rì yá.
Ada hit-snap-PST 3SG
'Ada broke it.' | (21) a. Òbí gbù-rù yá.
Obi kill-PST 3SG
'Obi cut/killed it.' |
| b. #Ó kù-jì-rì Àdá.
3SG hit-snap-PST Ada
'(S)he/it broke Ada.' | b. Ó gbù-rù Òbí.
3SG kill-PST Obi
'(S)he/it cut/killed Obi.' |

The process verbs in the reversal construction have different argument structures, although they look similar to the verbs in (21)-(20). While experiencers in process verbs are internal arguments and generated within the VP domain, as is argued for in section 4, the agent subjects in the (a) sentences in (21)-(20) are external arguments generated in Spec-vP. A few process verbs that allow for inversion also have other forms of the verb that are used when the actions expressed are intentional. Consider (22)-(23) below.

- | | |
|--|-------------------|
| (22) a. Àdá nyù-rù mámíri.
Ada excrete-PST urine
'Ada urinated.' | |
| b. *Mámíri nyù-rù Àdá.
urine excrete-PST Ada
Intended: 'Ada urinated.' | |
| (23) a. Àdá bà-rà mámíri.
Ada excrete-PST urine
'Ada involuntarily urinated on her body.' | |
| b. Mámíri bà-rà Àdá.
urine excrete-PST Ada
'Ada involuntarily urinated on her body.' | (Uwalaka 1988:49) |

With the verb *nyú* in (22) that expresses the fact that the action is intentional, inversion is illicit, but with the unintentional counterpart *bá* in (23), inversion is possible. The process verbs and the complements they take under inversion can be viewed as being idiom-like, in a way similar to the ICVs. The process verbs and their complements together give the interpretation of the action as being unintentional and reflexive even without the reflexive pronoun being used in the sentences.³

To summarize, experiencer reversal construction in Igbo involves ICVs and process verbs with an idiom-like interpretation. The verbs have an animate argument with no intentional causer meaning. The construction is similar to, but different from copular and locative inversions, and the quasi-passive which are found cross-linguistically (Bresnan 1994; Ura 1998; den Dikken 2006; Salzmann 2011; Zeller 2013; Marten & van der Wal 2014; Diercks 2017). Also, these expressions are not instances of passivization as there is no argument reduction and no change in the verbal morphology as well.

³The kind of verbal idioms assumed here are the idiomatically combining expressions (Nunberg et al. 1994; Harwood et al. 2016). This type of idiom is less conventionalized, more transparent and compositional compared to the opaque idiomatic phrases. The meaning of the individual words that make up the ICV-IC, for instance, can still be analyzed in terms of the contributions of the ICV, and especially, the IC parts.

3.2. Grammatical function change: The experiencer and the IC

Within the study of inversion constructions, especially those that argue that the position of the preverbal element is an A-position, a major preoccupation has been to show that the preverbal argument is a true subject, and the postverbal argument behaves like an object (Diercks 2017). Different subjecthood tests, such as subject agreement, control, raising and reflexive binding are used (Bresnan 1994; Ura 1998).⁴ In this section, I apply several tests to provide evidence that the preverbal element behaves like a subject and the postverbal one like an object, regardless of their thematic roles.

Igbo has (copy-)raising (Ura 1998), so embedded clauses are CPs introduced by a complementizer. In general, only the subject of the embedded clause can be raised (with regular transitive verbs), never the object; in the inversion construction, we see that whatever is preverbal (experiencer or theme) can be raised (24)-(25).

(24) *Raising of preverbal ES*

- a. Úchè kwà-rà úkwárà.
Uche ICV-PST cough
'Uche coughed.'
- b. Ó dì kà [Úchè kwà-rà úkwárà].
3SG COP C Uche ICV-PST cough
'It seems Uche coughed.'
- c. Úchè dì kà [ò kwà-rà úkwárà].
Uche COP C 3SG ICV-PST cough
'It seems Uche coughed.'

(25) *Raising of preverbal IC*

- a. Úkwárà kwà-rà Úchè.
cough ICV-PST Uche
'Uche coughed.'
- b. Ó dì kà [úkwárà kwà-rà Úchè].
3SG COP C cough ICV-PST Uche
'It seems Uche coughed.'
- c. Úkwárà dì kà [ò kwà-rà Úchè].
cough COP C 3SG ICV-PST Uche
'It seems Uche coughed.'

Another diagnostic for subjecthood is the reflex of movement attested in relative clauses in

⁴This test is one of the major test for subjects in Bantu languages where one finds rich verbal agreement. Since there is no subject agreement morphology in Igbo, this test cannot be applied. Some other tests are also not applicable as Igbo does not have the appropriate structure. Passivization, for instance, is used in English and most Bantu languages to determine the status of the inverted object or locatives. This test cannot be applied as Igbo lacks passives. For control (and binding), the non-animacy of the IC makes this impossible. Test to check the possibility of extraction of elements from subject and object positions is also difficult. This is because ICs are often bare NPs. Extraction from experiencers seem impossible to test as well, as there are no experiencers with only PPs. Notions similar to expressions such as *the boy on the horse* or *books about linguistics* in English are expressed with relative CP in Igbo. Thus, they are already islands and extraction from them, either in pre- or postverbal position, is impossible.

Igbo. Relativization, which is possible with both subject and object, in Igbo indicates that the experiencer argument, when in the preverbal position, is a subject, and when it occurs in the postverbal position, it behaves like an object. One major distinction between subject and object relativization in Igbo is the tonal reflex of movement found only in subject relatives. When subjects are relativized, the (finite past tense) low tones on the verb change to downstep tones (Goldsmith (1981b), Mbah (2006), Manfredi *forth.*). There is no change in the SVO word order and no relative complementizers or pronouns in Igbo. In the case of object relativization, the object is moved to the clause-initial position, before the subject. Whichever of the two arguments (experiencer or IC) in the reversal construction is preverbal triggers downstep when relativized. In (26) and (27) below, the downstep tone on the verb is boldfaced. The (c) sentences illustrate object relativization, which does not trigger the downstep.

- (26) a. Àdá wè-rè íwé.
 Ada ICV-PST anger
 ‘Ada was angry.’
- b. Àdá **w-e-re** íwé á-pù-ó-lá.
 Ada ICV-PST anger PFX-go.out-SFX-PFV
 ‘Ada who was angry has gone out.’
- c. Íwé Àdá wè-rè dì míma.
 anger Ada ICV-PST COP good
 ‘Ada’s anger has good justification’ [lit. ‘Anger that Ada had is good.’]
- (27) a. Íwé wè-rè Àdá.
 Ada ICV-PST anger
 ‘Ada was angry.’
- b. Íwé **w-e-re** Àdá kà dì yá n’óbì.
 Ada ICV-PST anger still COP 3SG P-heart
 ‘Ada is still angry.’
- c. Àdá íwé wè-rè à-gà-á-lá áhia.
 Ada anger ICV-PST PFX-go-SFX-PFV ahia
 ‘Ada who was angry has gone to the market.’

Another subject/object test is the distribution of the focus marker *kà* in focus and wh-questions. The marker is absent in focus/wh-subjects but obligatory in (ex-situ) focus/wh-object (Goldsmith 1981b; Ikekeonwu 1987; Ndimele 1991; Uwalaka 1991; Ogbulogo 1995; Nwankwegu 2015; Amaechi & Georgi 2017). For the reversal constructions, the argument which starts out as the subject is incompatible with *kà*, but it is required if the argument starts out as the object.

Both the experiencer subject (ES) and the IC can be focused. As earlier pointed out in subsection 3.1.1, focusing of the IC results in an ICV focus interpretation. Sentences (b) in (28) and (29) show object focus of the postverbal arguments, and sentences in (c) indicate subject focus which is often expressed using a cleft.

- (28) a. Àdá wè-rè íwé.
 Ada ICV-PST anger
 ‘Ada was angry.’
- b. Íwé **kà** Àdá wè-rè.
 anger FOC Ada ICV-PST

- object IC focus
- c. Ó bù Àdá wè-rè íwé.
3SG COP Ada ICV-PST anger
'It is ADA that was angry.'
- subject ES focus
- (29) a. Íwé wè-rè Àdá.
anger ICV-PST Ada
'Ada was angry.'
- b. Àdá kà íwé wè-rè.
Ada FOC anger ICV-PST
'ADA that was angry.'
- object ES focus
- c. Ó bù íwé wè-rè Àdá.
3SG COP anger ICV-PST Ada
'It is Ada that was ANGRY.'
- subject IC focus

For questions, unlike the experiencer, the IC cannot be questioned independently either postverbally or preverbally, rather the whole VP-event is questioned. This further shows that the ICV-IC is a single unit.⁵ The examples below are questions to (3), repeated below as the (a) sentences in (30) with the experiencer as subject and (31) where the experiencer is in the postverbal position.

- | | |
|--|--|
| <p>(30) a. Úchè nà-àtú újọ.
Uche HAB-ICV fear
'Uche is afraid.'</p> <p>b. Ònyé nà-àtú újọ?
who HAB-ICV fear
'Who is afraid?'</p> <p>c. *Gíni nà-àtú Úchè?
what PROG-ICV Uche</p> <p>d. Gíni nà-èmè Úchè
what PROG-do Uche
'What is happening to Uche?'</p> | <p>(31) a. Újọ nà-àtú Úchè.
fear HAB-ICV Uche
'Uche is afraid.'</p> <p>b. Ònyé kà újọ nà-àtú?
who FOC fear HAB-ICV
'Who is afraid?'</p> <p>c. *Gíni kà Úchè nà-àtú?
what FOC Uche PROG-ICV</p> <p>d. Gíni kà Úchè nà-èmè
what FOC Uche PROG-do
'What is Uche doing?'</p> |
|--|--|

The (b) sentences in (30) and (31) clearly show the subject/object extraction asymmetry with regards to the distribution of the focus marker. These subject/object extraction asymmetries in the different constructions considered provide evidence indicating that the preverbal argument is a subject, and that the postverbal argument is an object.

The behaviour of embedded subject under long-distance extraction provides interesting evidence for preverbal element as the subject in the reversal construction. The same downstep tone in subject relatives is also found in the embedded clause when subjects undergo long-distance movement. This is attested in the reversal constructions as well. Consider (32) below.

⁵With regular transitives, it is possible to question all arguments.

- | | | |
|--|--|--|
| <p>(i) Àdá hù-rù ósí sí.
Ada seePST stick
'Ada saw a stick.'</p> | <p>(ii) Ònyé hù-rù ósí sí.
who seePST osisi
'Who saw a stick?'</p> | <p>(iii) Gíni kà Àdá hù-rù?
what FOC Ada seePST
'Who did Ada see?'</p> |
|--|--|--|

(32) *embedded subject extraction*

- a. Úchè chèrè nà Àdá wè-rè íwé.
Uche thought that Ada ICV-PST anger
'Uche thought that Ada was angry.'
- b. Ònyé_i kà Úchè chèrè t_i we-re íwé?
who FOC Uche thought ICV-PST anger
'Who does Uche think was angry?' *wh-question*
- c. Àdá_i kà Úchè chèrè t_i we-re íwé.
Ada FOC Uche thought ICV-PST anger
'Uche thought that ADA was angry.' *focus*

Notice that apart from the downstep tone, the well-known *that*-trace effect is also observed. The declarative complementizer *nà* in (32-a) vanishes in the sentences in (32-b-c) where the embedded subject is focused/wh-moved to the left edge of the matrix clause. This is not the case in long-distance object movement.

(33) *embedded object extraction*

- a. Úchè chèrè nà íwé wè-rè Àdá.
Uche thought that anger ICV-PST Ada
'Uche thought that Ada was angry.'
- b. Ònyé_i kà Úchè chèrè nà íwé wè-rè t_i
who FOC Uche thought that anger ICV-PST
'Who does Uche think was angry?' *wh-question*
- c. Àdá_i kà Úchè chèrè nà íwé wè-rè t_i
Ada FOC Uche thought that anger ICV-PST
'Uche thought that ADA was angry.' *focus*

In long-distance object extraction, the relative downstep tone is absent, and the declarative complementizer *nà* is obligatorily. Notice that the focus marker *kà* occurs with the moved focus/wh-marked embedded subject. In this way, embedded subject are like non-subjects by being compatible with the *kà* morpheme.⁶

3.2.1. Case alternation

Recall that in the personal pronoun table in (2), case distinctions are detectable in the 2nd and 3rd person singular. Consider the following examples in (34)-(35) where the experiencer DP is replaced with a pronoun.

⁶The interested reader can find an analysis of these asymmetries in Amaechi & Georgi (2017).

- | | |
|---|---|
| (34) a. Àdá tÙ-rÙ újø.
Ada ICV-PST fear
'Ada was afraid.' | (35) a. Újø tÙ-rÙ Ada.
fear ICV-PST Ada
'Ada was afraid.' |
| b. Ó tÙ-rÙ újø.
3SG.NOM ICV-PST fear
'S/he was afraid.' | b. Újø tÙ-rÙ ya.
fear ICV-PST 3SG.ACC
'S/he was angry.' |

The examples here are with the experiencer as the IC cannot be replaced with a pronoun. The experiencer is assigned case based on its position in the structure — nominative if it is the structurally higher argument that moves to Spec-TP (34), or accusative if the IC moves to Spec-TP and the experiencer remains in the VP domain (35).

Landau (2010) claims that experiencers are locatives introduced by null preposition. He argues that the (null) preposition has a [loc] feature which licenses the object experiencer. The raising of the experiencer to subject position, according to Landau, is an instance of (covert) locative inversion. Evidence from different languages shows that often psych verbs are introduced by prepositions. One also finds similar cases in Igbo. For instance, (36-a) is an example of subject experiencer verb, and (36-b) is object experiencer verb, both involving prepositions.

- | | |
|--|--|
| (36) a. Àdá hÙrÙ Òbí n'ányá.
Ada see Obi P-eye
'Ada loves Obi.' | |
| b. Àdá tÙrÙ Òbí n'ányá.
Ada ICV-PST Obi P-eye
'Ada surprised Obi.' | |

But with the psych verbs involved in the reversal construction which is under consideration here, there are no prepositions found, and the experiencer argument does not bear an inherent case assigned by a (null) preposition. Rather, its case is determined by its position in the structure — whether pre- or postverbal. This is explicitly indicated with the case alternation. If the experiencer were assigned a case by a (null) preposition, it should not be able to receive case from a higher head, viz. nominative from T when in preverbal position or accusative from v when in postverbal position.

Several tests presented in this subsection show that the preverbal element in the reversal construction is actually a subject, and the postverbal argument behaves like an object.

3.2.2. *Reversal as A-movement*

An important question which this subsection is concerned with is whether reversal is an instance of A- or A-bar movement. Here, I argue that the former is the case. One argument for A-movement to Spec-TP is the case alternation discussed in the preceding subsection. Whatever element that occupies the preverbal position receives the nominative case, and the element in the postverbal position is assigned the accusative case. See examples (35) and (36) above.

Argument against A-bar movement to Spec-CP comes from the landing site of moved XP. In Igbo, only one XP can undergo focus/wh-fronting (Nwankwegu 2015; Amaechi & Georgi 2017).

- (37) a. Àdá rì-rì jí n'áhía.
 Ada eat-PST yam P-market
 ‘Ada ate yam at the market.’
- b. Gínị kà Àdá rì-rì ___ n'èbée
 what FOC Ada eat-PST P-where
 ‘What did Ada eat where?’
- c. Èbée kà Àdá rì-rì gínị ___
 where FOC Ada eat-PST what
 Lit: ‘Where did Ada eat what?’
- d. *Èbée (kà) gínị (kà) Àdá rì-rì ___ ___
 where FOC what FOC Ada eat-PST

For the reversal construction, if the preverbal (that is, inverted) XP were to be in Spec-CP position, focus/wh-fronting of another XP should be impossible as the sole landing site is already occupied; but this is not the case as the experiencer in the postverbal position can be focus/wh-fronted with the IC in the Spec-TP position (38-b). If the IC were to occupy the sole landing Spec-CP position, focus/wh-movement of the experiencer should have been impossible.

- (38) a. Íwé wè-rè Àdá.
 anger ICV-PST Ada
 ‘Ada was angry.’
- b. Àdá kà íwé wè-rè.
 Ada FOC anger ICV-PST
 ‘ADA that was angry.’

The reversal construction is also not a case of topic fronting as it does not show any of the topic features in the language.⁷ For topics, usually a resumptive pronoun occurs in the base position of the topicalized argument (cf. (39)). This is not possible with the complements of the verbs that allow for inversion in Igbo. Also recall that the IC in the reversal construction cannot be replaced with a pronoun (section 3.1.1). This explains why the sentences in (40-c-d) are ungrammatical.

- (39) a. Àdá, ó rì-rì jí.
 Ada 3SG eat-PST yam
 ‘Ada, she ate yam.’
- b. Jí, Àdá rì-rì yá.
 yam Ada eat-PST 3SG
 ‘Yam, Ada took it.’

- (40) a. Àdá, ó wè-rè íwé.
 Ada 3SG ICV-PST anger
 ‘Ada, she was angry.’
- b. Àdá, íwé wè-rè yá.
 Ada anger ICV-PST 3SG
 ‘Ada, she was angry.’
- c. *Íwé, Àdá wè-rè yá.
 anger Ada ICV-PST 3SG
- d. *Íwé, ó wè-rè Àdá.
 anger 3SG ICV-PST Ada

⁷One piece of evidence in the consideration of locative inversion in some Bantu languages as topics comes from the behaviour of the locatives in siSwati (Marten 2010) and Zulu (Buell 2007) where under inversion, there is a preference to have a resumptive (locative) expletive following the locative in cases of putative locative inversion (Salzmann 2011; Diercks 2011, 2017). In some unrelated languages where experiencer subject inversion is found, it has also been argued that the preposed experiencer is in topic position, not in a subject position, see Temme & Verhoeven (2016) for this argument for Greek and Hungarian.

It is argued here that the reversal construction involves A-movement. Evidence for this comes from case alternation, the sole landing position of fronted constituents and topicalization.

3.3. Taking additional arguments

A very interesting difference between the inverted structure, where the experiencer is in the object position, and the uninverted one is in their ability to take new arguments. The ICVs in the reversal construction can take an additional argument, as shown in subsection 3.1.1. Also see Aboh (2015) for similar behaviour of the ICVs in Gungbe. It is only possible to have these new arguments when the experiencer is in the subject position and not possible in the inverted structures.

- | | |
|--|--|
| (41) a. Àdá nà-èwé-ré m íwé.
Ada HAB-ICV-APPL 1SG anger
'Ada is angry at me.' | (42) a. Úchè nà-àtú Àdá újọ.
Uche HAB-ICV Ada fear
'Uche is afraid of Ada.' |
| b. *Íwé nà-èwé-ré m Àdá.
anger HAB-ICV-APPL 1SG Ada
Intended: 'Ada is angry at me.' | b. *Újọ nà-àtú Àdá Úchè.
fear HAB-ICV Ada Uche
Intended: 'Uche is afraid of Ada.' |

The (b) sentences in (41) and (42) above are ungrammatical because with the introduction of a new argument, inversion is no longer licit. As already shown with the order of arguments in a basic clause (section 2), there is no preposition dative in Igbo, only double object construction with the Goal/Recipient>Theme order, and adjuncts are clause-final.

- (43) Àdá nyè-è-rè m Òbí égo n'áhía ùnyàáhù.
Ada give-APPL-PST 1SG Obi money P-market yesterday
'Ada gave Obi some money on my behalf at the market yesterday.'

It is also important to note that the applied (or any other) argument introduced cannot easily swap with the experiencer in any case with the meaning still preserved.

- (44) a. Àdá nà-èwé-ré m íwé.
Ada HAB-ICV-APPL 1SG anger
'Ada is angry at me.'
- b. M nà-èwé-ré Àdá íwé.
1SG HAB-ICV-APPL Ada anger
'I am angry at Ada.'
'#Ada is angry at me.'

So far, the basic facts about the reversal construction have been shown in this section. Subject/object tests have been applied to show that the preverbal argument in Spec-TP is the subject, and the postverbal element, the object. It was also argued that the inversion is an instance of A-movement. The special intervention found when an argument is introduced was also discussed.

4. Analysis

In this section, an analysis is provided that explains why inversion is possible with this class of ICVs and process verbs, as well as the blocking effect observed when there is an applied argument.

4.1. The structure of experiencers and the ICV

Experiencers have received a lot of attention (Belletti & Rizzi 1988; Grimshaw 1990; Dowty 1991; Pesetsky 1995; Anagnostopoulou 1999; Barðdal 2001; Rozwadowska 2005; Landau 2010), and different approaches have been proposed concerning the structure of psych verbs. Belletti & Rizzi (1988) argue that there are three kinds of psych verbs - subject experiencer (SE), object experiencer (OE), and dative experiencer (DE). The OE and DE verbs have an unaccusative structure involving movement. With DE where inversion is possible, the theme can raise above the experiencer to the subject position, and when this happens, the theme argument gets structural nominative case. This is shown in the structure in (45) below with the experiencer and the theme contained in the same VP domain.

$$(45) \quad [\text{VP} [v' \text{ DP}_{\text{Experiencer}}] [v' \text{ V DP}_{\text{Theme}}]]$$

The experiencer psych verbs that allow for inversion are assumed to have an unaccusative structure. The experiencer is an internal argument of the verb which is generated as the sister of V' and not in the specifier of vP, since the experiencers are not agents (Landau 2010). This is why inversion is not found with regular transitive verbs which have an agent theta role assigned to the external argument. Either the experiencer or the complement that is inside the VP is able to raise to the Specifier of TP. This is possible because both VP-internal arguments are equidistant (Chomsky 2000).⁸ The reason for the equal eligibility of both the experiencer and the theme to be able to move to Spec-TP is unclear. Cross-linguistic studies have shown that the two arguments of experiencers with unaccusative structure often show this kind of behaviour and thus the arguments are assumed to be equidistant (Belletti & Rizzi 1988; Grimshaw 1990; Dowty 1991; Ura 1998; Anagnostopoulou 1999; Landau 2010).

The reversal construction in Igbo shows these proto-typical properties of constructions that allow for inversion. As discussed in section 3.1, there is no agent argument in the reversal constructions. For the psych ICVs, there is no agentive and causative argument at all, and in the case of the process verbs, the causer is unintentional. These verbs have the common feature of not having an agent.

Since the verbs in Igbo where inversion is possible are mostly ICVs, it is worth looking at the structure of these verbs. Some analyses have been put forward for the ICV. Essegbe (1999)

⁸An alternative is to assume the small clause analysis for copula inversion (den Dikken 2006), where the experiencer, the ‘variable’, and the IC, the ‘predicate’, are both constituents of the small clause, which in turn is selected by the copula. Thus, inversion is raising of the predicate to subject position.

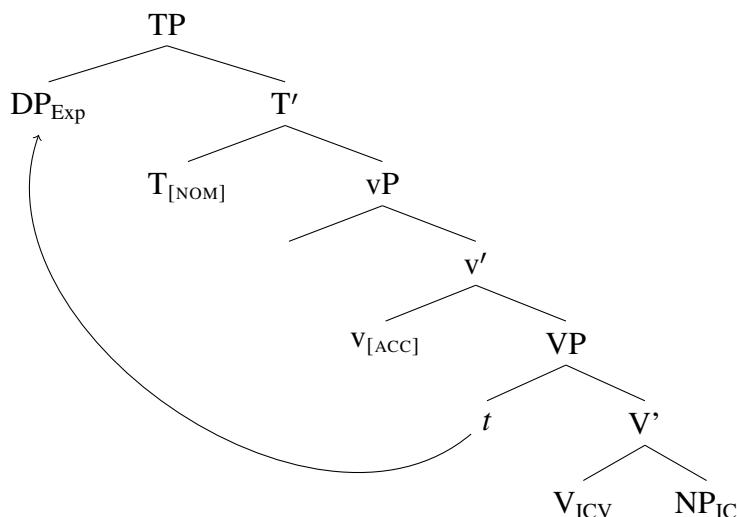
(i) ... be [SC [Subj Exp] [Pred IC]]

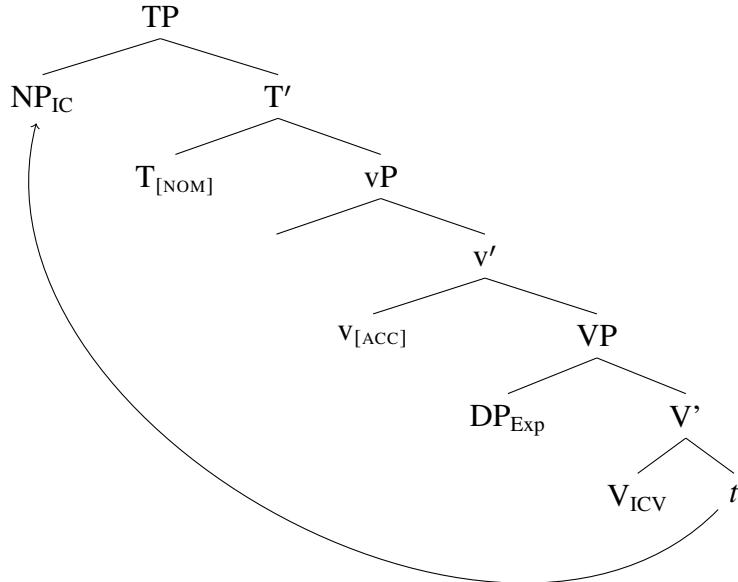
This line of analysis is not able to account for the structures with the applicative that takes the VP as its complement. With the ApplP, it should still be possible to have both the experiencer and the IC in the small clause raise to higher Spec-TP but this is not the case. Proposing a different structure for when there is an applicative does not appear viable as the meaning of the experiencer does not change with the applicative in the sentence. It is the case that there is a single structure for the dual word order.

argues that the argument structure of the ICV is no different from other lexical verbs except that they have less specific meaning. This line of argument appears not to be so true as ICVs have been shown to not fully behave like other lexical verbs as they can not be focused or questioned (Aboh 2015; Korsah 2015), and they have been shown to behave like idioms (Ihionu 1992; Korsah 2015). Considering the double object nature of ICV, and that a goal (or a verb, in the case of V-V compound), for instance, can appear between the ICV and its IC in Igbo, Ihionu (1992) proposes that the structure of the ICV is similar to English denominal verbs. The difference is that in English there is morphological incorporation (Baker 1988), and the case of Igbo seems to be abstract incorporation of the IC to V at LF. The abstract incorporation rightly accounts for the ICV-IC semantic dependency, and thus seems to solve the puzzle, but when being presented with the inversion of the experiencer subject and the IC as shown in the reversal construction data, this would require excorporation under inversion. As the IC which would have been incorporated to V will have to be extracted again and moved to Spec-TP in the cases where the ICs occupy the preverbal position in the reversal constructions. Aboh (2015) also rightly points out that the incorporation analysis incorrectly rules out cases of extraction in which the complement is displaced, such as focusing of the IC which has a predicate focus reading as against an NP focus interpretation. Aboh (2015) claims that ICVs are light verbs, and that the ICV is merged in *v*, not V, as lexical verbs are merged in V.

Korsah (2015) argues against a light verb analysis and proposes that the ICV-IC, like idioms, is stored as a complex unit in the lexicon in the earlier stage as a unit, and at which point, the ICV-IC are opaque for syntactic processes. Conversely, they are able to behave like regular transitive verbs when they enter into the syntax. At this stage, the ICV-IC break up and their constituent parts are able to be marked with particular morphosyntactic features. This happens after the ICV moves to *v*, leaving behind the IC as the sole element in the ICV-IC unit. Contra Korsah, I assume that the ICV-IC projects a V' rather than an NP as the complex unit behaves more like a verb, and the *v* often select something verbal, not nominal, as its complement. Both DP_{Exp} and the IC are within the same VP domain and both can move to Spec-T since they count as equidistant following Belletti & Rizzi (1988) as shown in the structures in (46)-(47).

(46) *DP_{Exp}* movement to *Spec-TP*



(47) *IC movement to Spec-TP*

It is assumed that the experiencer DP is merged higher than the IC in the structures as the superiority fact that reappears when we have an applied argument shows. Only the experiencer can occur in the Spec-TP when an applied argument is present, and never the IC as discussed in section 3.3.⁹

4.2. Case checking and quirky subjects

The order of case checking is crucial in the structure as case alternation data indicate that the experiencer either gets nominative or accusative case depending on its structural position within the clause. It is the case that the argument that raises to Spec-TP satisfies the EPP, and gets nominative case (Baker 2008). This shows that in Igbo, case assignment and movement are connected. The T head attracts the argument that it assigns case to. If the experiencer moves to Spec-TP, it checks the case in T and vice versa.

The accounts in the literature for object and dative experiencer psych verbs that allow dual word order, have been that the experiencer bears inherent (quirky) case: case that is assigned to internal arguments, and tied to a specific theta role (Belletti & Rizzi 1988; Torrego 1998; Landau 2010). Manfredi (1991) also suggested that this is likely to be the case in Igbo with the subject-object reversal. Considering the data presented in this study, it is obvious that the experiencers are not external argument of the verb but they do not bear inherent case as clearly

⁹The structure of the process verbs with unintentional causers are not covered in this account. This class of verbs appear to have a different syntax which is not similar to that of the ICVs as they do not appear to have a double unaccusative structure. I leave the integration of these verbs into the account presented here for future research as their argument structure needs to be studied in more detail.

shown by the nominative and accusative case alternation in subsection 3.2.1. The experiencer bears nominative case when it is in the subject position, and accusative case when it occupies the object position. The quirky case analysis put forward for languages such Icelandic (Barðdal 2001), does not work in Igbo. The case of the experiencer is purely determined by the position in the structure. In other words, in Icelandic, a fully licensed DP is moved to spec-TP (with nominative or any other case, if it is a quirky subject). In Igbo, on the other hand, the nominative needs to be licensed by spec-head agreement, so the subject gets licensed in the spec-TP position.¹⁰ It is also the case that no preposition licenses these experiencers in Igbo. Hence, Landau's claim that all experiencers are PPs (where a (covert) P assigns inherent case to its NP complement) cannot be upheld for Igbo as case on the experiencer changes depending on which argument undergoes EPP-movement.

4.3. Equidistance and the applicative phase

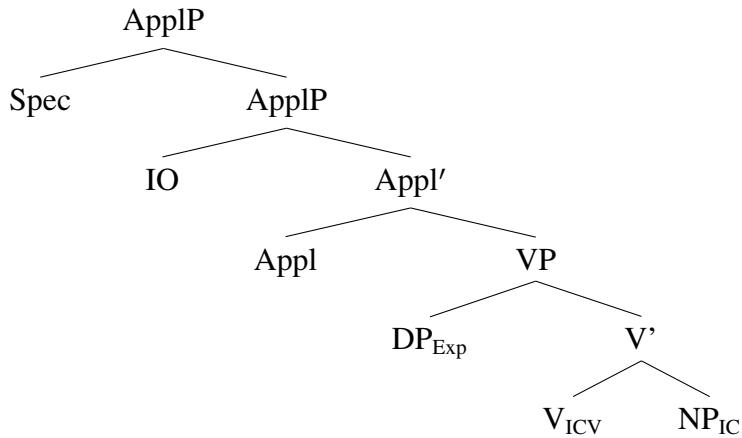
This subsection investigates the restriction on inversion when an applicative argument is introduced in the structure, and accounts for why equidistance no longer works but rather superiority is turned on in these special cases with applicatives. Cross-linguistically, the account of inversion has been based on equidistance (Belletti & Rizzi 1988; Ura 1996), the idea that the experiencer and the theme arguments contained in the same minimal VP domain can be attracted and are equally eligible to move to a higher position. The equidistance analysis correctly accounts for the movement of the experiencer and IC arguments to Spec-TP, but presented with the applied arguments in the structure, the experiencer and IC argument no longer appear to be equidistant as only the experiencer is able to move to Spec-TP. Merging the applicative in the structure results in some form of superiority for the arguments contained in the VP domain as the higher experiencer in the specifier of VP is the only argument that is able to raise to Spec-TP. Consider the example in (41) where the IC argument can no longer move to occupy the subject position because of the presence of the applicative (48-b).

- (48) a. Àdá nà-èwé-ré m̄ íwé.
 Ada HAB-ICV-APPL 1SG anger
 'Ada is angry at me.'
 b. *Íwé nà-èwé-ré m̄ Àdá.
 anger HAB-ICV-APPL 1SG Ada
 Intended: 'Ada is angry at me.'

I assume that the applied argument is introduced in the specifier of an applicative head, a high appl(licative) in the sense of Pylkkänen (2008) since the applied objects are in a relation with the event expressed by the VP. Given the unaccusative structure of the experiencers, both ES and IC are embedded within the same VP, which the ApplP takes as its complement. I follow McGinnis (2001) in assuming that the high applicative is a phase so that a phase-EPP feature which drives DP movement is added to the Appl to which there is exactly one edge.

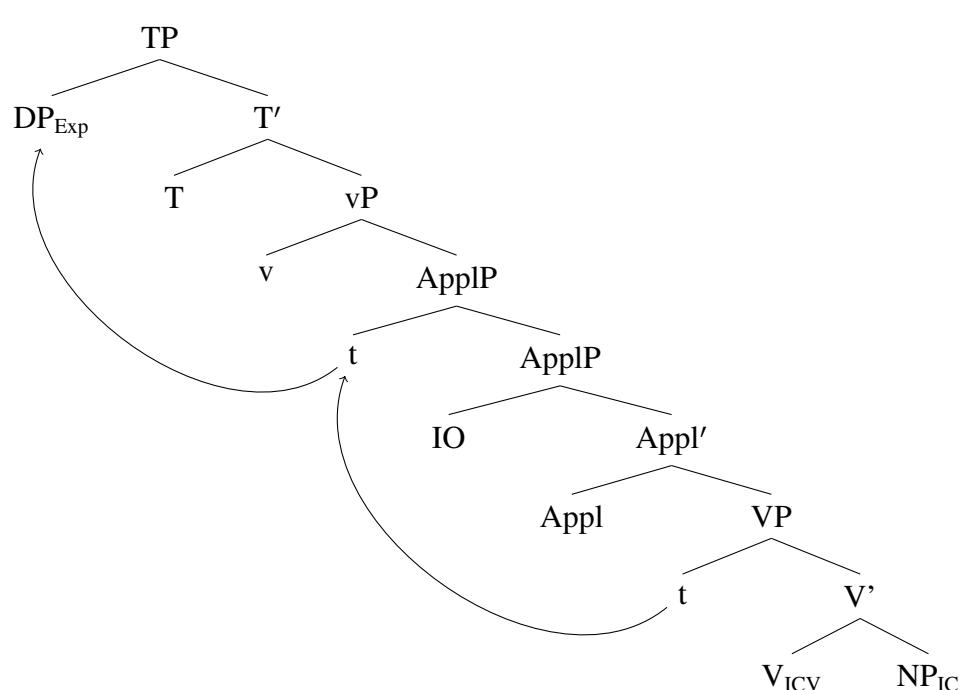
¹⁰See Haider (2004) for a similar argument for the difference between English and German in-situ wh-constructions with reference to Icelandic.

(49)

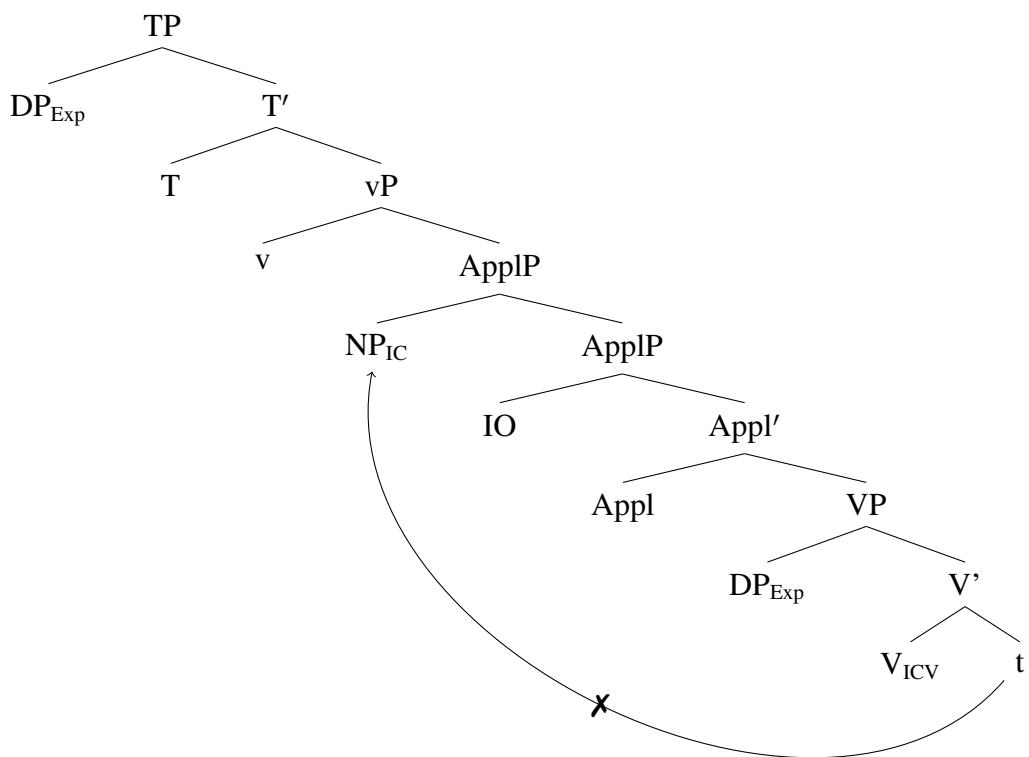


With the structure in (49), there is an intermediate movement position for an argument in the lower VP to move over the indirect object and escape the domain of the Appl phase, and to finally raise to Spec-TP. Note that the indirect object can not fulfill this requirement of raising to Spec-TP and receiving nominative case even though it appears that it occupies a similar edge domain as the experiencer in the higher specifier position of Appl. In Igbo, the indirect object does not also invert with the experiencer. So, only the experiencer gets to be raised to Spec-TP. I assume that the indirect object does not raise to Spec-TP because of the activity condition (Chomsky 2001; Baker 2008). The applied argument, selected by Appl already has its case checked by Appl, so it is inactive with respect to T agreement. Consequently, an argument from inside VP must move to the edge (accessible specifier domain) of the ApplP-phase to be able to move to Spec-TP. The DP_{Exp}, given superiority, moves from inside the VP to the edge of the ApplP-phase to be able to move to Spec-TP, satisfy the EPP and receive nominative case, as shown in the structure in (50). The lower NP_{IC} is trapped in the phase and cannot move, hence, no inversion with an applied object, as in (51).

(50)



(51)



A problem that is not yet solved is why it is the case that only the higher experiencer, and not the IC, can move to avoid the phase when there is a high applicative. Given equidistance, it should be possible to also have the IC move across the indirect object to the Appl edge since DPs within the domain of a VP are equidistant, and this allows inversion. But this is not possible as the data show. It seems that there is a locality restriction on movement when Appl is merged as only the higher experiencer contained within the VP is able to escape the Appl phase, and the IC is trapped in the phase. For this, I assume that the intermediate movement step is A'-movement since there is no case checking at this position. Adopting Richards' 2001 idea that multiple specifiers that feed A-movement are equidistant but multiple specifiers that feed A'-movement appear not to be equidistant, I assume that since the intermediate movement is an instance of A'-movement, equidistance is no longer licit but rather there is strict locality.¹¹ This means that the higher experiencer moves to the one available Appl phase-EPP edge position.

5. Summary and conclusion

This paper has shed more light to the under-examined subject-object reversal in Igbo. The study shows that most of the verbs that show this dual word order are inherent complement verbs and

¹¹This movement seems to be a case of improper movement. But this kind of derivation must be possible as well for unaccusative and passive, based on accounts by Legate (2003), Richards (2011), and others — where it is argued that unaccusative/passive *v* is a phase head. As a consequence, in a passive sentence, for instance, the internal argument must move to Spec-vP first (the phase edge) before it can move to Spec-TP, its surface position.

Also, recall that Igbo has (copy-)raising, as discussed in section 3.2, which also seems to involve improper movement (movement of an element from within the embedded clause to the embedded Spec-CP, an A'-position, to the matrix Spec-TP position, an A-position). There is the possibility that Igbo may be tolerable to improper movement derivations in general.

are psych predicates. Subject tests that can be applied to the Igbo data show that the reversal of the arguments is always associated with reversal of grammatical function of the two arguments in the construction, such that, the experiencer behaves like a subject when it is in the preverbal position, and behaves like an object when it occupies the postverbal position. Reversal is possible in double unaccusative structures, each of the argument can move to Spec-TP since they count as equidistant. The preverbal element targets Spec-TP hence it is A-movement. Interesting is the intervention by the applicative, where the applicative blocks the raising of the IC to the Spec-TP position. Given equidistance, the experiencer and the IC contained in the same VP domain are both able to move to Spec-TP and satisfy the EPP requirement. This equal accessibility is unavailable when there is a high applicative. It is assumed that the applicative with its EPP-phase requirement can only accommodate a single argument, and since the movement to this Spec-AppP is an instance of A'-movement given that there is no case checking, strict locality is observed. Hence, only the higher experiencer argument of the two arguments contained in the VP domain can move to the accessible edge of the App phase and finally to Spec-TP.

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Abbreviations

1,3	first, third person	NOM	nominative
ACC	accusative	P	preposition
APPL	applicative	PFV	perfective
C	complementizer	PFX	prefix
COP	copula	PROG	progressive
FOC	focus marker	PL	plural
FUT	future tense	PST	past tense
HAB	habitual aspect	SFX	suffix
NEG	negation	SG	singular

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The case of adjunct islands in Italian

Chiara Dal Farra

This work investigates extraction from adjuncts in Italian, as well as two factors that may have a role in island violation: the length of the filler-gap dependency and the effect of resumptive pronouns of the intrusive kind. The island effect is different according to the adjunct taken into account: in some cases extraction is consistently unacceptable, whereas in others it is licensed. Extraction is connected to the level of attachment of the adjunct and the formation of single macro-events made by the matrix verb and the one contained in the adjunct.

1. Introduction

The goal of this work is to investigate three main points regarding extraction from adjuncts: (i) the possibility of subextraction from these domains, (ii) the effect of embedding, and (iii) the effect of resumptive pronouns. I will address the questions mentioned with a pilot experimental study and data from Italian. I will show that extraction is sometimes licensed, and therefore I will challenge the traditional view which considers adjuncts invariably as strong islands. I will discuss some of the factors able to manipulate the island effect and the reasons why extraction is connected to some cases only.

As is well known since Ross (1967), islands are structural domains that impose constraints on certain grammatical operations and make the dependency formation either unacceptable or degraded. Islands are usually divided into weak and strong, where the diagnostic is based on the possibility of extracting certain elements: in the case of weak islands some phrases can be extracted, whereas with strong islands all extractions are banned (Cinque 1990; Szabolcsi & Lohndal 2017 for an overview).

Adjuncts belong to the class of strong islands: domains out of which extraction leads to ungrammaticality either in the case of argument extraction, as in (1a) and, especially, in adjunct extraction, the case of (1b).

- (1) a. * Which boy_i did Mary arrived [before Sara kissed _{_i}]?
b. * How_i did Mary arrive [before Sam kissed Sara _{_i}]?

Even though island effects are subject to cross-linguistic differences, according to some scholars extraction from adjuncts is universally banned (Stepanov, 2007). For this reason adjunct islands have been accounted for by means of principles holding in narrow syntax, as in the case of the Condition on Extraction Domain (Huang, 1982) and of Late Merge (Stepanov 2007), or following a PF interface approach, as in the case of the Multiple Spell-Out approach (Uriagereka 1999; Nuñes & Uriagereka 2000). The prediction of these theories is that extraction from these domains is always bad, given that either they “become” opaque domains after an early spell-out due to linearization problems (Uriagereka, 1999), or they are inserted after everything else in the structure, i.e. too late to participate in the derivation (Stepanov, 2007).

However, we do find many exceptions cross-linguistically (see Truswell 2007, 2011; Sheehan 2010; Brown 2017 for English, Uriagereka 2011; Fábregas & Jiménez-Fernández 2016a, b for Spanish, Müller 2017 for Swedish and Biskup & Šimík 2018 for Czech). This is true for different types of adjuncts: bare present participial adjuncts, as can be seen in examples in (2), secondary adjectival predicates in (3), and prepositional adjuncts, represented in (4).

- (2) a. Which play did you fall asleep [watching _]?
- b. *¿Qué entró [diciendo _] Juan?*
What entered saying Juan
'What did John came in saying?' (Fábregas & Jiménez-Fernández, 2016a:1308)
- (3) a. *¿Con quién llegó [enfadada _] María?*
with whom arrived angry María
b. Whom did Mary arrive [angry with _]? (Fábregas & Jiménez-Fernández, 2016b:42)
- (4) a. What are you working so hard [in order to achieve _]? (Boeckx, 2012:24)
b. Which man did you return home [without talking to _]? (Sheehan, 2010:141)

The examples above show that the approaches trying to account for the islandhood of adjuncts are too strong, since none of them is able to account for the extractability cases considered in (2)-(4).

In this work I focus on the possibility of extraction out of prepositional adjuncts in Italian. I will therefore report the results from a pilot experimental test made on a small group of people in order to check whether my hypotheses are correct and which factors have to be analysed in more details.

The paper is organized as follows. Section 2 presents some of the factors able to manipulate the strength of the island violation focusing on the role of tense, embedding, and resumptive pronouns. In section 3 the judgment acceptability test is explained, whereas section 4 contains a discussion of the main results of the test: the difference among adjuncts in the island effect and the lack of effect of resumption. In section 5 the possibility of extraction is accounted for taking into account two levels: (i) the attachment site of the adjunct, and (ii) the creation of a single complex event made by the matrix verb and the one contained in the adjunct.

2. Factors affecting the acceptability of extraction

The empirical domain of this test consists of comparative judgments, which deviate not only according to the sentence, but sometimes also according to the participant. In fact, given the type of sentences involved, the division between grammatical and ungrammatical sentences is not sufficient: often they are not clearly acceptable or unacceptable, but they fall in a grey area of partial acceptability. Therefore, I adopt the experimental syntax methodology. Formal experimental methods measuring acceptability have become more and more reliable over the past few years. Their purpose is to move beyond informal judgments and collect more fine-grained data to shed light on complex phenomena. Moreover, they may reveal previously unobserved patterns, which would remain unnoticed with a more traditional and informal methodology (see Sprouse 2007a, b).

In this test, I was mainly interested in the possibility of extraction from prepositional adjuncts, as well as in the effect of the filler-gap dependency and in the effect of a resumptive pronoun. I will briefly review each of them in the following sections.

2.1. Keeping the island effect at its minimum

The strength of the island effect can be manipulated by means of several factors, and the degree of unacceptability might differ substantially depending on them. Many of these factors are known in the literature, and include (but are not restricted to): (i) the role of finite tense in the adjunct (Cinque 1990; Manzini 1992); (ii) extraction of a DP with respect to extraction of a PP (Cinque, 1990); (iii) the type of verbs used in the matrix and the adjunct clause (Truswell 2007, 2011; Fábregas & Jiménez-Fernández, 2016a); (iv) D-linking effect (Cinque 1990; Phillips 2013); (v) the position of the adjunct. Here I will focus only on the first point, namely the verb in the adjunct realized in a finite tense. Compare sentences in (5).

- (5) a. Quale ragazza Gianni è partito (per Parigi) [senza salutare _]?
 which girl Gianni is left for Paris without to.greet
 ‘Which girl did John leave for Paris without greeting?’

b. * Quale ragazza Gianni è partito (per Parigi) [senza che salutasse _]?
 which girl Gianni is left for Paris without that he.greeted
 ‘Which girl did John leave for Paris without that he greeted?’

(5a) is an acceptable sentence; a DP argument, *quale ragazza*, has been extracted from the adjunct introduced by *senza*. Crucially, the verb in the adjunct is in its non-finite form. If the tense of verb in the adjunct is finite, extraction is ruled out, as in (5b). The presence of a finite verb in the adjunct is already known as one of the main factors able to strengthen the island effect: whenever the adjunct contains a tensed verb, extraction is much worse (see Cinque 1990; Manzini 1992; Szabolcsi & Lohndal 2017), as can be seen also for the English asymmetries in (6).^{1,2}

- (6) a. * Which topic did you leave [because Mary talked about __]?
b. ? Which topic did you leave [without talking about __]?

³Such an effect could be connected to the fact that a finite sentence is considered as a CP, whereas a non-finite one as a TP.³

The islandhood of adjuncts in Italian has already been investigated with a formal experiment (Sprouse et al., 2016).⁴ An example of the adjunct islands they tested is given in (7).

- (7) * Cosa ti lamenti [se uso _ in classe]?
 what yourself complain if I.use in class
 ‘What do you complain if I use in class?’ (Sprouse et al., 2016:18)

As expected, extraction in cases similar to (7) were rated very poorly. The *wh*- constituent in fact is extracted from a tensed adjunct introduced by *se* (if), and extraction is ruled out. Moreover, a simple *wh*- constituent is used. Notice however that there is a D-linking effect able to ameliorate the island effect: it is easier to extract elements with more specific/informative fillers. Compare (5a) with (8).

¹ However, there are languages allowing extraction from finite adjuncts, see the cases of Swedish described in Müller (2017) and of Czech in Biskup & Šimík (2018). See also Chaves (2012) for some exceptions from English such as the one in (i):

(i) This is the formula that I would be devastated [if someone had already finished].

² Notice that the complete unacceptability of (6a) can also be connected to the kind of adjunct used: there are asymmetries between adjuncts that presumably are high in the structure, as seems to be the case for *because*, and those which should be lower (see Uriagereka 2011; Boeckx 2012).

³ Thanks to Irene Amato for pointing this out.

⁴ The test was not limited to adjuncts: they investigated the islandhood of different domains in both English and Italian: *wh-/whether*, complex NP and subject, beside adjuncts.

- (8) * Chi Gianni è partito [senza salutare_]?
 who Gianni is left without saying.goodbye
 'Who did John leave without greeting?'

Therefore in the sentences used in the test these factors were carefully manipulated in order to obtain the weakest possible effect, and they were applied in all sentences so that the only difference among them was the type of adjunct used.

2.2 The effect of resumption

The presence of a resumptive pronoun is generally considered able to reduce the island effect, or to circumvent it entirely in some languages. Resumptive pronouns (RPs) are obligatory bound pronouns appearing in the tail position of a filler-gap dependency, and obligatorily interpreted as co-referent with the filler of the dependency (McCloskey, 2006:95). The distinction usually made is among grammatical and intrusive RPs. Grammatical RPs can freely alternate with gaps in most long-distance dependencies, and they are obligatory in island contexts. It is the case of languages like Irish, Hebrew and Arabic (Aoun et al. 2001; Shlonsky 1992; McCloskey, 2006). In these cases, resumption is immune from island constraints, as the examples from Irish in (9) show.

- (9) a. teach nach n-aithneochthá [cá rabh sé].
 house NOT recognize where was it
 'A house; that you wouldn't recognize where it_i was.'
 b. * teach nach n-aithneochthá [cá rabh _].
 house NOT recognize where was
- (McCloskey, 2006:99)

In other languages, such as English and Italian, RPs are not licensed by the grammar, and for this reason they are referred to as *intrusive* resumptive pronouns. Nonetheless they appear in some contexts, especially in spontaneous speech. Even though these languages do not have the same rescue strategy mentioned above, the presence of a resumptive pronoun is often reported to improve the status of sentences containing island violations (Ross 1967; Kroch 1981; Asudeh 2011 for English, Bianchi 2004; Belletti 2006 for Italian). Thus, compare (10a) to (10b) for English, and (11a) to (11b) for Italian.⁵ Example (10c) shows a case of extraction from an adverbial clause and the use of an intrusive resumptive pronoun in English taken from corpora production.

- (10) a. The guy who I hate almost everything **he** does.
 b. * The guy who I hate almost everything _ does. (Kroch, 1981:125)
 c. Apparently, there are such things as bees in the area which if you are stung by **them**,
 you die. (Prince, 1990:483)
- (11) a. * L'uomo a cui sono certo del fatto che _ parleranno...
 the man to whom I.am.sure of.the fact that they.will.talk
 b. (?)? L'uomo che sono certo del fatto che **gli** parleranno...
 the man whom I.am.sure.of the fact that to.him they.will.talk
- (Belletti, 2006:130)

⁵ The striking fact for the Italian example in (11b) is that standard Italian does not form relative clauses with the resumptive pronoun strategy (Belletti, 2006), and sentences like (i) are accepted at a substandard level, rather than in standard Italian.

(i) L'uomo che **lo** arresteranno se continua così...
 the man that him they.will.arrest if he.goes.on like.that

However, such an ameliorating effect is not detected in several tests, either assessing production or acceptability (Ferreira & Swets 2005; Heestand et al. 2012; Polinsky et al. 2013; Beltrama & Xiang 2016). I will here explore further whether such an amelioration can be found in Italian.

3. The experiment

3.1. Materials

A 2x2x2 factorial design was employed, with 8 conditions resulting from fully crossing three factors: (i) STRUCTURE; (ii) LENGTH and (iii) RESUMPTION.

For the STRUCTURE factor, the unacceptable cases of extraction from an island were compared to the (supposedly) acceptable cases of parasitic gaps. This is different from many other experimental studies regarding the island effect, where the island condition is compared to extraction from a declarative sentence (Sprouse 2007a; Sprouse et al. 2016 among others). Parasitic gaps are constructions in which a single *wh*-phrase is associated with multiple gaps in a sentence: one is inside an island, and the other is not. The gap inside the island is licensed by the presence of a higher c-commanding gap, created by movement; since its acceptability depends on this other gap, it is called *parasitic*. I decided to use parasitic gaps in order to have minimal contrast with the sentences I was investigating, and given that several studies showed that these structures are fully acceptable, and actually comparable to declarative sentences (see Phillips 2006; Wagers & Phillips 2009).

For the LENGTH factor, sentences with a short distance filler-gap dependency were compared to longer dependencies.

For the RESUMPTION factor, sentences with a gap were compared to sentences with a resumptive pronoun.

See (12) for the entire paradigm of an item.

- (12) a. Quale ragazzo_i Silvia ha guardato __i senza salutare __i?
 which boy Silvia has looked without to.greet
 ‘Which boy did Silvia look without greeting?’
 (parasitic gap, short, gap)
- b. Quale ragazzo_i Silvia ha guardato senza salutarlo_i?
 which boy Silvia has looked without to.greet.him
 ‘Which boy did Silvia look without greeting him?’
 (parasitic gap, short, RP)
- c. Quale ragazzo_i tutti dicono che Silvia ha guardato __i senza salutare __i?
 which boy everybody say that Silvia has looked without to.greet
 ‘Which boy did everybody say that Silvia looked without greeting?’
 (parasitic gap, long, gap)
- d. Quale ragazzo_i tutti dicono che Silvia ha guardato senza salutarlo_i?
 which boy everybody say that Silvia has looked without to.greet.him
 ‘Which boy did everybody say that Silvia looked without greeting him?’
 (parasitic gap, long, RP)
- e. Quale ragazzo_i Silvia è partita senza salutare __i?
 which boy Silvia is left without to.greet
 ‘Which boy did Silvia leave without greeting?’
 (island, short, gap)
- f. Quale ragazzo_i Silvia è partita senza salutarlo_i?
 which boy Silvia is left without to.greet.him
 ‘Which boy did Silvia leave without greeting him?’
 (island, short, RP)

- g. Quale ragazzo tutti dicono che Silvia è partita senza salutare $_i$?
 which boy everybody say that Silvia is left without to.greet
 ‘Which boy did everybody says that Silvia left without greeting?’
 (island, long, gap)
- h. Quale ragazzo tutti dicono che Silvia è partita senza salutarlo i ?
 which boy everybody say that Silvia is left without to.greet.him
 ‘Which boy did everybody says that Silvia left without greeting?’
 (island, long, RP)

The 8 conditions were tested in three types of prepositional adjuncts introduced by *dopo* ‘after’, *prima* ‘before’, and *senza* ‘without’, for a total of 24 items.

Fillers were also included, in a ratio of 1:1, for a total of 24 fillers of comparable length and varying acceptability: even though most of them were completely grammatical or ungrammatical, the acceptability of some sentences was expected to fall somewhere in between. In doing so, participants were encouraged to use a large portion of the scale rather than focusing only on some parts. Moreover, fillers consisted of both declaratives and questions, which were included so that the target items were not the only questions in the experiment.

Every subject was therefore tested on 48 items total. Items were presented in a pseudo-randomized order, so that the same condition never appeared twice in a row. They were distributed into two blocks, which were presented in a different order among participants.

3.2. Participants

Twelve people participated in the experiment. The subject pool was uniform: age range 22-28 years, they came from the North-East of Italy and all of them had at least a bachelor degree. They participated voluntarily in the experiment.

3.3. Procedure

Items were presented in a written form. Participants were asked to judge the acceptability of the sentences presented on a 7-point Likert scale, where 7 indicates perfect acceptability, and 1 total unacceptability. Before beginning the experiment, participants were provided with instructions on how to use the scale: they were asked to rate 6 or 7 sentences they found perfectly acceptable, to give 1 or 2 to sentences they found completely unacceptable, and to assign 3-5 to sentences that were somewhere in between. They were also instructed to judge the sentences on the basis of their native-speaker intuition, rather than any prescriptive rules, and to go with their first instinct instead of spending time thinking about their answers. Moreover, the first five experimental items were used as a pre-test phase and were then excluded from the statistical analysis. The practice items were not marked as such: participants did not know these were practice items.

For statistical analysis, raw ratings of each individual subject, including both target and filler items, were first transformed into *z*-scores in order to avoid potential scale biases between participants. Linear mixed-effects models were then ran on the transformed data with the R statistical package lme4 (Bates et al. 2015). The fixed effect predictors included STRUCTURE, LENGTH and RESUMPTION, as well as their interaction, and the random effects included subjects and items. All predictors were sum coded before the data analysis, with [+ island], [+embedding] and [-resumption] coded as 1, and [- island], [- embedding], and [+ resumption] coded as -1.

3.4. Results

Transformed results from the experiment are summarized in Table 1. Statistical analysis revealed that there is no main effect of RESUMPTION, i.e. there is no difference among sentences with resumptive pronouns and their counterparts with a gap, in any of the adjuncts considered: *dopo* ($\beta = -0.15$, $se = 0.08$, $p > 0.06$), *prima* ($\beta = 0.01$, $se = 0.11$, $p > 0.92$) and *senza* ($\beta = 0.15$, $se = 0.13$, $p > 0.91$).

I will present results for the gap and the resumptive model separately.

	<i>after</i>	<i>before</i>	<i>without</i>
parasitic gap, short, gap	0.68	0.43	0.98
parasitic gap, short, RP	1.08	1.28	1.13
parasitic gap, long, gap	0.42	0.85	0.42
parasitic gap, long, RP	0.72	0.45	0.52
island, short, gap	-0.53	-0.28	0.45
island, short, RP	-0.57	-0.43	-0.54
island, long, gap	-1.04	-0.28	0.3
island, long, RP	-0.86	-0.43	-0.31

Table 1: Means of z-score ratings for each condition and each adjunct.

Raw ratings results summarizing each adjunct type and condition are presented in Figures 1, 2 and 3.

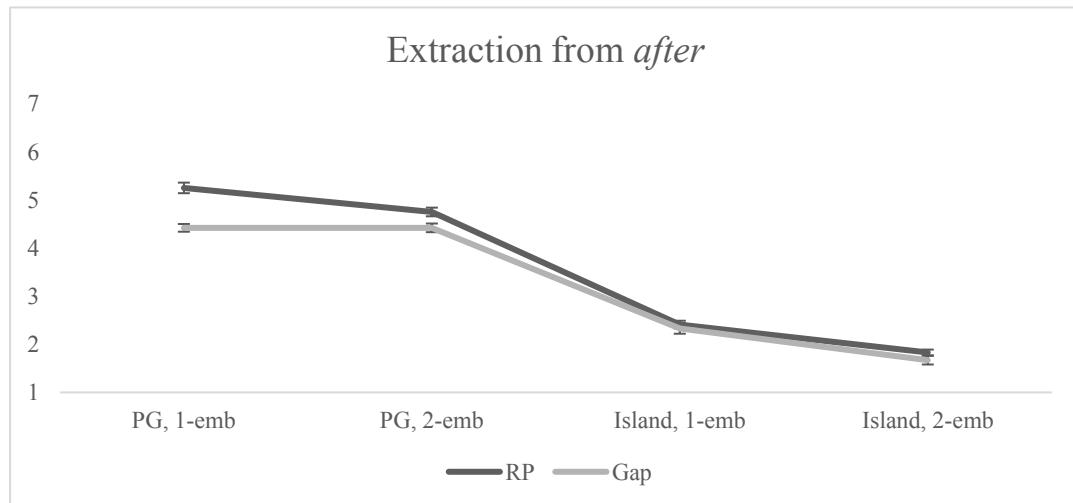


Figure 1: Raw acceptability judgments on a 1-7 scale. The y-axis indicates average ratings. Error bars indicate standard errors.

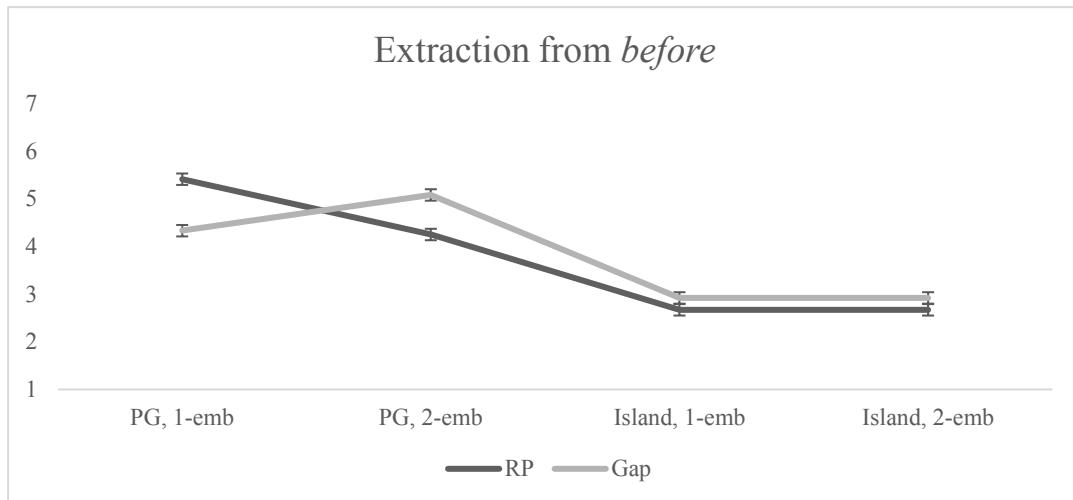


Figure 2: Raw acceptability judgments on a 1-7 scale. The y-axis indicates average ratings. Error bars indicate standard errors.

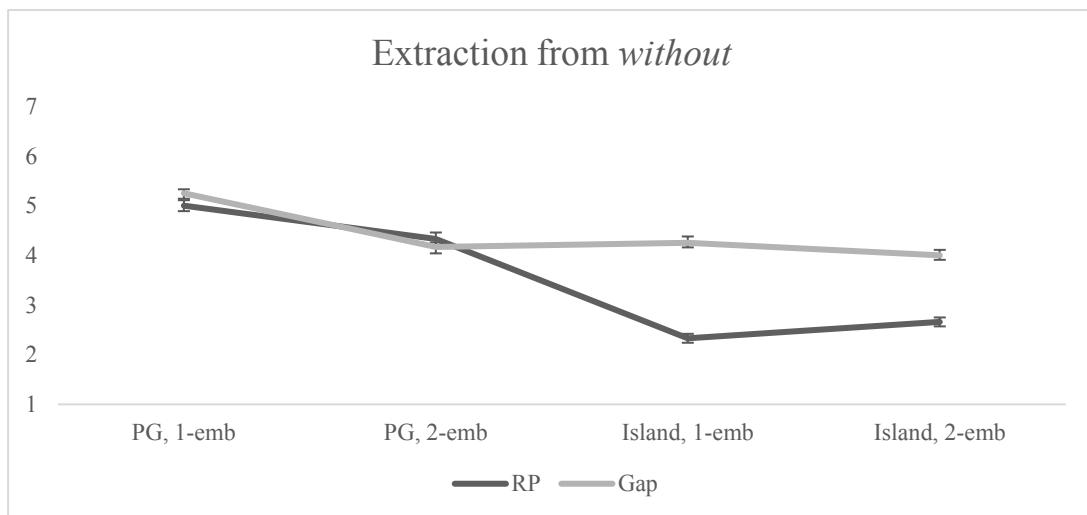


Figure 3: Raw acceptability judgments on a 1-7 scale. The y-axis indicates average ratings. Error bars indicate standard errors.

3.4.1. Structures with gap

When the sentence is realized with a gap instead of a resumptive pronoun, the effect of STRUCTURE is significant for both the adjunct introduced by *dopo* (linear mixed effect estimate: $\beta = -0.68$, $se = 0.11$, $p < 0.001$) and by *prima* ($\beta = -0.46$, $se = 0.12$, $p < 0.004$): sentences containing an island were always significantly rated lower than their parasitic gap counterparts. Interestingly, the case of *senza* is different: the effect of STRUCTURE is not significant ($\beta = -0.16$, $se = 0.08$, $p > 0.2$).

There is no main effect of LENGTH for any of the adjuncts analyzed: *dopo* ($\beta = -0.17$, $se = 0.11$, $p > 0.14$), *prima* ($\beta = 0.10$, $se = 0.12$, $p > 0.40$) and *senza* ($\beta = -0.18$, $se = 0.08$, $p > 0.06$). This means that there is no significant difference among long and short dependencies.

Interaction of STRUCTURE and LENGTH was not significant for any adjunct: *dopo* ($\beta = 0.02$, $se = 0.11$, $p > 0.83$), *prima* ($\beta = -0.11$, $se = 0.12$, $p > 0.39$) and *senza* ($\beta = 0.10$, $se = 0.08$, $p > 0.22$).

3.4.2. Structures with resumption

When the sentences are realized with a resumptive pronoun, there is a main effect of STRUCTURE for every adjuncts: *dopo* ($\beta = -0.81$, se = 0.09, $p < 0.0003$), *prima* ($\beta = -0.60$, se = 0.12, $p < 0.007$), and *senza* ($\beta = -0.59$, se = 0.11, $p < 0.003$). Even in the case of *senza* the presence of a resumptive pronoun makes the sentence significantly worse than its parasitic gap counterpart, differently from the gap structure.

LENGTH does not have an effect, for any adjunct: *dopo* ($\beta = -0.16$, se = 0.09, $p > 0.86$), *prima* ($\beta = -0.19$, se = 0.12, $p > 0.15$) and *senza* ($\beta = 0.12$, se = 0.11, $p > 0.28$), as well as the interaction of STRUCTURE and LENGTH (*dopo*: $\beta = 0.02$, se = 0.09, $p > 0.86$, *prima*: $\beta = 0.19$, se = 0.12, $p > 0.14$ and *senza*: $\beta = 0.17$, se = 0.11, $p > 0.13$).

3.4.3 Interim summary

The main results from this study can thus be summarized with the points below:

- (i) Resumptive pronouns do not help rescuing the island effect. On the contrary, they can strengthen the effect, at least in one case, i.e. *senza*. Note that this may be connected to independent reasons, such as the fact that they are perceived as substandard;
- (ii) Different adjuncts lead to different islands effects;
- (iii) Different adjuncts lead also to different acceptability judgments for parasitic gaps;
- (iv) The length of the dependency has no main effect.

I will discuss these points in the next sections.

4. Discussion

4.1. The differences among adjuncts

As seen in section 3.4.2, in all of the adjuncts considered in this test, the effect of STRUCTURE is significant in the resumptive model, which is the expected result given what we know about these domains. This means that sentences containing an island violation are rated significantly lower than their parasitic gap counterpart. We can thus confirm that parasitic gap sentences can be used as acceptable counterparts of islands, and, moreover, that the island status of adjuncts does not change thanks to resumptive pronouns: they do not rescue the island violation. I will discuss this result in the next section.

The crucial result in the STRUCTURE factor comes from the gap model. Once again extraction from *dopo* and *prima* is considered bad, and there is thus a main effect of STRUCTURE, independently from the presence of a resumptive pronoun or of a gap. It is different in the case of *senza*: when the resumptive element is not present, there is no island effect, i.e. this sentence does not present an island violation and is not interpreted as an island for extraction.

What is interesting is that there are differences among the adjuncts taken into account. Such a distinction can be seen in the case of extraction from the island condition with no embedding and no resumption: extraction in the case of *senza* is much more acceptable than in the other adjuncts, where it seems to be completely ruled out.⁶ Compare the three cases in Figure 4.

⁶ Notice that a weaker island effect in some adjuncts was already detected in some experimental (Heestand et al. 2012, Polinsky et al. 2013) and theoretical works (Cinque 1990).

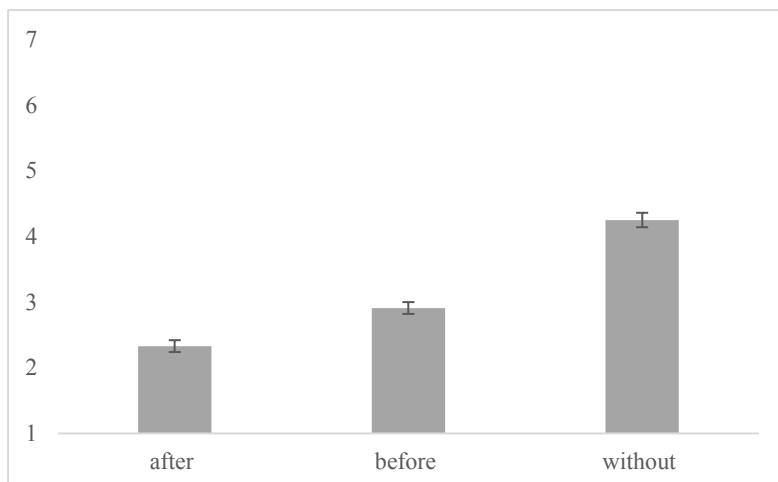


Figure 4: Raw acceptability judgments on a 1-7 scale representing the average ratings for the island condition, with short filler-gap dependency and no resumption. Error bars indicate standard errors.

Another interesting point regards the acceptability of parasitic gaps. In this kind of structure, the gap contained in the island is licensed because of the presence of a higher gap outside the island. Basically, they are made of a “good” and a “bad” gap, and the latter can be considered good only if the former is present as well. Parasitic gaps are therefore well-formed sentences, as the literature on the topic long stated, and they can be easily processed (Phillips 2006, 2013; Wagers & Phillips 2009). Hence the expectation for the sentences I used in the test was that they would be considered equally acceptable by everybody. However, if we look at the results for the condition with no embedding and no resumption, a slight distinction can be seen among adjuncts.

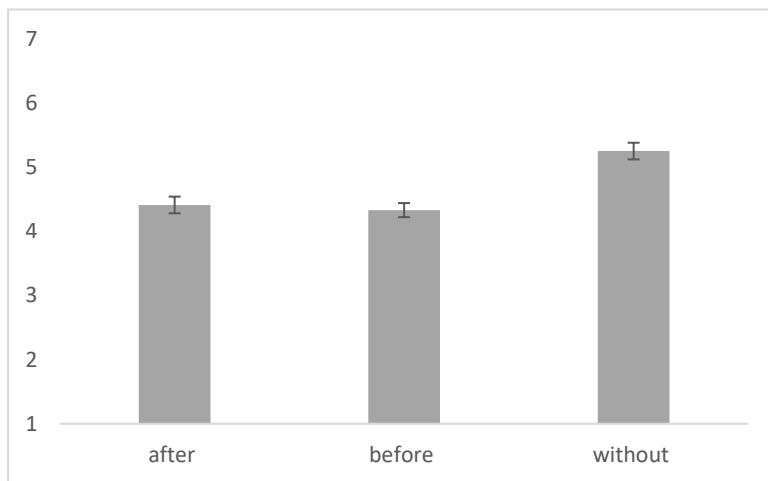


Figure 5: Raw acceptability judgments on a 1-7 scale representing the average ratings for the parasitic gap condition, with short filler-gap dependency and no resumption. Error bars indicate standard errors.

Apparently, not all parasitic gaps are accepted in the same way. Crucially, the case of *senza* is always the better option, whereas the cases of *dopo* and *prima* are not so good. I will use as an example the sentences in (13):

- (13) a. Quali dolci Luca ha mangiato _ dopo aver rubato _ ?
 which sweets Luca has eaten after having stolen
 ‘Which sweets did Luca eat after having stolen?’

- b. Quale libro Anna ha cercato _ per mesi prima di trovare _ ?
 which book Anna has looked for months before to.find
 ‘Which book did Anna look for months before finding?’
- c. Quale ragazzo Silvia ha guardato _ senza salutare _ ?
 which boy Silvia has looked without to.greet
 ‘Which bot did Silvia look without greeting?’

As can be seen, sentences containing the parasitic gap are very similar, in that all of them have transitive verbs in the matrix and in the adverbial clause, the DP argument is extracted from prepositional adjuncts and it is the object of the matrix verb. Moreover, in all of the sentences the *wh*- constituent is a complex D-linked one, rather than a simple *wh*. Finally, the verb in the adjunct is in its non-finite tense and in every sentence there is an overt subject shared by the matrix verb and the one in the adjunct.

The same conditions apply to the island cases, as can be seen from the examples in (14). Notice that as mentioned in section 2.1, all the factors able to strengthen the island effect were manipulated in order to obtain the weakest possible effect.

- (14) a. Quali dolci Luca è scappato [dopo aver rubato _]?
 which sweets Luca is run.away after having stolen
 ‘Which sweets did Luca run away after having stolen?’
- b. Quale libro Anna si è preoccupata [prima di trovare _]?
 which book Anna herself is worried before to.find
 ‘Which book did Anna worried before finding?’
- c. Quale ragazzo Silvia è partita [senza salutare _]?
 which boy Silvia is left without to.greet
 ‘Which boy did Silvia leave without greeting?’

Given that the structures are equal in most aspects, we should attribute the differences of both the island and the parasitic gap condition to the adjunct itself. Let’s therefore assume that adjuncts are not a uniform group, but a heterogeneous one that needs to be sorted according to some criteria. I will further develop this hypothesis in the following sections.

4.2. What did John think that Mary said about embedding?

The lack of an effect of LENGTH is somewhat unexpected: in several accounts the length of the filler-gap dependency is one the main factors able to explain the island effect, as tested by many scholars, and especially Sprouse (2007). Such an effect is claimed to be able to determine the acceptability or unacceptability of a sentence, particularly in reductionist approaches: the longer the distance from the gap, the more difficult it is to connect gap and extracted element, and the more memory is required to be used.

However, in this test the length of the dependency is not significant: sentences with a longer filler-gap dependency are not rated as worse than their counterparts with shorter dependencies. Moreover, there are no differences between the resumptive and the gap model: in both cases there is no effect of LENGTH.

4.3. Resumptives fail to rescue islands

Although many scholars have considered the presence of a resumptive pronoun (even of the intrusive kind) as a rescue strategy for island violations, in this test there was not such an effect: sentences containing a gap are not rated worse than their counterparts with a resumptive pronoun. On the contrary, the case of *senza* has the reverse situation: when the RP is present there is a main effect of STRUCTURE, whereas in the gap model such an effect is not present. At least in this case, thus, it seems that the presence of an RP actually makes the sentence worse and extraction is not licensed.

Therefore, the results obtained here are in line with results of other tests investigating the acceptability of similar sentences (see Heestand et al 2012; Polinsky et al. 2013), in that once again the ameliorating effect was not really detected. It seems that in these cases the lack of an effect of resumptives may be connected to different reasons: the type of task asked to participants, and the environment in which the test takes place.

First, evidence that the instructions of the test have a role is found in Beltrama & Xiang (2016). In this test two different instructions were assigned to participants, namely to judge the *acceptability* or the *comprehensibility* of sentences containing island violations and resumptive pronouns, as well as counterpart sentences containing gaps. Interestingly, the effect of RPs was significant for both Italian and English in the comprehensibility task, but not in the acceptability one – which is usually the one employed for these tests. Moreover, this effect was present only when a context sentence preceded the item. This may be due to the fact that RPs help (i) to construct a coherent parse, and (ii) to retrieve part of a non-local dependency, given that finding the tail of a filler-gap dependency may be particularly difficult in island contexts.⁷

Moreover, there is a discrepancy between production and acceptability of intrusive resumptive pronouns, which makes it difficult to assess these kinds of structures in an experimental context: RPs are systematically realized in spontaneous speech, as noticed in studies of corpora (see Prince, 1990), but nonetheless they tend not to be accepted. This tendency is particularly clear in the example of Ferreira & Swets (2005), where the production of RPs was elicited in island contexts and the same speakers who produced these sentences did not accept them when asked to rate their acceptability.

It is important to notice that these kinds of elements are generally perceived as part of a ‘bad’ version of a languages like Italian and English, hence as substandard varieties, as first noted by Ross (1967). In fact, intrusive RPs tend to be connected to informal and spoken registers, which means that speakers might be inclined to classify them as not entirely acceptable, even though they use them. Participants may be influenced by normative considerations, and therefore reject these forms. If this is really the case, it is obvious that to obtain such an effect the environment in which these sentences are tested is crucial: we do not expect to see an amelioration among those who were prescriptively instructed that these elements should not be used. It is much easier to find them in spontaneous speech, which is usually less controlled than in an acceptability task where participants are required to actually think about that construction.⁸

Thus, further investigations should thus be made to assess this point, extending the sample of participants and checking more factors than those usually considered.

Notice however that there is an asymmetry among adjuncts in the effect of resumption: in the case of *senza* the presence of an RP actually makes the sentence worse (basically it turns the sentence into an island), whereas in *dopo* and *prima* there are no differences among the gap or the resumptive counterpart. Therefore, in the former case the points above cannot be applied in that the RP has the reverse effect, but they should rather be connected to the other adjuncts.⁹

5. Explaining extraction

In this section, I will provide a first account regarding the possibility of extraction from certain adjuncts, and the impossibility from others. Let’s first go back to the differences among adjuncts discussed in section 4.1. First of all, remember that the sentences investigated are similar in many aspects and nonetheless we find a difference with respect to the type of adjunct: some of

⁷ See Beltrama & Xiang (2016) for a detailed analysis of these points.

⁸ We should also consider the fact that those who participate in this kind of studies are usually enrolled at university and it may be more difficult to find an effect of resumptives in higher levels of education, precisely because people are instructed not to like them. Notice that there is a difference in this respect among trained linguists and linguistically-naïve people, namely the ones usually employed for these tests.

⁹ Notice however that the same effect is not found in parasitic gap: the presence of a resumptive pronoun in such sentences doesn’t change the acceptability of the sentence, i.e. we cannot say that the ban on extraction depends (only) on the RP. Thanks to Irene Amato for pointing this out.

them are opaque - hence no extraction can take place - whereas in some others the opacification of the domain is rather optional. According to the results of this study, the adjunct introduced by *senza* is the most transparent, while those introduced by *dopo* and *prima* show a stronger island effect. Moreover, a similar distinction holds for the case of parasitic gaps. Why do we find such a difference in both structures?

Given the similarities between these sentences, the difference between them is to be attributed to the adjunct itself, and in particular to its syntax. A suitable difference regards the level of attachment of adjuncts.¹⁰ These are connected to different points of merger in the structure, and their height influences the possibility of extraction: when adjuncts are in a higher projection they are opaque domains, whereas more transparent adjuncts are connected to a lower point (see Sheehan 2010; Narita 2011; Brown 2016 for similar proposals regarding the extractability from adjuncts).

In the cases discussed here, it can be the case that *dopo* is attached to the phase head vP and is therefore an opaque domain not allowing extraction of any element, whereas *senza* is in a lower projection such as VP and is thus transparent.¹¹

Why should there be a difference connected to adjunct types, though? This may have to do with the possibility of forming macro-events. It is known that different events can combine to form complex structures and single macro-events which can be further decomposed into simpler ones.¹² Here, the event introduced by the adjunct is combined with the one of the main verb, forming a (unique) complex event structure and thus voiding the islandhood of the domain. Such a distinction is supported by an interpretive difference between the two types of adjuncts, as noted in Truswell's (2007, 2011) semantic approach. In fact, opaque adjuncts tend to situate two separate events in relation to each other, whereas transparent ones modify aspect within a single event.

The semantic approach of Truswell (2007, 2011) can be connected to syntactic reasons, namely their position in the structure. In fact, the possibility of having a complex structure is connected to the level of attachment of the adjunct: it is open only for lower adjunction sites but blocked for higher ones. This is why we need both steps in order to account for extraction. Let's look once again at the asymmetry among *senza* and *dopo*. Examples are repeated in (15).

- (15) a. Quali dolci Luca è scappato [dopo aver rubato _]?
which sweets Luca run away after having stolen
'Which sweets did Luca run away after having stolen?'
- b. Quale ragazzo Silvia è partita [senza salutare _]?
which boy Silvia has left without to.greet
'Which boy did Silvia leave without greeting?'

A sentence like (15a) is judged unacceptable, and following the approach above this is the case because here the two events described in the matrix and in the adjunct cannot be united to form a complex structure because of the height of the level of attachment. In fact, as seen above, *dopo* is connected to vP. The acceptability of (15b) depends on the fact that the adjunct is here merged lower, in VP and thus the creation of a single event is possible.¹³

¹⁰ See also Haegeman (2012) for a similar proposal for central adverbial clauses based on independent reasons.

¹¹ There can be a different analysis of merging points based on a more fine grained level of attachment of the verbal domain, which also allows us to multiply the potential merging points. See the proposal of Sheehan (2010) for prepositional adjuncts, and the one by Fábregas & Jiménez-Fernández (2016a, b) based on bare present participial adjuncts and adjectival secondary predicates. In their analysis the verbal domain is based on the decomposition of the Aktionsart in Ramchand (2008).

¹² Independent analyses of macro-events have also been proposed for the case of telic pairs (see Giorgi & Pianesi 2001; Higginbotham 2009).

¹³ Note that there is also another syntactic reason in assuming different merging points for adjuncts: if we consider Agree to happen under c-command, adjuncts do not enter into an agree relation with vP, whereas a lower merging point, say in VP, could explain the c-command relation and thus the asymmetry between the two merging points as far as extraction and events are considered. However, assuming a lower merging point may be problematic for extraction, especially after head movement. In such a case, extraction should happen early in the

6. Conclusion

To conclude, this pilot experimental study confirms that resumptive pronouns of the intrusive kind cannot rescue an island violation in an acceptability task. On the contrary, with some adjuncts its presence can strengthen the island effect. The test also showed that extraction from prepositional adjuncts is sometimes licensed in Italian, and it is affected by two factors, mainly: (i) the level of attachment of the adjunct, and (ii) the possibility of forming a complex event structure instead of two separate ones. Such an approach also explains the differences that are found among adjunct types.

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Never Not a Negative Concord Item

Expletive Negative Concord in West Germanic

Marten Stelling

Several West Germanic languages have systems of negative concord that are optional and show an unexpected word order. In this paper, I will argue that the reason for these phenomena is the fact that the negative marker involved in these concord systems is an instance of expletive negation.

1. Introduction

In some West Germanic languages, there are systems of what is usually considered Negative Concord. However, they can not be readily explained by existing theories thereof. I will make a case for an alternative explanation in terms of Expletive Negation.

1.1. Negative Concord

Negative Concord (NC) is a phenomenon that has attracted considerable attention in the literature and continues to do so (Haegeman & Zanuttini 1996; Giannakidou 2000; Herburger 2001; De Swart & Sag 2002; Zeijlstra 2004). A concise definition of NC would be a co-occurrence of two items, each of which can negate a sentence on their own, yielding a single negation. Consider the following:

- | | | |
|-----|---|------------------|
| (1) | a. I didn't see anybody.
b. I saw nobody.
c. I didn't see nobody. | Standard English |
|-----|---|------------------|

In example (1), we see the sentential negation *not*, which in Standard English corresponds to the logical negation \neg , and *nobody*, which is a so-called Neg-word, that is to say a negative

quantifier over a certain domain: in the case of *nobody*, people. Both of them contribute a logical negation to the sentence.

Standard English is a non-NC, or double negation (DN) language, and therefore (1c) will yield a double negation, meaning that it was not the case that the speaker saw nothing, or did see something. This is in contrast to many dialects of English, such as African American English, which are NC varieties. Here, the sentence *I didn't see nobody* yields the same meaning as (1a) and (b).

NC languages in turn split up into strict and nonstrict NC languages. Italian is an example of a nonstrict NC language. In Italian, *non* ('not') and *nessuno* ('nobody') can contribute negation individually in (2a) and (b), but there is no DN reading in (c). Additionally, Italian being a nonstrict NC language, vP-external Neg-words do not enter into a NC relationship (examples from Zeijlstra 2008:2).

- | | |
|---|---------|
| (2) a. Gianni non telefona.
Gianni NEG call
'Gianni doesn't call.' | Italian |
| b. Nessuno telefona a Gianni.
n-body call to Gianni.
'Nobody calls Gianni.' | |
| c. Gianni non telefona a nessuno.
Gianni NEG call to n-body
'Gianni doesn't call anyone'
'Gianni doesn't call nobody.' | |

This lack of a NC relationship stands in contrast with strict NC languages, such as Czech, where a Neg-word must always be associated with a negative marker elsewhere in the clause (examples from Zeijlstra 2008:5):

- | | |
|--|------------------|
| (3) a. Milan nevolá.
Milan NEG-call
'Milan doesn't call.' | Czech, strict NC |
| b. Milan nikomu *(ne)volá.
Milan nobody NEG-call
'Milan doesn't call anybody.' | |
| c. Dnes nikdo *(ne)volá.
today n-body NEG.calls
'Today nobody is calling' | |

The crucial point here is (3c), a Neg-word in the subject position. This does not trigger NC in Italian (Zeijlstra 2008:2):

- | | |
|--|-----------------------|
| (4) a. Gianni non telefona.
Gianni NEG call
'Gianni doesn't call.' | Italian, nonstrict NC |
| b. Gianni *(non) telefona a nessuno.
Gianni NEG call to n-body
'Gianni doesn't call anyone.' | |

- c. Nessuno (*non) telefona a Gianni.
 n-body NEG call to Gianni
 'Nobody calls Gianni.'

To sum up, in strict NC, the Neg-word must either c-command the negative marker or be c-commanded by it (3b,c), and in nonstrict NC, the Neg-word can only be c-commanded by a negative marker (4b,c):

	Strict NC:	Neg-word > Negative marker
(5)		Negative Marker > Neg-word
	Nonstrict NC:	*Neg-word > Negative marker
		Negative Marker > Neg-word

1.2. West Germanic Optional Negative Concord

In several West Germanic languages, a third type of NC arises. In both Bavarian and Flemish, NC involving Neg-words and negative markers is optional, and requires the Neg-word to c-command the negative marker, with the obverse order yielding Double Negation (DN) (Bayer 1990, Haegeman 1995). Outside of NC contexts, the negative marker functions as a sentential negation of its own (Flemish examples after Haegeman 1995:170, Bavarian examples from Bayer 1990:16f):

(6) Single Negation:

- a. da Valère *niemand* gezien oat. West Flemish
 that Valère nobody seen had
 'that Valère had not seen anybody'
- b. Valère slaapt niet.
 Valère sleeps NEG
 'Valère doesn't sleep.'
- c. das *keine* Unanständlichkeit bassirt isd. Upper Bavarian
 that no indecency happened is
 'that no indecency has occurred.'
- d. Peter schlafst nichd.
 Peter sleeps NEG
 'Peter doesn't sleep.'

(7) Negative Concord:

- a. da Valère *niemand nie* gezien oat. West Flemish
 that Valère nobody NEG seen had
 'that Valère had not seen anybody'
- b. das *keine* Unanständlichkeit (*nichd*) bassirt isd. Upper Bavarian
 that no indecency NEG happened is
 'that no indecency has occurred.'

(8) **Double Negation:**

- a. da Valère *nie niemand* gezien oat. West Flemish
that Valère NEG nobody seen had
'that Valère hadn't seen nobody' (= seen somebody)
- b. das nichd keine Unanständlichkeit bassirt ist. Upper Bavarian
that NEG no indecency happened is
'that not no indecency occurred.' (=some indecency)

West Germanic NC shows a pattern that can be summed up thus:

- (9) West Germanic: | *Neg > Neg-word
 | Neg-word > Neg

This is an inversion of nonstrict NC, but more restricted than strict NC, in which negative markers appear to both the left and the right of Neg-words, and exists only in a small number of closely related languages. Additionally, West Germanic NC is optional. In this paper, we will thus explore the following questions:

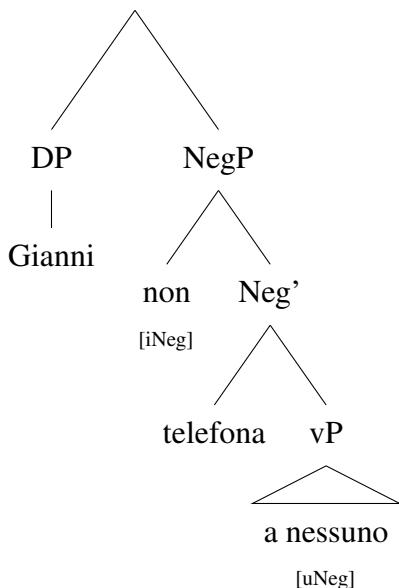
1. What underlies the West Germanic NC system, and especially its differences from other NC systems?
2. Is there a relationship with its optionality?
3. Why does it affect these languages?

2. Previous Analyses of Negative Concord

2.1. Zeijlstra (2008)

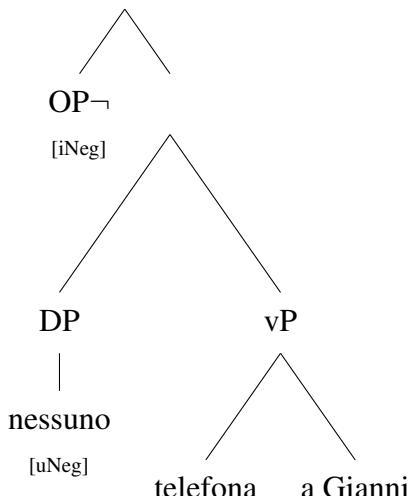
In Zeijlstra (2008), Negative Concord is syntactic agreement between a higher (possibly covert) negative operator carrying a feature [iNEG] and one or more morpho-syntactically negative elements, but semantically non-negative elements carrying [uNEG]. Nonstrict NC as in Italian is handled by assuming [iNeg] on the negative marker *non*, and [uNeg] on the Neg-words c-commanded by the negative marker. A vP-external Neg-word, which is always associated with sentential negation and never enters into a concord relationship with the negative marker (see (3b)) is c-commanded by an abstract negative Operator OP- \neg carrying [iNeg], which is inserted as a repair strategy (examples from Zeijlstra 2008:2f).

- (10) a. Gianni non telefona a nessuno. Italian
Gianni NEG calls to nobody
'Gianni doesn't call anybody.'



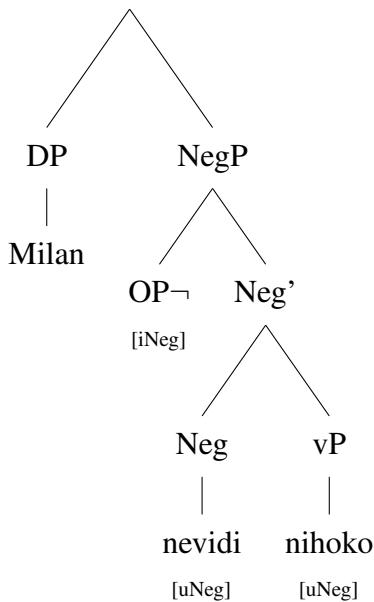
- b. Nessuno telefona a Gianni.
 nobody calls to Gianni
 'Nobody calls Gianni'

Italian

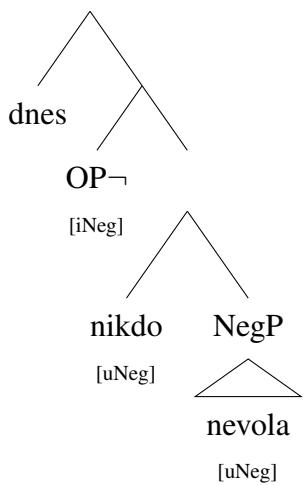


When it comes to strict NC as in Czech, both Negation and Neg-words carry a [uNeg] feature, and OP¬ carrying [iNeg] is always present, c-commanding the negative marker and Neg-word.

- (11) Milan nevidí nihoko. Czech
 Milan NEG-see nobody
 ‘Milan doesn’t see anybody.’



- (12) Dnes nikdo nevolá. Czech
 today nobody NEG.calls
 ‘Today nobody is calling.’



Given that both the Neg-word and negative marker are non-negative, it is possible for them to show up in any configuration relative to each other. This explains quite neatly the differences between strict and nonstrict NC. At the same time, Zeijlstra has no way of accounting for the quirky word order in West Germanic NC. If West Flemish or Bavarian NC behaves like a non-strict NC system, the [uNeg] on the Neg-word is not c-commanded by the negative marker, hence, no NC would be possible contrary to fact:

- (13) da Valère niemand[uNeg] nie[iNeg] gezien oat. West Flemish
 that Valère nobody not seen had
 # ‘that Valère hadn’t seen anybody.’

The DN reading with the reverse order, that is, the Neg-word c-commanding the negative marker, is also unexpected:

- (14) da Valère nie[iNeg] niemand[uNeg] gezien oat. West Flemish
 that Valère not nobody seen had
 # ‘that Valère hadn’t seen nobody.’

Conversely, if West Flemish or Bavarian NC behaves like a strict NC language, and thus assigns a [uNeg] feature on both negative markers and Neg-words as well as an OP \neg , the DN reading with a Negation c-commanding the Neg-word is also not explained:

- (15) da Valère OP \neg [iNeg] nie[uNeg] niemand[uNeg] gezien oat. West Flemish
 that Valère not nobody seen had
 ‘that Valère hadn’t seen nobody.’

An analysis in line with Zeijlstra (2008) is therefore unlikely to succeed.

2.2. Haegeman and Lohndal (2010)

Haegeman & Lohndal (2010) is a paper that offers direct criticism of Zeijlstra (2008), based on West Flemish. This makes it especially valuable for our purposes. Haegeman and Lohndal’s (H&L) main criticism pertains to the simultaneity of its agreement. In its place, they propose consecutive binary agreement. This form of agreement happens sometimes between two [uNeg] features, but always finally with a c-commanding [iNeg] feature.

Additionally, H&L’s analysis involves a more complex set of features. In addition to [Neg] features, H&L add a quantification feature on Neg-words. Owing to the fact that their quantificational qualities are what sets them apart from negative markers, this allows them to constrain the variation in NC word order somewhat. In practice, this amounts to [uNeg, iQ] on Neg-words, [uNeg, uQ] on negative markers, and [iNeg, iQ] on OP \neg . This allows Haegeman and Lohndal to partially account for the inverted NC/DN behaviour of West Flemish:

- (16) a. 1. OP \neg [iNeg, iQ] > niemand [uNeg, iQ] > nie [uNeg, uQ] → Agree: [uNeg, uQ]
 2. OP \neg [iNeg, iQ] > niemand [uNeg, iQ] > nie [uNeg, uQ] → Agree: [uNeg]

In step 1, the [iQ] feature on the Neg-word checks the [uQ] feature on the negative marker. Simultaneously, the [uNeg] features on both items also enter into a kind of agreement relation, creating a composite [uNeg] feature for further computation. In step 2, that leftover composite [uNeg] features is checked off by the [iNeg] on OP \neg .

However, there is no clear explanation why *nie* > *niemand* would have a DN, rather than a NC reading. Like in Zeijlstra (2008)’s analysis of strict NC, any configuration of Neg-word and negative marker should be able to enter into agreement along the lines of step 1 in (16), both of them having a [uNeg] feature. The combined feature set would then be able to enter into agreement step 2, creating a NC reading contrary to fact. Alternatively, the mismatch between the [uQ] on the negative marker and the [iQ] on the c-commanded Neg-word could cause a

crash for *nie < niemand* constructions. However, that would simply rule out such constructions, making H&L's theory unable to account for the double negation reading. Lastly, one might argue that, rather than a crash, the feature mismatch in *nie < niemand* construction triggers the insertion of an OP— as a repair strategy, which could then trigger a double negation reading. H&L are not clear on this.

3. Expletive Negation

Are we dealing with NC at all? In this paper, we would like to consider Expletive Negation (EN) as an alternative explanation for the quirky behavior of West Germanic NC structures.

EN is a phenomenon where an apparently negative marker creates a sort of indifference reading (Eilam 2009), without contributing a semantic negation of its own (examples from Eilam 2009:2:

- (17) a. ma še-dani (**lo**) katav hitparsem ba-iton. Hebrew
what that-Danny not wrote was.published in.the-newspaper
'Whatever Danny wrote was published in the newspaper.'
'What Danny didn't write was published in the newspaper.'
- b. Du kannst nicht gehen, bis du %(*nicht*) deinen Teller leergegessen hast. German
you can not go until you not your plate finished have
'You can't leave until you have finished your plate.'
'You can't go until you have not finished your plate.'

EN has been widely researched, and there is at this point little consensus on its nature. Starting from Van der Wouden (1994), there have been important contributions in Abels (2002), Abels (2005), and Yoon (2011), which posit some level of interaction with subjunctive mood. Makri (2013) on the other hand puts forward an analysis of EN involving attitude semantics. We will be working along the lines of Eilam (2009) and Preminger (2010), who have an analysis in terms of domain widening.

Expletive Negation is generally and independently of authors' stances on its semantics taken to be an NPI: it is licensed in downward-entailing contexts like *until*, but not in upward entailing contexts, such as *after*:

- (18) a. Du kannst nicht gehen, bis du nicht deinen Teller leergegessen hast. German
you can NEG go until you EN your plate finished have
'You can NEG leave until you have finished your plate.'
- b. Du kannst nicht gehen, nachdem du (**nicht*) deinen Teller leergegessen hast.
you can NEG go until you EN your plate finished have
'You cannot leave until you have finished your plate.'

This relates back to the domain-widening behaviour of EN: NPIs are generally domain-wideners (Kadmon & Landman 1993) (see Krifka 1995, Chierchia 2013 for a refinement and a formal implementation of the intuition that NPIs can trigger strengthening effects).

Expletive Negation (EN) is generally licensed by a downward entailing element that introduces a domain of quantification (examples from Makri 2013:13ff, unless otherwise noted):

- (19) a. Degree Comparatives:
 Ta voiture est moins *coûteuse* que je ne le pensais. French
 your car is less costly than I NEG it thought
 ‘Your car is less costly than I thought.’
- b. *Before*-clauses:
Avant qu' elle ne sorte, elle doit prendre son repas. French
 before that she NEG go-out she must take her meal
 ‘Before she goes out, she must eat.’
- c. Dubitatives:
 Non *dubitabat* quin ei crederemus. Latin
 NEG doubt lest.that-NEG him believe
 ‘He did not doubt whether we believed him.’
- d. Free Relatives: (Eilam 2009:2):
ma še-lo ta'ase ata tikashed babxina. Hebrew
 what that-NEG you.will.do you will.fail in.the.test
 ‘Whatever you do, you’ll fail the test.’

Eilam (2009), Preminger (2010) and Chierchia (2013) propose that, being an NPI, EN triggers domain widening (example from Eilam 2009:2):

- (20) a. *ma še-dani katav hitparsem ba-iton.* Hebrew
 what that-Danny wrote was.published in.the-newspaper
 ‘What Danny wrote was published in the newspaper.’
- b. *ma še-dani lo katav hitparsem ba-iton.* Hebrew
 what that-Danny EN wrote was.published in.the-newspaper
 ‘Whatever Danny wrote was published in the newspaper.’

Finally, EN cannot have focus relative to the licensor, because focus on the EN triggers semantic negativity (Eilam 2009:3):

- (21) a. *ma še-dani lo katav hitparsem ba-iton.* Hebrew
 what that-Danny EN wrote was.published in.the-newspaper
 ‘Whatever Danny wrote was published in the newspaper.’
- b. *ma še-dani LO katav hitparsem ba-iton.* Hebrew
 what that-Danny NEG wrote was.published in.the-newspaper
 ‘What Danny didn’t write was published in the newspaper.’

4. West Germanic NC involves Expletive Negation

In this section, I would like to argue that the properties of EN shown above point towards an explanation of the unusual NC-like structures in West Germanic. This would work like the NC phenomenon already described independently by Espinal (2007), Espinal & Tubau (2016) for Catalan. Let us first look at the similarities between the two:

Neg-words implicitly introduce a domain of quantification (see (19)), which can be widened and trigger the presence of an NPI licenser:

- (22) A: Did you see any of the grad students at the party?
 B: I saw **nobody**. I actually stayed home that night, so I really saw **nobody at all!**

This allows us to predict a strengthening effect of West Germanic NC: West Germanic NC would have to carry some sort of emphatic meaning. This is borne out in Bavarian (data elicited from an (Eastern) West Middle Bavarian speaker):

- (23) a. Peter hod koan Menschn gseng, gnau gnumma, Peter hod koan Menschn ned
Peter has no human seen exactly taken Peter has no human not
gseng. Bavarian
seen
‘Peter saw nobody, that is to say, Peter has seen nobody at all.’

b. # Peter hod koan Menschn ned gseng, gnau gnumma, Peter hod koan Menschn
Peter has no human not seen exactly taken Peter has no human
gseng.
seen
‘Peter saw nobody, that is to say, Peter has seen nobody at all.’

In the ‘that is to say’, or ‘in fact’ test, it is generally only possible to go from a weaker proposition to a stronger one, and not the other way around:

- (24) a. You **can** go home, in fact you **must**!
b. # You **must** go home, in fact you **can**!

Given that the NC-like item cannot occur before the plain Neg-word in an 'in fact' configuration, it is predicted to be the semantically stronger one.

If the negative marker in question is a NPI licensed by a Neg-word, rather than a normal negative marker in a NC configuration, the fact that a Neg-word c-commanding that negative marker yields a single negation follows immediately (data based on Haegeman & Lohndal 2010:182):

- (25) a. da Valère niemand nie gezien oat
 that Valère nobody EN/*NEG seen had
 ‘that Valère hadn’t seen anybody.’

b. da Valère nie niemand gezien oat
 that Valère *EN/NEG nobody seen had
 ‘that Valère hadn’t seen nobody’ (=had seen somebody)

As for the obverse configuration, with the negative marker c-commanding the Neg-word, as in (25b): *nie* is not licensed by the Neg-word, and can thus not be taken to be an instance of EN. At this point, the hearer can assume negativity for the negative marker as a repair strategy.

Lastly, focus in West Germanic NC works identically to EN. West Germanic 'NC' negation can not be focused relative to the Neg-word (data based on Haegeman 1995:170 and checked with a native speaker):

- (26) a. da Valère NIEMAND nie gezien oat
 that Valère nobody not seen had
 ‘that Valère had not seen anybody’

b. da Valère niemand NIE gezien oat
 that Valère nobody not seen had
 ‘that Valère had not seen nobody’ (= had seen somebody)

At this point, we can conclude that EN is a better explanation for West Germanic Neg-word > Neg structures than NC. We will call the phenomenon of NC-like EN structures 'Expletive Negative Concord', or ENC.

4.1. The Semantics of West Germanic Expletive Negation 'NC'

All of this opens the question of the exact semantic properties of expletive negation. As mentioned before, there is little consensus on the semantic content of EN. Largely, analyses of EN can be split into two different camps: One which takes it to be an NPI that is homophonous with sentential negation, and one which takes it to be an instance of sentential negation in which the semantic negativity is in some sense hidden from the surface semantics of the item.

Assuming EN to be an NPI homophonous with sentential negation has been suggested by, among others, Schwarz & Bhatt (2006), and Ladusaw (1979). According to the supporters of the homophonous approach, here are two ostensible negative markers: 1. a normal negation and 2. a homophonous NPI with domain widening, but no strictly negative properties.

This distinction would work very well with the rather crucial domain-widening property attested for West Germanic 'NC' in section 4. To be precise, the rescuing operation in example (25) would be well reflected in the switch between two homophonous items with different licensing conditions. NPI-hood would furthermore explain the domain-widening behavior of West Germanic NC without any need for further mechanisms.

The other major approach is exemplified by e.g. Abels (2005), Makri (2013), Yoon (2011), and Yoon (2013): EN is negative at some deeper level, such as not-at-issue semantics. These approaches tend to draw on EN's connection to subjunctive mood in many languages. Yoon (2011), for example, links it to the evaluative subjunctive, which has a function that Yoon sums up as 'Potentiality with negative anticipation'. This moves us closer to NC, given that two semantically negative items would be involved in West Germanic 'NC', but further from the licensing behavior thereof. Additionally, there seems to be very little evidence linking West Flemish EN to subjunctive mood.

5. EN, NC, and EMNEs

Having dealt with the questions about the underlying structure and optionality of West Germanic NC, we will now turn to the remaining one: why does expletive 'NC' arise in these languages specifically? Several West Germanic languages have another phenomenon in which a Neg-word c-commands a negative marker without triggering a DN reading: Emphatic Multiple Negation Expressions (EMNEs) (Zeijlstra 2010).

5.1. EMNEs

EMNEs are fairly frozen expressions with a structure in which a Neg-word scopes over a negative marker. They are marginal but attested in Dutch (Zeijlstra 2010) and German:

- (27) a. Ich habe NIEMALS nicht geraucht. German
 I have never not smoked
 'I didn't ever smoke.'
- b. Ik heb NOOIT niet gerookt. Dutch
 I have never not smoked
 'I didn't ever smoke.'

Like ENC, EMNEs carry an emphatic, or strengthening effect, as shown by the 'precisely'-test:

- (28) a. Ich habe nicht geraucht, genau gesagt: ich habe NIEMALS nicht geraucht. German
 I have not smoked exactly said: I have never not smoked
 'I didn't smoke, that is to say: I didn't ever smoke.'
- b. # Ich habe NIEMALS nicht geraucht, genau gesagt: ich habe nicht geraucht.
 I have never not smoked exactly said: I have not smoked
 'I didn't smoke, that is to say: I didn't ever smoke.'

And again, the negative marker cannot be focused relative to Neg-word without yielding a DN reading:

- (29) a. Ich habe niemals NICHT geraucht. German
 I have never not smoked
 'I didn't ever not smoke.'
- b. Ik heb nooit NIET gerookt. Dutch
 I have never not smoked
 'I didn't ever not smoke.'

As an interim conclusion, we could posit that EMNEs have many, at least superficial, similarities to ENC.

5.2. EMNEs are EN undergoing lexicalization

In Dutch, EMNEs are single compound words (Zeijlstra 2010). That means that it is impossible to split the Neg-word and negative marker for whatever reason. In German, on the other hand, the Neg-word can marginally undergo focus movement:

- (30) a. NIEMALS habe ich nicht geraucht German
 never have I not smoked
 'I didn't ever smoke (at all).'
- b. NOOIT heb ik niet gerookt. Dutch
 never have I not smoked
 # 'I didn't ever smoke (at all).'

If we connect the cases of EMNEs in German and Dutch with the case of ENC in Flemish, which can be split up easily as long as the Neg-word continues to c-command the negative marker, something of a continuum crystallizes:

- (31) Continuum of lexicalization:
- Flemish: fairly free position of EN in the sentence, as long as it is to the right of the Neg-word

- German: Focus movement of the Neg-word marginally possible, but dispreferred
- Dutch: Neg-word and Negation are bound by strict adjacency.

The reason for this continuum of lexicalization may lie in the loss of NC. Both German and Dutch used to be NC languages, but lost their concord systems several hundred years ago. It seems possible that ENC shows up as true NC disappears, and crystallizes into EMNEs. More research is needed on this topic.

6. Conclusion

In this paper, I made a case for a reinterpretation of a problematic case of negative concord as an instance of expletive negative concord. Based on polarity and focus behavior, we have shown that ENC is, if nothing else, a good fit for dealing with the weirdness of West Germanic NC systems.

The ‘inverted’ structure of West Germanic NC arises from the fact that it is not to be resolved by way of agreement, but, the negative marker being an NPI, through licensing under c-command. An analysis based on EN also accounts well for the optionality of the negative marker in these NC-like constructions: It is not optional insofar as it contributes its own meaning by triggering domain widening. Lastly, the question as to why ENC is a phenomenon in only a small set of closely related languages remains an issue. One possible answer could come from diachronic linguistics and the further investigation of EMNEs, but any answer is only tentative.

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The verb *t̪i:xə* in Barguzin Buryat

A case of overt surface anaphora

Ekaterina Morgunova

This paper examines the verb *t̪i:xə* ‘do so’ in Barguzin Buryat. This verb serves as a proform, which, as the research shows, can substitute various structures. I provide a description of the functional distribution of the verb *t̪i:xə* and propose that this anaphoric construction is in fact a type of ellipsis, or a case of overt surface anaphora.

1. Introduction

Verbal proform is a type of anaphora in which a certain word or phrase stands in for a verb. This type of anaphoric processes has not yet been extensively studied in languages of the world, since the previous studies based mostly on Germanic languages (in particular Norwegian (Lødrup 1994), Swedish (Källgren & Prince 1989), German (Lopez & Winkler 2000), Danish (van Craenenbroeck 2004, Houser et al. 2006), and English (Kehler & Ward 1999, 2004, Aelbrecht 2009, Baltin 2012, Bentzen et al. 2013, Bruening 2018).

This paper deals with the verb *t̪i:xə* ‘do so’, one of the anaphoric verbs in Barguzin Buryat (< Central Mongolic < Mongolic). The data used in this study were collected during a field trip to Baraghan village in the year 2017. The main source of information was elicitation.

According to Sandjeev (1941), the verb *t̪i:xə* is one of the so-called ‘pro-nominal verbs’ used in Buryat. Colloquially, they are mostly used in converbal forms that serve as conjunctions between clauses, as demonstrated in (1).

- (1) *t̪i:-xə-də* man-ha: ajaga-tai: xara uha aba-ʒa u:-han xun bajaʒa-xa
do.so-POT-DAT we-ABL cup-COM black water take-CONV drink-PFCT man get.rich-POT
bolo-no.

become-PRS

(Context: ...when we give the black water to a man, we give away our luck and wealth along with it.) ‘**Then (=having done so)** the man, who has drunk a cup of black water we gave him, will get rich.’

This paper, however, focuses on the anaphoric usage of this verb, which presupposes replacing some lexical verb, the meaning of which can be retrieved from the context. An example of such usage is presented in (2).

- (2) basaga-d oi: oso-bo. b^jidə baha t^ji:-gəjə!:!
 girl-PL forest go-PST2 we also do.so-HRT
 ‘The girls went to the forest. Let’s also do so!’

This study provides a thorough description of the construction’s syntax and argues that the verb *t^jixə* represents a case of overt surface anaphora, i.e. an anaphoric construction that involves ellipsis and is at the same time phonologically overt.

The paper is structured as follows. Section 2 describes the functional distribution of the verb in question. Section 3 offers a brief overview of the methods used to identify the anaphoric status of similar constructions, proposed in the literature, and the following discussion of the anaphoric status of the verb *t^jixə*. Section 4 summarizes the results and offers some concluding observations.

2. Functional distribution of *t^jixə*

Let us start with revealing what structures can be replaced by the verb in question. The verb *t^jixə* can replace both intransitive (3) and transitive VPs (4).

- (3) badma unta-na dugar baha t^ji:-nə.
 Badma sleep-PRS Dugar also do.so-PRS
 ‘Badma sleeps and Dugar also does.’
- (4) sajana jabloka əd^ji-nə badma baha t^ji:-nə.
 Sajana apple.ACC eat-PRS Badma also do.so-PRS
 ‘Sajana is eating an apple, and Dugar is also doing so.’

As demonstrated by the examples above, the remnant left along with the verb is usually a subject, although some speakers permit DPs of other syntactic roles as remnants and find examples like (5) and (6) acceptable.

- (5) % dugar tort əd-əjə p^jirozno baha t^ji:-gə:.
 Dugar cake.ACC eat-PST1 brownie.ACC also do.so-PST1
 ‘Dugar ate a cake and he also ate a brownie.’
- (6) % t^jur:n dugar sajana-da bəʃəq əl^jgə:-bə xələr^jin^j dar^jima-da t^ji:-bə.
 first Dugar Sajana-DAT letter.ACC send-PST2 then Darima-DAT do.so-PST2
 ‘First Dugar sent a letter to Sajana, then he also sent a letter to Darima.’

Adverbs can also be remnants. In that case, the VP with all the arguments of the verb is replaced with *t^jixə*, as in (7).

- (7) əgle:gur badma f^jud-ə: səbərlə-nə udəʃə baha t^ji:-nə.
 morning Badma tooth-REFL clean-PRS evening also do.so-PRS
 ‘Badma cleans his teeth in the morning and in the evening.’

Sentences like (8), in which more than one remnant is left along with the verb *t̪iːxə* are usually considered to be grammatically incorrect by the speakers.

- (8) * badma darim-i:jə tan-ja:, dorʒi dugar-i:jə baha t̪iː-gə:.
 Badma Darima-ACC recognize-PST1 Dorzhi Dugar-ACC also do.so-PST1
 ‘Badma recognized Darima, and Dorzhi recognized Dugar.’

Structures larger than a usual VP can act as the antecedent of the verb *t̪iːxə* as well. For instance, (9) demonstrates that in cases when the passive verb is the antecedent, the verb *t̪iːxə* can replace both the lexical verb phrase and the passive verb phrase. This is evident from the presence of the passive suffix *-gda* in the former case and its absence in the latter.

- (9) a. gər-tə ojo:r uga:-gd-a: sonxo baha t̪iː-gə:.
 house-DAT floor.NOM clean-PASS-PST1 window.NOM also do.so-PST1
 ‘The floor in the house was cleaned, and the windows also were.’ (a=b)
 b. gər-tə ojo:r uga:-gd-a: sonxo baha t̪iː-gd-ə:.
 house-DAT floor.NOM clean-PASS-PST1 window.NOM also do.so-PASS-PST1

Overall, the verb *t̪iːxə* can replace any verbal forms, as long as it is in the appropriate morphological form. For instance, in (10) a nominalization serves as an antecedent for the verbal proform, while in (11) the antecedent of the verbal proform is a participle.¹

- (10) bi badm-i:n tərgə əmdələ-h-i:ə-nj məd-ə:b
 I Badma-GEN cart.ACC break-PFCT-ACC-3 know-PST1-1
 dugar sajan-i:n baha t̪i:gə-h-i:ə-nj məd-ə:.
 Dugar Sajana-GEN also do.so-PFCT-ACC-3 know-PST1
 ‘I know that Badma broke the cart, and Dugar knows the same about Sajana.’
- (11) əsəgəldər koncerta-da t̪i:hən basagan gər-tə hur-na.
 yesterday concert-DAT do.so-PFCT girl house-DAT sit-PRS
 (Context: The boy who sang at the concert yesterday, is having a walk.) ‘A girl who also did so yesterday, is at home.’

Moreover, the verb *t̪iːxə* can serve as a proform for a whole clause, as shown in (12). (12a) demonstrates that the verb *t̪iːxə* can substitute the embedded clause without its complementizer. In that case the verbal proform copies the morphological form of the embedded verb. At the same time, the Buryat verbal proform can also replace the entire clause including the complementizer *gəʒə*, as shown in the example (12b). Here the verb *t̪iːxə* gets the converb suffix *-ʒə*. Probably, that is possible due to the fact that the complementizer *gəʒə* used to be a converb form of the verb ‘say’ (*gə-ʒə* ‘say-CONV’), that was later grammaticalized.²

- (12) a. badma sajan-i:ə bul-ja: gəʒə han-a;,
 Badma Sajana-ACC win-PST1 COMP think-PST1

¹In (10) the root of the verbal proform is *t̪i:gə-* instead of *t̪i:-*. This is a valid variant of the root, attested in other contexts as well. So far I haven’t found valuable distinctions between two allomorphs.

²One might assume that in (12b) the verbal proform substitutes not an embedded clause with a complementizer but a converb. However, the subjects of the main and embedded clauses are different in that sentence; in these cases converbs cannot be sentential actants.

- ojuna sajan-i:⁹ baha t̪i:-gə gəzə han-a:
 Ojuna Sajana-ACC also do.so-PST1 COMP think-PST1
 'Badma thought that Sajana had won, and Ojuna also thought Sajana had done so.'
 (a=b)
- b. badma sajan-i:⁹ bul-ja: gəzə han-a:
 Badma Sajana-ACC win-PST1 COMP think-PST1
 ojuna sajan-i:⁹ baha t̪i:-zə han-a:
 Ojuna Sajana-ACC also do.so-CONV think-PST1

Finally, *t̪i:xə* can be used as an affirmative word, as shown in (13).

- (13) t̪i:-xə.
 do.so-POT
 '(- Will the guest come?) Yes.'

3. *The anaphoric status of t̪i:xə*

Having considered the distribution of the verb *t̪i:xə* I now turn to its anaphoric status.

The present analysis will rely on the terminology suggested by Hankamer & Sag (1976). Hankamer and Sag argue that there are two distinct types of anaphoric processes: surface anaphora and deep anaphora. The former notion describes null phrasal elements, that are deleted or replaced by a proform later in the derivation, while the latter attributes to those anaphors that appear as proforms in the initial numeration. The differences between these two anaphoric processes can be shown with the help of the two constructions, discussed in Hankamer & Sag (1976): VP-ellipsis, which is assumed to be an case of surface anaphora, and *do it* anaphora, assumed to be an instance of deep anaphora. Both are illustrated in (14).

- (14) Baltin 2012: (1)
- John will visit Sally, and Fred will visit Sally too.
 - John will visit Sally, and Fred will do it too.

Structures like this differ from each other in certain ways. First, anaphors like VP-ellipsis require syntactic control (15a), while anaphors like *do it* permit pragmatic antecedents (15b).

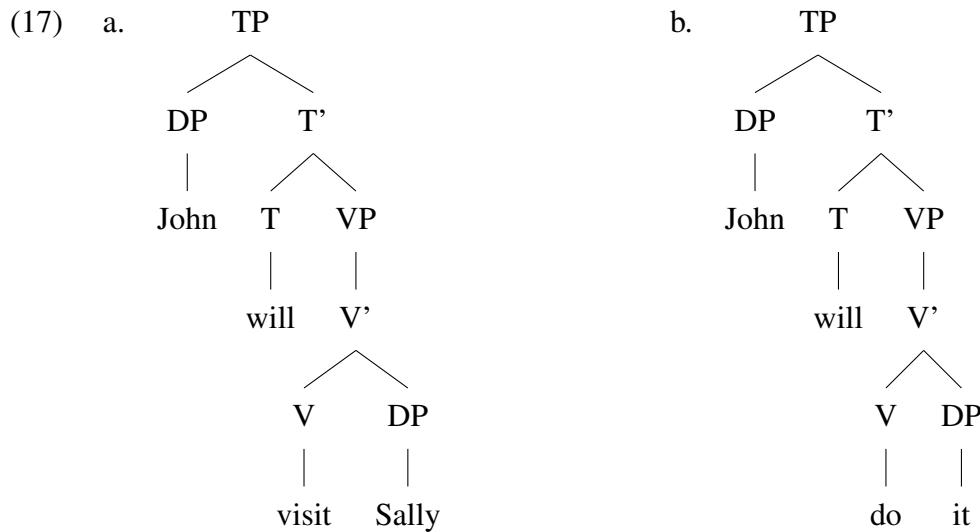
- (15) Hankamer & Sag 1976: (3)-(4)
- [Hankamer ateempts to stuff a 9-inch ball through a 6-inch loop]
 Sag: #It's not clear that you'll be able to.
 - [Hankamer ateempts to stuff a 9-inch ball through a 6-inch loop]
 Sag: It's not clear that you'll be able to do it.

Secondly, structures like these interact differently with the processes that require internal structure for unpronounced material. For instance, wh-elements can be extracted out of the null VP (16a), and cannot be extracted out of the *do it* anaphor (16b).

- (16) Baltin 2012: (2)-(3)
- Although I dont know who John will visit, I do know who Fred will visit.

- b. *Although I dont know who John will visit, I do know who Fred will do it.

These differences are expected if we assume that the null VP originally contains the lexical material that corresponds to its antecedent, while the *do it* anaphor appears in the initial numeration in the same form as it is in the final numeration. Hence, the underlying structures of the VP-ellipsis and the *do it* anaphora will be (17a) and (17b), respectively (borrowed from Baltin 2012: (4)-(5)).



The one point made in Hankamer & Sag (1976) that is important for this paper is the following: the status of an anaphoric construction is independent of whether it has an overt phonological realization or not. Therefore there are four logically possible types of anaphora, all of which have been observed in the literature: overt and nonovert deep anaphora and overt and nonovert surface anaphora.

VP-ellipsis, that was showed above in (14a), is assumed to be a typical case of nonovert surface anaphora, while the *do it* anaphor (14b) is considered to be an instance of overt deep anaphora (Kehler & Ward 2004). Null complement anaphora (18) is argued to be a case of nonovert deep anaphora (Depiante 2000).

- (18) I asked Bill to leave, but he refused Ø.

One example of the overt surface anaphora was reported in Danish in Houser et al. (2006). The researches claim that the *det* pronominal substitutes VPs in a sentence and has the properties of the surface anaphoric process.

- (19) Houser et al. 2006: (1)

Han siger han kan hkle, men selvflgelig kan han ikke det.
he says he can crochet but of.course can he not DET
'He says he can crochet, but of course he can't.'

The objective of this section is to demonstrate that the Hankamer and Sag's assertion about possible types of the anaphoric devices can be backed up not only with the examples from Germanic languages, but from other languages as well. Namely, I will argue that the verb *t̪iːxə*

represents a case of overt surface anaphora, which previously has been claimed to be a rare type of anaphoric devices (Houser et al. 2006).

To begin with, *t̪i:xə* can be controlled pragmatically, as shown in (20).

- (20) m̪in̪i əʒə baha t̪i:-dəg.

I.GEN mother too do.so-HAB

(Speaker watches somebody making tea in a certain way and says:) ‘My mother also does so.’

According to Hankamer & Sag (1976), this strongly indicates that the verb in question is a case of deep anaphora. However, as Merchant (2013) claims, pragmatically controlled anaphoric processes might still involve ellipsis, i.e. represent a case of surface anaphora. Therefore we cannot rely on this sampling method alone.

Other characteristics of Buryat verbal proform, however, suggest that it is a case of surface anaphora.

Firstly, as has been shown in the previous section, the verb *t̪i:xə* can substitute structures of different size, for instance, a VP and an entire embedded clause. Although, to my knowledge, such a characteristic of an overt anaphoric means has not been previously identified as a diagnostic for its anaphoric status (let alone been attested in other languages), I suggest that it might indicate that the verb in question is a surface anaphor. This is motivated by the following theoretical considerations. If we were to assume that *t̪i:xə* is a case of deep anaphora, than we would have to postulate, that there are at least two homonymous proforms — one proform for a VP and one proform for a CP. Although that is a possible way to look at the current phenomena, it is not the most satisfying one. On the contrary, under the surface anaphora analysis the diversity of the possible forms of the Buryat verbal proform is actually expected, since it is supposed to act like an ellipsis site.

Next, the verb *t̪i:xə* can replace stative verbs, as shown in (3). As noted in Bentzen et al. (2013), this fact distinguishes at least the Norwegian surface anaphor *gjøre det* from English deep anaphors *do it* and *do so*. Even though there are no close congeners for the Buryat verbal proform, I still think that it is important to note that *t̪i:xə* correlates with other surface anaphors in this matter.

- (21) b̪i badm-i:n t̪ergə əbd-ə:-ʃ-i:ə mədə-nə-b
I Badma-GEN cart.ACC break-PST1-PART-ACC know-PRS-1
dugar baha t̪i:-nə.
Dugar also do.so-PRS
'Badma sleeps and Dugar also does.'

Finally, it is possible to extract constituents out of *t̪i:xə*. This fact indicates that the verb in question has an internal structure of a kind, which allows to make an extraction out of it. The following examples suggest that both A-extraction and A'-extraction are possible.

To begin with, this verb can substitute passive forms of the verb. The fact that the subject of the passive VP can be the remnant left along with the verb *t̪i:xə*, as in (22), means that the A-extraction of the internal argument of the initial verb is possible.

- (22) gər-tə ojo:r uga:-gd-a: sonxo baha t̪i:-gə:.
house-DAT floor.NOM clean-PASS-PST1 window.NOM also do.so-PST1
'The floor in the house was cleaned, and the window also was.'

The same fact holds for the cases in which the nominalization is substituted by the proform, as demonstrated in (10) in the previous section, repeated here as (23). According to Bondarenko (2017) the subject of the nominalization receives the genitive case when the phi-features are transmitted from head of the highest functional projection of the nominalization (F_0) onto a lower nominalizing head (n_0), and the subject is forced to undergo movement to the Spec,*nP*. If this analysis is true, then the sentence in (23) clearly indicates that this type of movement out of the *t̪i:xə* internal structure is possible as well.

- (23) bi badm-i:n t̪ergə əmdəl-h-i:ə-n̪ məd-ə:-b
 I Badma-GEN cart.ACC break-PFCT-ACC-3 know-PST1-1
 dugar sajan-i:n baha t̪i:gə-h-i:ə-n̪ məd-ə:-.
 Dugar Sajana-GEN also do.so-PFCT-ACC-3 know-PST1
 'I know that Badma broke the cart, and Dugar knows the same about Sajana.'

The next set of examples proves that A'-extraction out of the structure of *t̪i:xə* might be possible as well. First, some speakers allow A'-extraction of direct and indirect object out of the ellipsis site, as it was demonstrated in the previous section (examples (5) and (6) are repeated here as (24) and (25), respectively).

- (24) % dugar tort əd-əjə p̪irozno baha t̪i:-gə:.
 Dugar cake.ACC eat-PST1 brownie.ACC also do.so-PST1
 'Dugar ate a cake and he also ate a brownie.'
- (25) % t̪ur:ən dugar sajana-da bəʃəg əl̪i:gə:-bə xələr̪i:n̪ dar̪ima-da t̪i:-bə.
 first Dugar Sajana-DAT letter.ACC send-PST2 then Darima-DAT do.so-PST2
 'First Dugar sent a letter to Sajana, then he also sent a letter to Darima.'

Secondly, wh-words can be extracted out of the proform site as well, as shown in (26). I must note that the nature of this movement is not clear as generally there is no wh-movement in Buryat. However, wh-words can be scrambled (27), so it may be assumed that scrambling out of *t̪i:xə* is permissible.³

- (26) a. xən-f̪ə-b buxi: konfətə əd-əjə xarin xən t̪i:-gə:-b bi mədənə-gui-b
 who-FC-Q all candy eat-PST1 but who do.so-PST1-Q I know-NEG-1
 'Somebody ate all the candies, but I don't know who did it.'
 b. əʒi: unʃ-a: xar̪i:n̪ b̪i mədə-nə-gui-b ju: t̪i:g-ə:-b
 mother read-PST1 but I know-PRS-NEG-1 what.ACC do.so-PST1-Q
 'Mother was reading, but I don't know what she was reading.'
- (27) (ju:) badma (ju:) əstər (ju:) ugra:d so:-go: (ju:) ol-o:-b
 what badma what yesterday what yard in-REFL what find-PST1-Q
 'What did Badma find yesterday in the yard?'

³I must admit, that some speakers do not consider the examples with A'-extraction to be fully acceptable. This fact correlates with the observations, that many overt surface anaphors do not allow A'-extraction, while allowing A-extractions (see Houser et al. 2006, Bentzen et al. 2013 and Bruening 2018). Two questions arise then: (i) why are A'-extractions more restricted than the A-extractions (see Bruening 2018 for a possible explanation; (ii) why do some Buryat speakers consistently allow A'-extractions out of the overt surface anaphor. I leave both questions open for now.

I should note that not all the reliable diagnostics suggested in the literature were used due to the lack of information about the Buryat language. I address the reader to Merchant (2013) for an overview of other tests for ellipsis. However, I believe that the tests that could be conducted present sufficient evidence in favour of stating that *t̪ixə* is indeed an example of surface anaphora.

4. Conclusion

The present paper discusses the verb *t̪ixə* ‘do so’ in Buryat. I briefly described its distribution and properties and argued that this verb represents a case of an overt surface anaphoric construction. That claim is supported by the fact that *t̪ixə* can substitute structures of different size (VPs and CPs) and the possibility of extraction out of the proformed cite. The only obstacle to analyzing *t̪ixə* as a surface anaphora is the availability of the pragmatic control. However, I believe that the last fact actually reinforces doubts on the reliability of this method, previously expressed in Merchant (2013).

Buryat data provides us with a typological confirmation of the existence of the overt surface anaphora category, which was otherwise in question, as already noted in Houser et al. (2006). Moreover, the Buryat verbal proform differs drastically from the verbal anaphors in Germanic languages in its distribution, therefore presenting a typologically interesting type of anaphoric device.

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Abbreviations

1, 3	1st and 3rd person	NEG	negation
ABL	ablative case	NOM	nominative case
ACC	accusative case	PART	participle
COM	comitative case	PFCT	perfect
COMP	complementizer	PL	plural
CONV	converb	POT	potentialis
DAT	dative case	PST1	1st past
FC	focus particle	PST2	2nd past
GEN	genitive case	Q	question particle
HAB	habitual	REFL	reflexive
HRT	hortative	RS	retrospective shift

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Elative marker in the constructions with physical contact verbs: evidence from Hill Mari

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We are going to look at the Hill Mari (<Finno-Ugric) constructions with an elative postposition *gäc*. In addition to standard elative contexts, *gäc* has some typologically predictable uses such as Information source, Set from which something is selected, Material, Standard of comparison etc. At the same time, the postposition *gäc* has a completely unexpected meaning which is just opposite of its elative-based uses – it is Contact point. We argue that the meaning of Contact point arises from the encoding of Selection from the set. Our assumption is supported by the syntactic and semantic restrictions related to this construction.

1. Introduction

There are three spatial cases in Hill Mari (< Mari < Finno-Ugric < Uralic): inessive, illative and lative (see Savatkova 2002, Alhoniemi 1993). An elative meaning is expressed with a postposition *gäc* that has a wide, but not always trivial polysemy. This paper is focused on the Contact point meaning developed by *gäc* in the constructions with physical contact verbs (for example, ‘to beat [in the back]’, ‘to pat [on the knee]’, ‘to hold [the hand]’). We discuss semantic and syntactic restrictions imposed on these constructions and propose a hypothesis why elative can describe Contact point.

Our data was collected by elicitation in fieldwork (the village of Kuznecovo and nearby villages, Mari El, Russia in 2017-2018) as well as by corpus analysis. The corpus comprises texts recorded during the field trips (ca. 39,000 tokens).

The paper is organized as follows. In Section 2 we discuss the polysemy of the postposition *gäc* and its counterparts in other languages. It is shown that some languages use elative for marking Contact point. Section 3 deals with the properties of the *gäc*-construction with physical contact verbs. Postpositional phrases with this meaning are subject to possessor raising. Section 4 concludes.

*2. Postposition *gäc* in Hill Mari*

2.1. Polysemy

The main meaning of *gäc* is elative (1). This postposition also has wide polysemy in non-spatial uses (2-8), most of which are typologically predictable (see Ganenkov 2002a:82-108).

- (1) *tädä šärgä göc tol-än*
 (s)he forest EL come-PRET
 'He came from the forest.'

- (2) Source point
män'-än toma-em göc tän'-än toma-et
 I-GEN house-POSS.1SG EL you-GEN house-POSS.2SG
jakte ik kilometär
 to one kilometer
 'There is one kilometer from my house to your house.'

- (3) Time period beginning
ät'ää tän'-äm öndekš cäs göc väč-a
 father you-ACC nine hour EL wait-NPST.3SG
 'Father is waiting for you since nine o'clock.'

- (4) Passive animate source
män' podark-äm özä-m göc näl-än-äm
 I gift-ACC elder.brother-POSS.1SG EL take-PRET-1SG
 'I got a gift from my elder brother.'

- (5) Standard of comparison
ti kornä tö kornä göc väč uštäss-eš kužä-rak
 this road that road EL five kilometer-LAT long-CMPR
 'This road is longer than that road by five kilometers.'

- (6) Material
paškudä toma-m kärpäc göc stroj-en
 neighbor house-ACC brick EL build-PRET
 'The neighbor built a house of bricks.'

- (7) Selection from a set
väč tärelkä göc ik-tö-žö pädärg-en
 five plate EL one-FULL-POSS.3SG break-PRET
 'One of five plates broke.'

It is interesting that the postposition *göc* has a completely unexpected meaning which is just the opposite of its elative-based uses – it is Contact point (8).

- (8) Contact point
män' pet'a-m kid-šö göc sev-äl'-ä
 I Petya-ACC hand-POSS.3SG EL hit-ATT-AOR.3SG
 'I hit Petya on his hand.'

There are semantical and grammatical constraints on verbs with which this meaning can appear (see Section 3.2). Cross-linguistically, an elative marker is not expected in such constructions (see Ganenkov 2002a; Creissels 2006, 2008). In Levin (2012) on hitting verbs it is not mentioned that the surface argument of a hitting event can be marked with elative.

2.2. 'Prolative hypothesis'

Ganenkov (2002b) mentions that the meaning of Contact point typologically arises from Path. It is also known that in some languages both an elative and proative meaning are expressed by one marker (see Noonan & Mihas 2007). In Hill Mari a postposition *mâčkâ* that is used as proative (9) can mark Contact point as well (10) following this typological pattern.

- (9) *pet'a kornâ* *mâčkâ / #gäc tol-eš*
 Petya road along EL go-NPST.3SG
 'Petya goes on the road (#from the road).'
- (10) *män' pet'a-m* *kid-šđ* *mâčkâ sev-äl'-đ*
 I Petya-ACC hand-POSS.3SG along hit-ATT-AOR.3SG
 'I hit Petya on the hand.'

However, the postposition *gäc* cannot have a proative meaning, see (9). Neither is there any diachronic evidence of its being a proative marker (Galkin 1964; Alhoniemi 1975). There are also some cognates of *gäc* in other Uralic languages (see Galkin 1964) such as Finnish ablative and elative (-sta / -stää и -lta / -ltää), Mordvinic ablative (-cmV), Udmurt elative -(â)s'-case markers. However, a proative meaning of these Source point markers was not described in any grammar of abovementioned languages; we checked (Hakulinen 1961; Karlsson 1999) for Finnish, (Kolyadenkov 1962) for Mordovic, (Alatyrev 1983; Winkler 2001) for Udmurt. Thus, the hypothesis that *gäc* marks Contact point because of its proative nature should be consequently rejected.

2.3. Typological parallels

Despite the fact that the polysemy of elative and Contact point meanings was not mentioned in any typological studies of spatial cases polysemy, Hill Mari is not the only language where this phenomenon takes place. Elative marker can encode Contact point in some other Uralic (11-15) and Altaic (16) languages. However it tends to be just briefly mentioned in traditional grammars without any theoretical account.

- (11) Ingrian Finnish (Fedotov 2012: 421)
koira purrò / pür minnù kiäè-st / jala-st
 dog bit.3SG bit.PST.3SG I.PART hand-EL foot-EL
 'Dog is biting / bit my hand / foot.'
- (12) Erzya (Tsigankin 1980: 165)
vit' ked-ne-de sae-mak, sur pir'a-do
 right hand-POSS.1PL-ABL take-IMP.2SG.S:1SG.O finger tip-ABL
kunda-mak
 grab-IMP.2SG.S:1SG.O
 'Take me by the right hand, grab me by the fingertips.'

- (13) Moksha (Tsigankin 1980: 165)
sembo-n' *mar^xta* *k'ad'-ta* *kunda-z'* *šumbrakšne-s'*
 everyone-GEN with hand-ABL catch-CONV greet-PST.3SG
 'He shook hands with everyone (lit.: He greets everyone by catching their hands).'
- (14) Enets (Sorokina 2010: 91)
uz-a-xa-da *moza-ç'* *kadaza-ç'*
 hand-ABL-POSS.3SG take-PST lead-PST
 'She took his hand and led him away.'
- (15) Forest Nenets (Koshkareva 2005: 248)
tikavaxad *ŋuda-n-da* *tarka-d* *n'amada* *soram-ba*
 then hand-GEN-POSS.3SG finger-ABL take join-DUR
xanada
 lead
 'Then she took his hand (lit.: finger) and led him.'

Ablative marking of Contact point is also described for Kalmyk in Kholodilova (2009). This article will be discussed below in connection with some similarities between the Kalmyk ablative and the Hill Mari elative (see Sections 3.2, 3.4).¹

- (16) Kalmyk (Kholodilova 2009: 80)
mini *ür-igə* *noxa* *köl-äṣə-n^j* *zuu-və*
 I.GEN friend-ACC dog leg-ABL-POSS.3SG bite-PST
 'Dog bit my friend's leg.'

From looking at these examples it becomes clear that elative and Contact point polysemy is not so uncommon phenomenon as it seemed before. As soon as we rejected the prolative hypothesis about the development of such polysemy some other hypothesis should be checked. We argue that the meaning of Contact point expressed by *göc* arises from the encoding of Selection from a set with this postposition (7). Contact point is thus categorized as a part selected from the whole entity (which is referred to by a direct object). Our assumption is supported by the set of possessive relations possible for the *göc*-constructions.

3. Possessor raising in the *göc*-constructions

The term 'possessor raising' is used in Shibatani (1994), Fried (1999), Payne & Barshi (1999), O'Connor (2007) for sentences like *He kissed her on the cheek*, where the object is 'raised' from the possessor position of NP. It will be shown below that postpositional phrases with *göc* in the constructions with physical contact verbs (*to kiss, beat, hit, hang, hold...*) are subject to possessor raising.

¹ There is a terminology problem related to words 'elative' and 'ablative'. However, these two words are used to refer to Source point markers.

3.1. Possessor encoding

The postposition *gäc* in an elative meaning is compatible with the constructions where an internal possessor is a dependent. An internal possessor is encoded with genitive as a dependent in a NP:

- (17) *ädär* [män'-än] *toma-em*] / [pet'a-n *toma(-žə)*]
 girl I-GEN house-POSS.1SG Petya- GEN house(-POSS.3SG)
gäc *läkt-än*
 EL go.out-PRET
 'The girl came out from my house / Petya's house.'

However in case of physical contact verbs the constructions without possessor raising is ungrammatical (18a). A possessor receives a new syntactic function of a verb argument (18b). A personal pronoun as a possessor can be omitted, but possessive marker is obligatory in this case (18c).

- (18) a. **vas'a* *pet'a-n* *kid-šö* *göc* *sev-äl'-ö*
 Vasya Petya-GEN hand-POSS.3SG EL hit-ATT-AOR.3SG
 ‘Vasya hit Petya on his hand.’

(18) b. *vas'a* *pet'a-m* *kid-šö* *göc* *sev-äl'-ö*
 Vasya Petya-ACC hand-POSS.3SG EL hit-ATT-AOR.3SG
 ‘Vasya hit Petya on his hand.’

(18) c. *vas'a* (*män'-äm*) *kid-*(em)* *göc* *sev-äl'-ö*
 Vasya I-ACC hand-POSS.1SG EL hit-ATT-AOR.3SG
 ‘Vasya hit me on my hand.’

At the same time, the proative postposition *mâčkâ* is acceptable in both constructions with possessor raising (19a) and constructions with an internal possessor in a PP (19b).

- (19) a. *vas'a* *pet'a-m* *kid-šö* *mâčkâ sev-äl'-ë*
 Vasya Petya-ACC hand-POSS.3SG along hit-ATT-AOR.3SG
 'Vasya hit Petya on his hand.'

(19) b. *vas'a* *pet'a-n* *kid-šö* *mâčkâ sev-äl'-ë*
 Vasya Petya-GEN hand-POSS.3SG along hit-ATT-AOR.3SG
 'Vasya hit Petya on his hand.'

3.2. Verbs in the possessor raising construction

Possessor raising in the construction with *gäc* is possible only with a certain set of verbs. There are some semantic and grammatical constraints on it. First of all, possessor raising with *gäc* is possible only with transitive verbs (see Table 1). Moreover, these verbs must denote physical contact, because only in this case the postposition *gäc* will mark Contact point. The semantics of physical contact necessary in the possessor raising construction was also concerned in Shibatani (1994); Payne & Barshi (1999). Verbs such as *seväläš* 'to beat',

niältäš ‘to stroke’, *pärälaš* ‘to bite’, *šäpsalaš* ‘to kiss’, *šäpsaš* ‘to pull’ meet these requirements, but verbs *täknäš* ‘to reach’ and *šuaš* ‘to throw’ do not.

Similar possessor raising constructions with elative markers were described in detail for Ingrian Finnish (Fedotov 2012) and for Kalmyk (Kholodilova 2009).² Table 1 provides a list of verbs possible in the possessor raising constructions in Ingrian Finnish, in Kalmyk and in Hill Mari. In general the sets of verbs are very similar but still not the same. Firstly, in Ingrian Finnish both transitive and intransitive verbs are possible in the possessor raising constructions, whereas in Hill Mari these constructions can include only transitive verbs. Secondly, there are some lexical differences: in Kalmyk, in contrast to Hill Mari, possessor raising with ablative marking is impossible with the verbs ‘to stroke’, ‘to beat’, ‘to kick’, ‘to cut’.³

Verb	Ingrian Finnish (Fedotov 2012)	Possibility of the construction with a source point marker	Kalmyk (Kholodilova 2009)	Possibility of the construction with a source point marker	Hill Mari	Possibility of the construction with a source point marker
grab	<i>kuapata,</i> <i>ottà kī</i>	+			<i>xvatajaš</i>	+
hold	<i>pittä</i>	+	<i>bär-</i>	+	<i>kâčaš</i>	+
bite	<i>purra</i>	+	<i>xaz-</i> , <i>zuu-</i>	+	<i>pärälaš</i>	+
tie	<i>sittò</i>	+			<i>jalštaš</i>	+
catch	<i>suahha kī,</i> <i>tavata</i>	+			<i>kâčaš</i>	+
pull	<i>tassì, tukistà,</i> <i>vettä</i>	+	<i>tat-</i>	+	<i>šäpsaš</i>	+
yank	<i>temmata,</i> <i>tempò</i>	+			<i>šäpsedäš</i>	+
pinch			<i>čimkə-</i>	+	<i>cäveštäš</i>	+
scratch			<i>maaʒ-</i>	+	<i>âdâraš</i>	+
embrace			<i>tevər-</i>	+	<i>eltäläš</i>	+
take			<i>av-</i>	+	<i>näläš</i>	+
prick			<i>šaa-</i>	+	<i>šâraš</i>	+
kiss			<i>ümsə-</i>	+	<i>šäpsalaš</i>	+

² We do not have detailed verb lists for the other languages mentioned in Section 2.3, therefore it is impossible to carry out a detailed semantic comparison with those languages.

³ Some of these verbs (for example, *cokə-* ‘to beat’) allow a construction with possessor raising, but a surface argument receives the instrumental, not ablative marking. These cases are not considered here.

poke			<i>xatzə-</i>	+	<i>šəralaš</i>	+
stroke			<i>il-</i>	?	<i>niältäš</i>	+
kick			<i>iškəl-</i>	?	<i>čəmalaš</i>	+
beat			<i>cokə-</i>	*	<i>seväläš</i>	+
throw			<i>šiv-</i>	*	<i>šuaš</i>	*
cut			<i>tääär-</i>	*	<i>päčkäš</i>	+
reach			<i>tisə-</i>	*	<i>täknäš</i>	*
shoot			<i>xa-</i>	*	<i>lüäš</i>	?
hold (intrans.)	pittä kī	+			<i>käčaš</i>	*
cling (intrans.)	tarttù	+			<i>čiktältäš</i>	*

Table 1. The comparison of verbs possible in the possessor raising construction with a source point marker⁴

Apart from that, the cross-linguistic comparison of verb lists may help to explain which meaning of a Source point marker develops into the Contact point meaning. Fedotov (2012) mentions Finnish verbs like ‘to grab’, ‘to hold’, ‘to bite’, ‘to tie’, ‘to catch’, ‘to pull’, ‘to yank’, ‘to hold (intr.)’, ‘to cling (intr.)’, see Table 1. They refer to continuous close interaction with the surface of an object causing its motion towards Agent. The trajectory of this motion has the source point from which the object is moving. However, there are lexemes in Hill Mari that do not cause motion from a source point, for example, the verbs ‘to beat’, ‘to kiss’, ‘to embrace’ etc. that have an elative argument. This fact makes us decline the hypothesis of semantical shift Source point > Contact point for Hill Mari postposition *gäč*.

3.3. The types of possessive relations in the possessor raising constructions

The possessor raising constructions are possible not for all types of possessive relations. The first column of Table 2 contains a set of possessive relations mentioned in Kibrik (2003). The possibility of possessor raising with these possessive relations is marked in the second column. It should be clarified that the relation ‘Posessor-Possessed’ in the possessor raising constructions only refers to a situation in which clothes are on Patient. Thus, (20) is grammatical only if the coat which is the contact point is on Patient, not in the wardrobe.⁵

Type of possessive relation	Possibility of possessor raising	Example
Possessor-Possessed	+	(20)

⁴ Empty cells mean that we do not have information about the lexeme in this language. Cells are colored if there are differences between the usage of verbs in Hill Mari, Finnish dialects or Kalmyk.

⁵ This semantic opposition is also mentioned, for example, in Haspelmath (1999) for the European languages.

Possessor-Body part	+	(21)
Whole-Part	+	(22)
Family relations	*	(23)
Social relations	*	(23)
Membership	*	(24)

Table 2. Possessor raising and types of possessive relations in constructions with physical contact verbs in Hill Mari

- (20) *pet'a maša-m pal'to gäc täk-äl-än*
 Petya Masha-ACC coat EL poke-ATT-PRET
 a. [Mary put on the coat] ‘Petya touched Masha's coat.’
 b. #[Mary's coat is in the wardrobe] ‘Petya touched Masha's coat.’
- (21) *pet'a maša-m šörgö-žö gäc šöpšal-än*
 Petya Masha-ACC cheek-POSS.3SG EL kiss-PRET
 ‘Petya kissed Masha's cheek.’
- (22) *pet'a tavar-âm kâčem gäc kâč-a*
 Petya axe-ACC handle EL hold-NPST.3SG
 ‘Petya is holding axe on its handle.’
- (23) **pet'a maša-m özä / täng gäc sev-äl-än*
 Petya Masha-ACC elder.brother friend EL beat-ATT-PRET
 ‘Petya beat Masha's brother / friend.’
- (24) **pet'a kolxoz-âm člen gäc sev-äl-än*
 Petya collective.farm-ACC member EL beat-ATT-PRET
 ‘Petya beat a member of the collective farm.’

All the above-mentioned constraints fit the typological generalizations on the possessor raising constructions (see König 2001) and match the *Inalienability Hierarchy*. According to this hierarchy, possessor raising is more expected in the left part of the scale than in the right one. Thus, it occurs most often when describing body parts.

- (25) **The Inalienability Hierarchy**
 (EP⁶ constructions are favored if the possesum is a)
 body part > garment > other contextually unique items (Haspelmath 1999: 112)

If we look through the sentences (22)-(24), we will be able to see that the set of possessive relation which are possible in constructions with *gäc* confirms our hypotheses about developing of the Contact point meaning from the meaning of Selection from a set.

It should be noted that the relations occurring in the construction with *gäc* in (20a), (21), (22) can be generalized as the relation between a set and a part. In all these relation types (namely ‘Possessor-Possessed’, ‘Possessor-Body part’, ‘Whole-Part’) an object marked with *gäc* must always be a ‘part’ of some bigger object which we can call a ‘set’ and which is syntactically a direct object. For example, in (22) a handle is a part of an axe, in (21) a cheek is a part of some person's face or just a part of this person, even in (20a) clothes on person are

⁶ External possessor.

also his part in a broad sense. We can see that other types of relation (namely ‘Family relation’, ‘Social relation’) are ungrammatical in constructions with *gäc*. These types cannot be described as a relation between a set and a part: in (23) we only mention that there is a connection between some persons, the relation between them is not hierarchical as between a part and a set. The same thing happens with Possessor-Possessed relation except from clothes on Patient (23b): this relation only shows that something belongs to somebody but it does not become its part too. Thus, we see that constructions with *gäc* are grammatical only when they describe relation between a set and a part in a broad sense.

The reader will probably have a question about why the relation ‘Membership’ is impossible in the possessor raising constructions with *gäc* as it is also involves a set and its part (member). It occurs because the condition when the direct object is a whole set and the dependent of the postposition is its part is not enough, otherwise sentence (24) would be grammatical. Its ungrammaticality shows that the contact between the elements of a set is crucially important and the ‘Whole-part’ relation should be supplemented by physical contact between the whole set and its part. This is the reason why the more abstract relation ‘Membership’ is impossible in the possessor raising constructions. Despite the fact that the member of the collective farm in (24) is a part ‘selected’ from a set (collective farm), the physical contact between the whole set and its part is impossible for this type of possessive relation. The necessity of physical contact of the whole and the part in the possessor raising constructions was also mentioned in Fried (1999), O’Connor (2007).

Thus, we can notice that only possessive relations which can be described as relation between a set and its part are grammatical in constructions with *gäc*. Moreover, there should be physical contact between a ‘set’ which is actually an object and its part. In our opinion, these constraints confirm that the Contact point meaning develops from the meaning of Selection from a set. We can assume that Patient is a whole set, it is marked with accusative (and the respective constituent moves to the direct object position). Some part is “selected” from it. The verb denotes a situation when this part is a point of Agent’s force application or a contact point, it becomes the dependent of the postposition *gäc*. Some part which becomes a point of physical contact is selected from this set. This is how Contact point may have developed from the meaning of Selection from a set.

3.4. Information structure and possessor raising

Kholodilova (2009:85) discusses that in Kalmyk the possibility of the possessor raising constructions with physical contact verbs can be determined by information structure. The degree of possessor’s involvement in a situation influences the possibility of possessor raising. The possessor raising construction is grammatical only in case when a possessor is topicalized and becomes the main sentence topic (26a). If something else is topicalized (for example, the speaker), possessor raising is impossible (26b).

- (26) a. *bičä noxa-gä / ^{ok}noxa-n siiüл-äsa-h^j tatə-* \emptyset
 NEG.IMP dog-ACC dog-GEN tail-ABL-POSS.3SG pull-IMP
 ‘Don’t grab the dog on its tail!’ {It hurts!} (Kholodilova 2009:85)

- (26) b. *bičä noxa-n / *noxa-gə kirtä siiül-äṣə-h^j bärə-*Ø
 NEG.IMP dog-GEN dog-ACC dirty tail-ABL-POSS.3SG hold-IMP
 ‘Don’t grab the dog on its dirty tail!’ (lit.: Don’t grab on the dog’s dirty its tail’.
 {You will soil your hands}.) (Kholodilova 2009:85)

However, this factor is not relevant for Hill Mari. The possessor raising constructions can be used, if the topic is either possessor (27a) or possessed (27b).

- (27) a. *pi-n pač-äžä lävärän, pi-m / ??pi-n*
 dog-GEN tail-POSS.3SG dirty dog-ACC dog-GEN
pač(-šä) gäc ik tökäl
 tail(-POSS.3SG) EL PROH.2SG touch
 ‘The dog’s tail is dirty, don’t touch the dog’s tail!’
- (27) b. *pi-n karšt-a, ik tökäl pi-m / ??pi-n*
 dog-GEN hurt-NPST.3SG PROH.2SG touch dog-ACC dog-GEN
pač(-šä) gäc
 tail(-POSS.3SG) EL
 ‘The dog feels some pain, don’t touch dog’s tail!’

4. Conclusions

Thus, we have found out that Hill Mari elative marker *gäc* has a wide network of non-locative meanings. Some of them are typologically predictable, such as Source point, Time period beginning, Passive animate source, Standard of comparison, Material, Selection from a set. Elative postposition *gäc* can also mark Contact point in constructions with some physical contact verbs. This meaning is partly opposite to its basic elative meaning. Such phenomenon is also attested in some other languages (both genetically related and not). However, no typological research on the polysemy of locative markers accounts for this fact.

There is possessor raising in the constructions concerned in Hill Mari. It is possible only with transitive physical contact verbs. In some other languages, for which we have detailed data, possessor raising constructions with elative occur with similar but not the same list of verbs. A broad typological study of this fact may further elaborate on the patterns of this polysemy.

Our hypothesis claims that the elative marker develops its meaning of Contact point from the meaning of Selection from a set, where the part (which is involved in the contact) is selected from the whole (which is a direct object). This assumption is supported by the set of possessive relations possible for *gäc*-constructions which all involve prototypical whole-part-relations (‘Possessor-Body part’, ‘Whole-Part’, ‘Possessor-Possessed’ only in case of physical contact, but not family or social relations).

Acknowledgements

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Abbreviations

ABL	Ablative	LAT	Lative
ACC	Accusative	NEG	Negation
AOR	Aorist	NPST	Non-past tense
ATT	Attenuative	O	Object
CMPR	Comparative	PART	Partitive
CONV	Converb	POSS	Possessiveness
DUR	Durative	PRET	Preterite
EL	Elative	PROH	Prohibitive
FULL	Full form	PST	Past tense
GEN	Genitive	S	Subject
IMP	Imperative	SG	Singular

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The acquisition of preposition placement by L1-Cypriot-Greek EFL speakers

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This study investigates the preposition placement acquisition by speakers of English as a Foreign Language (EFL) with Cypriot Greek as their first language. An experiment was conducted involving all four preposition placement options: preposition stranding, pied-piping, omission, and doubling. Participants exhibited and accepted all options to different extends. In the oral production data elicitation task, the most frequently observed option was pied-piping; in the acceptability judgment task, preposition stranding was the most acceptable option. Clausal complexity increased susceptibility to the ungrammatical options of preposition omission and doubling in both the oral production and the acceptability judgement task.

1. Introduction

The purpose of the present study is to investigate the acquisition of preposition placement by speakers of English as a Foreign Language (EFL) with Cypriot Greek as their first language (L1). Relevant studies involving EFL speakers (e.g. Rezai 2006; Sadighi et al. 2004; Salehi 2011) have examined the preference between preposition pied-piping and stranding; they have also observed the omission of prepositions, which is considered ungrammatical. Preposition pied-piping, stranding and omission are indicated in (1a-c) below. In preposition pied-piping, the entire PP (preposition phrase) is moved to the front of the clause. In preposition stranding, only the *wh*-word is moved to the front of the clause leaving the preposition stranded at the end of the clause. In preposition omission, the *wh*-word is moved to the front of the clause but the preposition is omitted, resulting in an ungrammatical sentence.

- (1) a. [PP To who]_i was Mary talking _i? [preposition pied-piping]
b. [DP Who]_i was Mary talking [PP to _i]? [preposition stranding]
c. *[DP Who]_i was Mary talking? [preposition omission]

A recent study involving native English speakers (Radford et al. 2012) has explored yet another pattern of preposition placement, namely the redundant and ungrammatical option of preposition doubling indicated in (1d).

- (1) d. *[PP To who]_i was Mary talking [PP to _it]?

[preposition doubling]

To our knowledge, though, EFL studies have not observed this option so far. Therefore, this study aimed at investigating the extent to which EFL speakers also produce all four options of preposition placement – namely preposition stranding, pied-piping, omission, and doubling – as well as which of these they judge as acceptable. First- and final-year English-major students at the University of Cyprus whose mother tongue was Cypriot Greek participated in an oral production task and a written acceptability judgment task. Both experiments comprised syntactic structures with different clausal complexity (interrogatives vs. relative clauses).

According to the experiments' findings, L1-Cypriot-Greek EFL speakers exhibit and accept all four options of preposition placement, albeit to different extents. However, in the oral production data elicitation task, the most frequently observed option was pied-piping, whereas in the acceptability judgment task, preposition stranding was the most acceptable option. The clausal complexity and the participants' year of study did not affect the participants' performance to a significant extent as independent variables per se. Nevertheless, the interactions between the clausal complexity and the four options reveal that clausal complexity increases the susceptibility to the ungrammatical option of preposition omission in both the oral production and the acceptability judgement task, which was also the case with preposition doubling in the acceptability judgement task, but not in the oral production task. The findings' implications regarding L1 transfer and input salience are also explored.

The outline of this paper is the following: In Section 2, the theoretical background regarding preposition stranding, pied-piping, omission, and doubling is examined and then the findings of various EFL studies are presented. Section 3 describes the methodology of the experiment we conducted to find out whether L1-Cypriot-Greek EFL speakers produce and judge as acceptable the four options of preposition placement. Section 4 presents the results of the two tasks of our experiment, and Section 5 discusses our findings by making the relevant connections with the findings of other EFL studies. Lastly, Section 6 sums up the main findings of our study and points out the study's contribution to the literature.

2. Theoretical background

Learning the prepositions of a language is probably one of the most challenging issues one has to face while learning a foreign language. Apart from learning preposition collocations, the placement of the prepositions is another important issue since it varies cross-linguistically, though it often receives less attention. To elaborate, all languages allow *preposition pied-piping*, which occurs when ‘the preposition along with its wh-complement is canonically pied-piped to the initial position of the sentence [i.e. the specifier position of the CP construction]’ (Rezai 2006:112). Preposition pied-piping is illustrated in (2) below.

- (2) [CP [PP To who]_i C⁰ [TP was [_{vP} Mary talking _it]]]]?

However, English, Frisian, Norwegian, Danish, and Macedonian (Merchant 2003; van Riemsdijk 1978), also allow a second option of preposition placement, which is referred to as *preposition stranding*. According to Denison (1998:220), preposition stranding can be defined as the syntactic phenomenon ‘whereby a preposition is left in a deferred, stranded position at or near the end of a clause without any immediately following object’ as indicated in example (3).

- (3) [CP [_P Who_i] C⁰ [_{TP} was [_{VP} Mary talking [_{PP} to t_i]]]]?

In languages which allow both preposition pied-piping and stranding, the two are not completely interchangeable. In English, particularly, it is prescriptively recommended that a sentence should not end in a preposition. Therefore, the pied-piping option is considered to be more appropriate in formal English, and, as a result, learners of English as a Foreign Language (EFL) may be corrected when using the preposition stranding option, and may be more familiar with preposition pied-piping since textbooks often contain formal language (Kao 2001). Nevertheless, stranding is considered to be more appropriate for everyday informal English. Consequently, stranding is widely used by both native and non-native speakers of English, particularly in oral speech (Radford et al. 2012), as it is also encountered from early on in the oral input of second – and possibly first – language acquirers in utterances like *Where do you come from?* (Rezai 2006:125).

As Abels (2003) points out, the languages mentioned above both exhibit stranding *and* license the ‘standard’ pied-piping option of treating the prepositions which all languages studied so far seem to exhibit. The latter seems to be a typological prerequisite for the former. Therefore, according to the *Markedness Theory*, the typologically ‘standard’ option, namely pied-piping, is supposed to be the ‘unmarked’ option; in contrast, stranding is supposed to be the ‘marked’ option (van Riemsdijk 1978). Besides, as van Riemsdijk (1978) further points out, normally, stranding should not be allowed in any language, since it requires the extraction of the *wh*-complement out of an island, namely the prepositional phrase, as indicated in (2) above. This explanation serves as a second reason why stranding is considered to be the marked option. In light of the above, the unmarked option is supposed to be ‘easier’ and, consequently, acquired earlier than the marked option in the languages which allow both options (van Riemsdijk 1978).

Consequently, a dilemma seems to be created. On the one hand, according to the ‘salience’ hypothesis, the earlier and quantitatively greater ‘availability of data’ (Bardovi-Harlig 1987:387) of the preposition stranding option in the oral input suggests that stranding is expected to be acquired first. On the other hand, according to the Markedness Theory, the unmarked option, that is, preposition pied-piping, should be acquired first. French (1985) examined the above dilemma with native English speaking children and found out that, since stranding is established earlier than pied-piping, salience seems to have a stronger effect on first language acquisition than markedness. The interesting question, then, would be whether this pattern is also found in second language acquisition and, especially, when the speakers’ L1 only allows preposition pied-piping. Indeed, there are several EFL studies which have dealt with this topic. However, in the past, it was not considered necessary that the participants had a common first language. For example, the study by Bardovi-Harlig (1987) examined EFL speakers of fifteen different languages. However, nowadays, the insights from comparative linguistics have multiplied the concern on how typologically similar given languages are. Thus, recent studies only concentrate on specific languages, and include participants with similar backgrounds so that any differences observed can be attributed only

to their first language and not any other factor (such as level of education, socioeconomic status, et cetera).

Studies involving EFL speakers whose L1 allows only the pied-piping option have assumed a variety of factors that could influence the frequency and the order of acquisition of the two options for preposition placement (preposition pied-piping and stranding). Overall, the explanations that have been offered can be summarised in two schools.

On the one hand, if pied-piping is acquired earlier and/or used more frequently than stranding, this could be attributed to the fact that preposition pied-piping is the unmarked option since it does not require the extraction out of the island the prepositional phrase shapes (van Riemsdijk 1978). Moreover, since preposition pied-piping is the unmarked option allowed by all languages, and the only option which the L1 of the particular studies' participants allows, it is expected that they will employ preposition pied-piping as it is the preposition placement option that they are more familiar with through their L1 (Mazurkewich 1985). Lastly, there are prescriptive rules in EFL learning which promote preposition pied-piping over stranding as the latter is considered informal and is therefore corrected into preposition pied-piping (Kao 2001).

On the other hand, if stranding is acquired earlier and/or used more frequently than preposition pied-piping, this can be attributed to the salience in the oral input (Bardovi-Harlig 1987), that is the quantity of input received containing the specific grammatical pattern. Stranding is the most salient (prevalent) option and, consequently, it is expected to be acquired first. Furthermore, certain syntactic economy considerations deem the stranding option as more economical than pied-piping (Sadighi et al. 2004). In particular, stranding requires that only the *wh*-complement be moved to the front of the clause, whereas preposition pied-piping requires the movement of the whole prepositional phrase (preposition and *wh*-complement).

Recent EFL studies have revealed conflicting results concerning the frequency and the order of acquisition of preposition pied-piping and stranding. To begin with, a study by Rezai (2006) involved L1-Persian university students who had learned English as a foreign language. The results of the acceptability judgment task of that study indicate that, although stranding was judged as acceptable to a greater extent compared to pied-piping, the difference between the two was not significant. The researcher concluded that the slight tendency towards stranding could be attributed to the salience of the stranding option. Thus, as it has also been suggested in Sadighi et al. (2004), who also investigated L1-Persian EFL speakers, the idea of the L1 enhancing the acquisition of the preposition pied-piping option over stranding was rejected (Rezai 2006:126). Despite stranding being the marked option, the EFL learners seem to be able to acquire it earlier than the unmarked pied-piping structures, since it is more frequent and acceptable in low proficiency learners as compared to higher proficiency EFL speakers. The findings are replicated in Salehi (2011), who also investigated L1-Persian EFL speakers with different levels of proficiency in English.

However, a study on L1-Jordanian-Arabic EFL learners by Almahammed, et al. (2015), reveals a reversed tendency in the grammaticality judgment and correction task employed for the purposes of the study. In particular, it was found that preposition pied-piping was slightly favoured over stranding, although the difference between the two was not statistically significant. Therefore, since pied-piping is the only option allowed in (Jordanian) Arabic, it was suggested that L1 transfer could better account for the preference towards preposition pied-piping.

Given the above, as also noted in Rezai (2006) and Almahammed et al. (2015), neither L1 transfer nor salience has dominance over the other. These two factors in combination with the

rest of the factors described above are all involved in the acquisition of preposition placement, resulting to the equivalent options (preposition pied-piping and stranding, respectively). Nevertheless, one could logically assume that the L1 plays a role in the findings, since L1-Persian EFL speakers seem to favour preposition stranding whereas L1-(Jordanian)-Arabic EFL speakers seem to favour pied-piping.

Apart from investigating preposition pied-piping and stranding, some of the above studies have also investigated the phenomenon of ‘null preposition’, that is, omission of the preposition. In the study by Almahammed et al. (2015:25) the preposition omission has also been observed to a relatively great extent (35.44%), which has been attributed to the learners’ unawareness of the fact that some verbs need to be followed by a preposition, especially in low proficiency levels. Similar observations are provided by Sadighi et al. (2004) who report an overall percentage of 55.4% of preposition omission.

In addition to the studies involving EFL speakers, Radford et al. (2012) investigated preposition placement by native speakers of English as evident in TV and radio live broadcasts’ spontaneous speech. According to their findings, apart from the three aforementioned options, there exists one more option concerning preposition placement: preposition copying. This involves the manifestation of the preposition in both the beginning and the end of a clause. The study concentrates specifically on preposition omission and preposition doubling. According to the findings, omission was four times as frequent as doubling in the spontaneous speech corpus. As the researchers point out, the emergence of these phenomena in spontaneous speech was attributed to high processing load due to the nature of radio and TV broadcasting (Radford et al. 2012:407). More specifically, preposition doubling was suggested to occur when a speaker who ‘starts producing a preposition pied-piping structure, when trying to reconstruct the missing prepositional phrase at the point of the gap, no longer remembers already having spelled out the preposition and thus spells it out again’ (Radford et al. 2012:408). In a similar manner, omission can be suggested to occur when speakers who start producing a stranding structure do not remember having omitted the preposition at the beginning of the sentence, and by considering that they have produced a preposition pied-piping structure, they end up not spelling the preposition neither at the beginning nor at the end of the sentence.

The study also examined native speakers’ intuitions about preposition placement in an acceptability judgment task. Preposition doubling was judged as acceptable to a great extent, as it was deemed to be redundant. Apart from that, doubling also seems to facilitate comprehension, since it allows the parsers to ‘activate the “correct” underlying grammatical and semantic representations despite redundant’ prepositions (Radford et al. 2012). This is more obvious when compared to the fact that preposition omission was deemed as unacceptable, since it seems to impede comprehension. Thus, the study concluded that, although only preposition pied-piping and stranding are considered to be grammatical, the emergence of preposition doubling in spontaneous speech and its high rates of acceptability challenge its ungrammaticality, or, at least, its unacceptability. Finally, it is important to note that the above findings can be attributed to the importance of cognitive processing load: the omission option is more often done in hurried spontaneous speech which is characterized by ‘high processing pressure’ and ‘limited opportunity for the speakers to plan their utterances very far ahead’ (Radford et al. 2012:407) because the speakers think they have produced a preposition already, and it is cognitively less demanding if they omit the preposition again rather than manifest them twice; in contrast, it is easier for the parsers to comprehend a clause with preposition doubling rather than omission, because the gap at the place of the preposition creates confusion.

Moreover, it should be noted that the aforementioned observation that ‘speech production errors [are] facilitated by a relatively high processing load’ (Radford et al. 2012) can also be attested when the clausal complexity increases. This technique was initially implemented in Bardovi-Harlig (1987), who employed both *wh*- questions and relative clauses. The reason behind this is the fact that both structures contained a *wh*-complement to the preposition, but they also differed in complexity, since relative clauses are an embedded clause which largely depends on the matrix clause for semantic and syntactic interpretation. In Bardovi-Harlig’s (1987) study, there was an evident difference between the two different structures which verified that relative clauses require increased cognitive processing. Furthermore, Sadighie et al. (2004) confirm the above observation, since the preposition omission was more prevalent in relative clauses than interrogatives, and, consequently, this submission to error production can be attributed to the increased cognitive processing load the embedded clause requires.

In light of all the above, and given the fact that the recent studies which have been presented above only deal with two specific languages (Persian and Jordanian Arabic), the present study generally aims at investigating the acquisition of preposition placement by monolingual Cypriot-Greek speakers who were advanced EFL learners.

Cypriot Greek only allows preposition pied-piping; preposition stranding is not grammatical, as indicated in the examples below. Since Cypriot Greek is an oral variety, the utterances presented below are represented using the International Phonetic Alphabet (IPA).

- (4) a. Se pcon emilan i Maria
 to who.ACC talk.PAST.3SG.PROG the.NOM Maria.NOM
 ‘To who was Maria talking?’
- b. *Pcon emilan i Maria se
 who.ACC talk.PAST.3SG.PROG the.NOM Maria.NOM to
 ‘Who was Maria talking to?’

The above examples demonstrate that, just like Persian and Jordanian-Arabic, Cypriot Greek also differs significantly from English, as it only allows preposition pied-piping and not stranding. Therefore, the three research questions intended to be answered by the present study are the following:

1. To which extent do L1-Cypriot-Greek EFL speakers produce and judge as acceptable structures involving preposition stranding, pied-piping, omission, and/or doubling?
2. Does clausal complexity influence the frequency of preposition stranding, pied-piping, omission, and/or doubling in the oral speech production or the acceptability of structures involving these phenomena?
3. Does the year of study (and, hence, the exposure to extensive English input), play a role in the frequency and acceptability of these phenomena?

According to our hypotheses and some preliminary observations of L1-Cypriot-Greek speakers, all four phenomena (preposition stranding, pied-piping, omission, and doubling) are expected to be observed in the oral speech production task. More specifically, it is expected that both first and fourth year students will exhibit omission and doubling, though first year students to a greater extent. Regarding the acceptability judgment task, both first and fourth year students are expected to judge the structures involving omission and doubling as acceptable, but first year students to a greater extent. Clausal complexity may also affect the

performance of the students, especially that of first year students, both in the oral production and the acceptability judgment task.

3. Methodology

3.1. Materials and subjects

The current study consisted of two main tasks. First, the participants went through an oral production data elicitation task involving the production of verbs paired with a prepositional phrase in interrogatives and relative clauses. Afterwards, an acceptability judgment task was employed, in which those two types of clauses involving the four phenomena (preposition stranding, pied-piping, omission, and doubling) were provided. The stimuli were presented to the participants in the form of a Power Point presentation on a computer screen and their responses were written down by the researchers.

For the purposes of our study, 24 L1-Cypriot-Greek EFL speakers were recruited. The sample comprised of both males and females, all of them were students of the Department of English studies at the University of Cyprus. Since one of the main purposes was to investigate whether extensive exposure to English input affected the emergence and acceptability of the four preposition placement phenomena, half of the participants were first-year students (19 years old), whereas the rest were fourth-year students (22 years old). None of them had any kind of hearing or speaking impairments. In order for the sample to be homogeneous regarding the degree of the participants' exposure to English, it was made sure that they were born and raised in Cyprus, that they had not attended any English-speaking school, and that they had only been exposed to English through the public educational system of Cyprus and private afternoon lessons. Another important factor in the selection procedure was the students' track of study. Specifically, students who were majoring in Linguistics were excluded because of their extensive exposure to syntax.

The researchers conducting the study were L1-Cypriot-Greek speaking 4th-year students of the Department of English studies at the University of Cyprus. Therefore, in order to prevent familiarity with the researchers having an impact on the 4th-year students' performance, the researcher interacting with each student was the one who was least familiar with them at the time. This was not the case with the 1st-year students as none of the researchers was familiar with any of them.

3.2. Procedure

The experiment took place in a quiet room at the University of Cyprus. Each participant met the researchers individually for approximately thirty minutes. One of the researchers would interact with the participants to explain the tasks and provide the answers of the first task. The researcher not interacting with the participants was writing down the participants' answers.

The first task of the experiment, as already stated, aimed at investigating the production of interrogative and relative clauses involving the placement of prepositions. In order to get the participants' spontaneous response, this task had a playful character, since it was a questions and answers game about Mickey Mouse. Two pictures appeared on each slide, along with the verb and its object(s) and the participants were asked to form *wh*-questions in order to find out which of the two alternatives presented on the screen was valid for Mickey. The purpose, of course, was to check whether and where they would place the prepositions. Out of the 12

verbs provided, 6 were fillers, that is, verbs which did not require a preposition so that the participants would be distracted. Having to remember specific information that was given to them also functioned as an efficient distractor. In other words, the participants had to remember the answers the researcher interacting with them would provide, because after all questions had been asked and answered, they had to recall these answers to form a relative clause which was partially primed in terms of the usage of the relative clauses. In this way, the participants would form both an interrogative and a relative clause structure for the 6 test verbs (*live in, talk to, stay in, work at, send to, look at*) without being biased about the preposition placement.

The second task aimed at investigating the participants' acceptability judgments regarding preposition placement in interrogatives and relative clauses. Relative clauses were considered to have higher clausal complexity, whereas the interrogative clauses were considered to have a lower clausal complexity. The participants were shown 32 sentences in random order which they had to read and judge according to the provided acceptability scale (the options were: 'correct', 'probably correct', 'not sure', 'probably wrong', 'wrong'). The sentences were presented one by one to make sure that the participants would not be able to compare the sentences and change their intuitions depending on the answers they had already provided. The 32 sentences included the four verbs *wait, believe, reply, and play*. Each verb was involved both in interrogatives and relative clauses, and one time for each of the four phenomena. Examples of an interrogative and a relative clause with the same verb for each preposition placement phenomenon are shown in the examples below. Interrogative clauses served as the lower complexity clauses and relative clauses served as the higher complexity clause as relative clauses are embedded clauses added to the main clauses.

(5) a. For which bus are you waiting?

[prep. pied-piping – interrogative clause]

b. The green bus is the bus for which I am waiting.

[prep. pied-piping – relative clause]

c. Which bus are you waiting for?

[prep. stranding – interrogative clause]

d. The green bus is the bus which I am waiting for.

[prep. stranding – relative clause]

e. *Which bus are you waiting?

[prep. omission – interrogative clause]

f. *The green bus is the bus which I am waiting.

[prep. omission – relative clause]

g. *For which bus are you waiting for?

[prep. doubling – interrogative clause]

h. *The green bus is the bus for which I am waiting for.

[prep. doubling – relative clause]

3.3. Method of analysis

The statistical analysis of the data collected in the first task was done using the SPSS software. A 3-way Mixed ANOVA was performed. The three variables that were tested were (a) the preposition placement phenomenon (preposition stranding, pied-piping, omission, and/or doubling), (b) clausal complexity, and (c) the year of study of the participants. The year of study was the between-subjects variable, whereas clausal complexity and the phenomenon were the within-subjects variables. Since in the first task the dependent variable was the phenomenon, the use of wrong tenses and the variation in the preposition they used (since some verbs could take different prepositions) did not matter.

The data collected in the second task was analysed using descriptive statistics with the use of Microsoft Office Excel. The acceptability judgment scale's options which indicated acceptability of the presented sentence (namely, 'Correct' and 'Probably correct') were collapsed and the resulting percentages were transformed into column charts.

In general, three participants were excluded from the analysis, since they had difficulty in forming the targeted structures in the first task and/or were judging the sentences in the second task semantically.

4. Results

The 3-way mixed ANOVA performed for the first task indicated that, in general, there was no statistically significant difference between the performance of first and fourth year students ($F(1,22) = 1.469, p = .238$). Clausal complexity did not predict which of the four phenomena would be produced ($F(1,22) = 0.062, p = .806$). In contrast, there were statistically significant differences between the four phenomena ($F(2.189, 48.153) = 6.363, p = .003$). Particularly, as indicated in Figure 1, preposition pied-piping was produced to a significantly greater extent than omission ($p = .014$) and doubling ($p = 0.004$), but not stranding ($p = .338$).

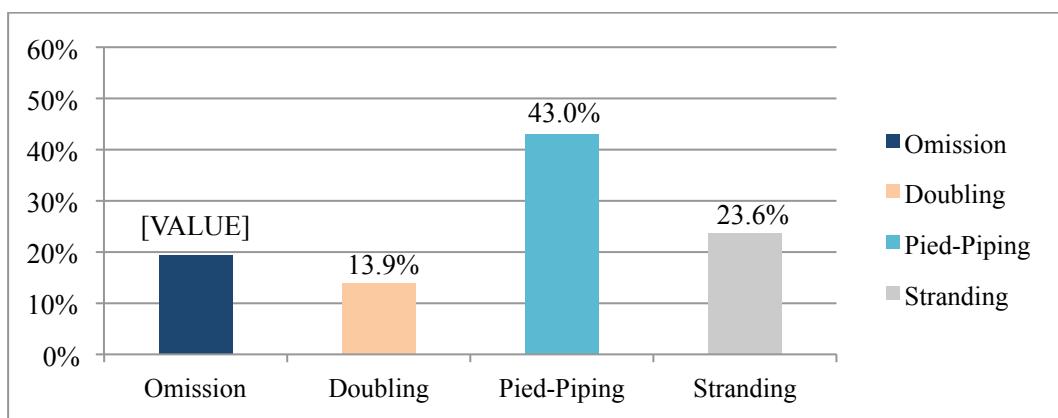


Figure 1. The production of the four phenomena in the production task

The interaction between clausal complexity and the phenomenon was statistically significant, ($F(2.216, 48.744) = 20.997, p < .001$). As depicted in Figure 2, in interrogatives, in which the clausal complexity is lower than in relative clauses, there was a statistically significant difference between preposition pied-piping and omission ($p = .001$), between pied-piping and doubling ($p = .025$) and between pied-piping and stranding ($p = .001$).

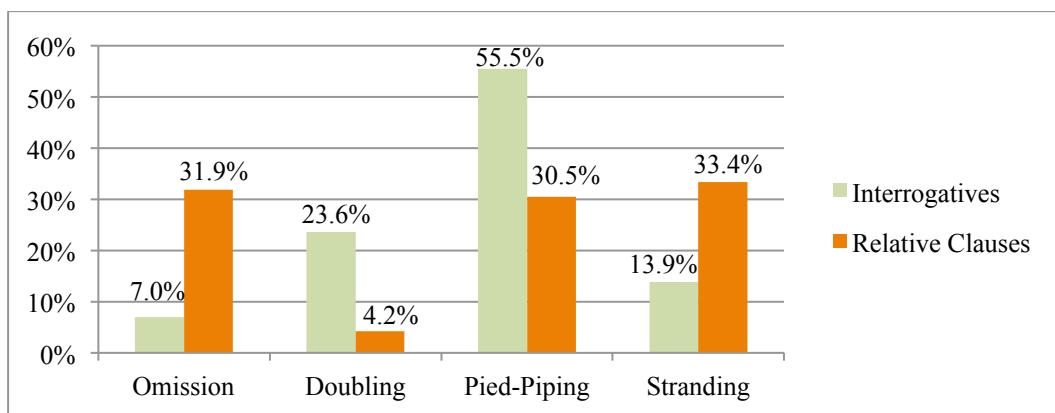


Figure 2. The interaction between clausal complexity and phenomenon in the production task

When the clausal complexity was low, then, participants produced preposition pied-piping more frequently than the other three alternatives. In relative clauses, though, in which the clausal complexity is higher as compared to interrogative clauses, preposition pied-piping was not the most frequently produced option. In fact, doubling was produced to a significantly lower extent compared to pied-piping, omission, and stranding ($p = .002$). For each phenomenon, there was a statistically significant difference between interrogatives and relative clauses ($p < .001$).

The interaction between the year of study and the phenomenon, which is presented in Figure 3, was not statistically significant ($F(1, 22) = .150, p = .703$). The only statistically significant difference observed was between pied-piping and doubling in the 4th year students group ($p = .006$).

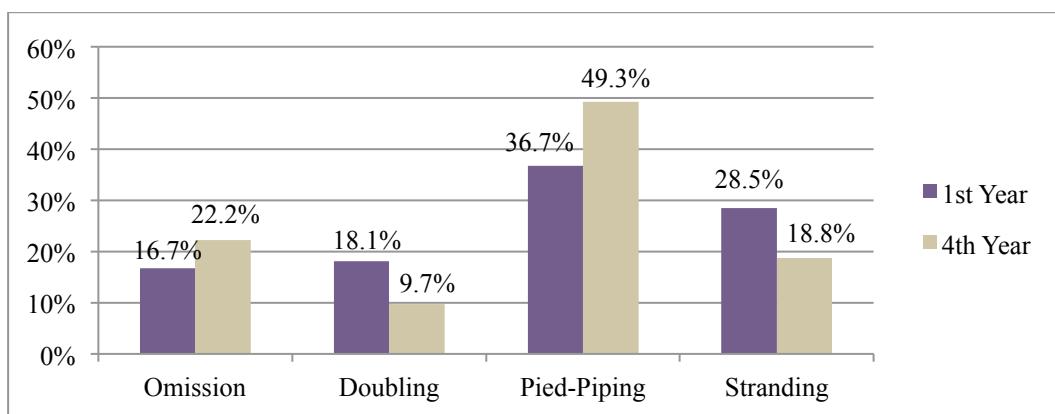


Figure 3. The interaction between year and phenomenon in the production task

The interaction between phenomenon, clausal complexity, and the year of study was not statistically significant either ($p = .372$). Concerning the data from first year students shown in Figure 4, there was a statistically significant difference between interrogatives and relative clauses for omission ($p = .002$), doubling ($p < .001$), pied-piping ($p = .002$) and stranding ($p < .001$). In interrogatives, there was a statistically significant difference between pied-piping and omission ($p = .001$) as well as a marginal one between pied-piping and stranding ($p = .049$). In relative clauses, the only statistically significant difference observed was between stranding and doubling ($p = .008$).

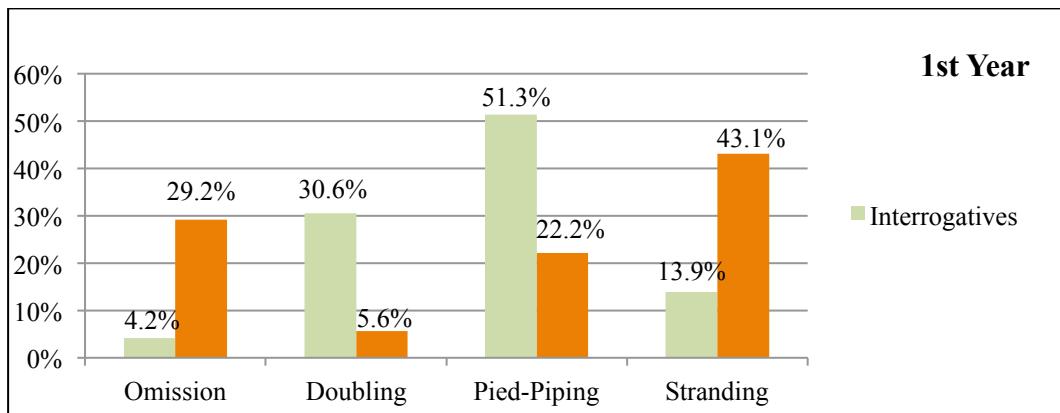


Figure 4. The interaction between phenomenon, clause and year for 1st year students in the production task

As for the data from fourth year students presented in Figure 5, there was a statistically significant difference between interrogatives and relative clauses regarding omission ($p = .003$), doubling ($p = .026$) and pied-piping ($p = .013$), but not stranding ($p = .082$). In interrogatives, pied-piping was produced to a significantly greater extent compared to omission ($p < .001$), doubling ($p = .031$) and stranding ($p = .007$). In relative clauses, there was a statistically significant difference between omission and doubling ($p = .012$) as well as pied-piping and doubling ($p = .003$).

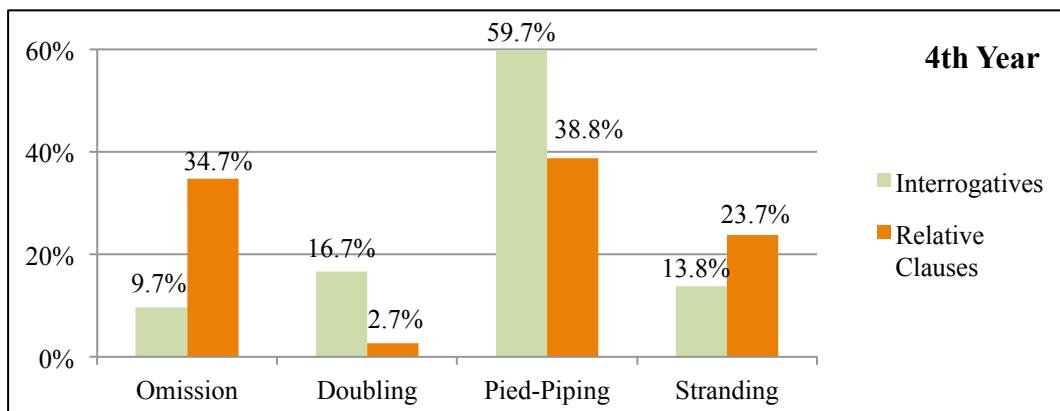


Figure 5. The interaction between phenomenon, clause and year for 4th year students in the production task

As shown in Figure 6, in the acceptability judgment task, preposition stranding was the most acceptable phenomenon (87%), whereas the ungrammatical option of preposition omission was the least acceptable one (37%). The acceptability scores for preposition doubling (55%) and preposition pied-piping (60%) were similar, despite the fact that preposition doubling is not a grammatical option whereas preposition pied-piping is.

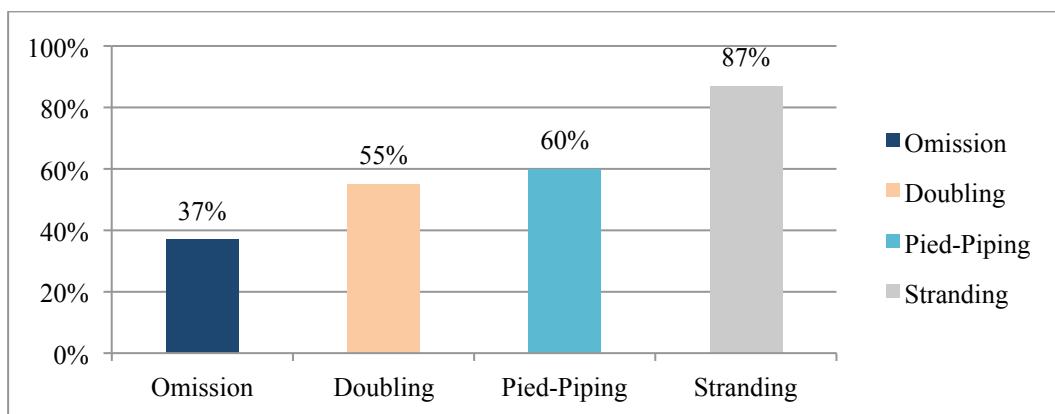


Figure 6. The acceptability percentages of the four phenomena in the acceptability judgement task

Regarding the relationship between clausal complexity and phenomenon, no striking differences were observed regarding the acceptability of the four phenomena in interrogatives and relative clauses. As demonstrated in Figure 7, the greatest difference between interrogatives and relative clauses was observed for omission. Specifically, preposition omission was more acceptable when it appeared in relative clauses (45%), which served as the complex clauses in our experiment, than in interrogative clauses (29%) which served as the simple clauses of our experiment.

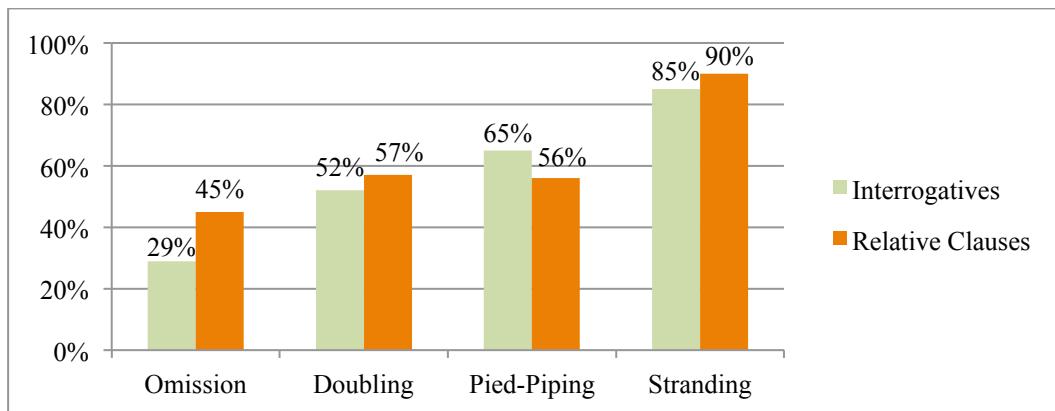


Figure 7. The relationship between clausal complexity and phenomenon in the acceptability judgement task

Likewise, as is evident from Figure 8, no great differences have been observed between the performance of first and fourth year students with regard to the acceptability of the four phenomena, except for preposition stranding. Fourth year students considered this phenomenon acceptable to a greater extent compared to first year students. In contrast, first year students considered preposition omission as acceptable in a greater extent than fourth year students did.

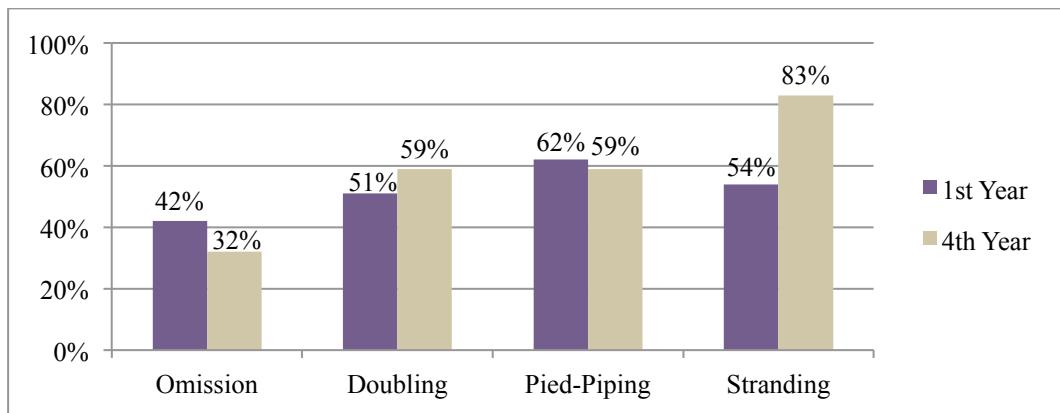


Figure 8. The relationship between year and phenomenon in the acceptability judgement task

Regarding the relationship between the year of study, the clausal complexity, and the phenomenon, it is worth noting that, as indicated in Figures 9 and 10, we observed similar tendencies for first year and fourth year students except for pied-piping. In particular, first year students considered pied-piping acceptable in interrogatives to a greater extent (71%) than fourth year students (59%) did, whereas fourth year students considered preposition pied-piping equally acceptable (59%) in the two clauses which differed in complexity. What also needs to be pointed out is that both groups considered preposition stranding to be highly acceptable in both clausal complexity environments. Moreover, both groups accepted all four phenomena, even the ungrammatical ones (i.e. preposition omission and doubling), and in certain cases to an extent as great as the acceptability of the grammatical option of preposition pied-piping.

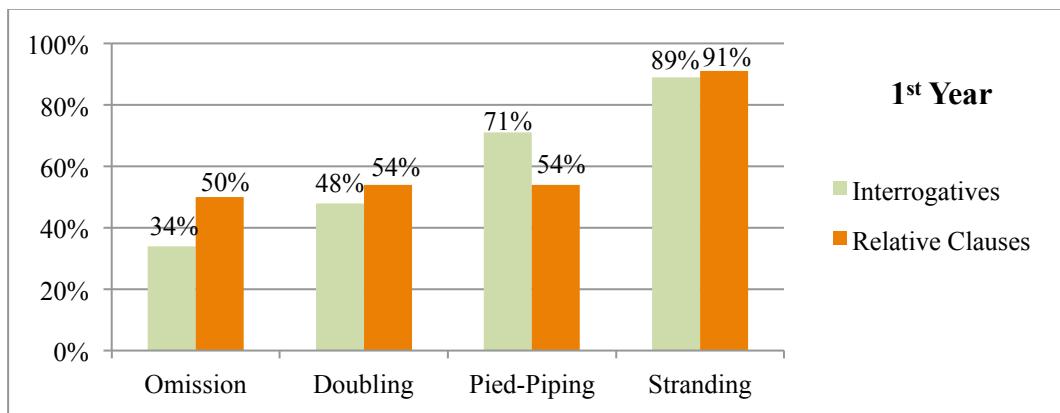


Figure 9. Interaction of phenomenon, clausal complexity, and year for 1st year students in the acceptability judgement task

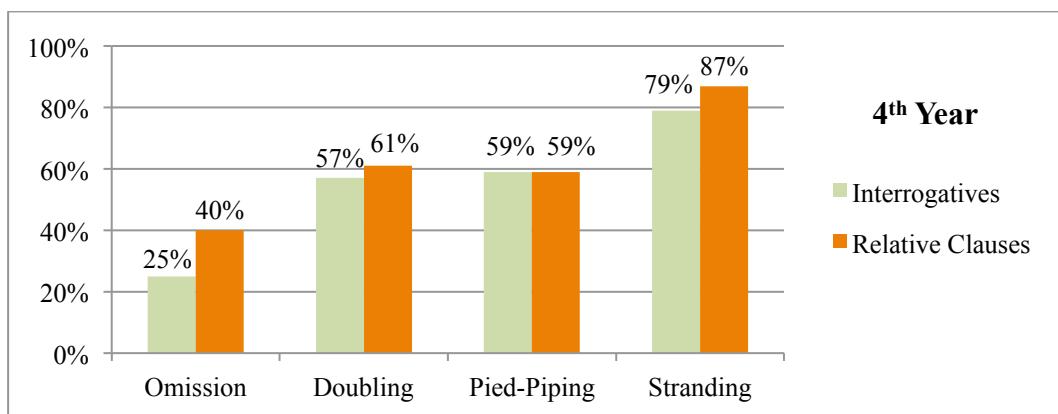


Figure 10. Interaction of phenomenon, clausal complexity and year for 4th year students in the acceptability judgement task

5. Discussion

One of the main findings of the study is the fact that, as expected, all four phenomena were produced in the oral production data elicitation task. However, there was not a statistically significant difference between preposition pied-piping and stranding. Therefore, the fact that preposition pied-piping was the most frequently produced construction may not be attributed to L1 transfer nor the fact that it is the unmarked option. In particular, pied-piping may have also been favoured by the nature of the task, since it involved pictures that would trigger concepts which are probably triggered first in the first language. The main contribution of this study, though, is the verification that of the preposition omission instances which other EFL studies report (e.g. Almahammed et al. 2015; Sadighi et al. 2004). As mentioned in Almahammed et al. (2015:25), the participants might have been unaware of the fact that the specific verbs need to be followed by a preposition in English. However, since the current study's participants are advanced EFL learners, what may have led them to committing preposition omission could be the increased cognitive processing load, as also suggested in Radford et al. (2012).

Apart from preposition omission, structures involving preposition doubling have also been produced. This is an important finding, taking into account that previous EFL studies, to our knowledge, have not reported the emergence of this phenomenon. Having been detected in the oral speech of native speakers in Radford et al. (2012), it could be suggested that the emergence of this phenomenon in our study serves as evidence that EFL speakers behave similarly to native speakers, in the sense that they are capable of producing structures which they do not consider as acceptable, especially when under 'high processing pressure' and 'limited opportunity for the speakers to plan their utterances very far ahead' (Radford et al. 2012:407).

However, although Radford et al. (2012) suggest that doubling is consciously detected by parsers who simply consider it as redundant, the fact that EFL speakers produce it to a lesser extent but judge it as acceptable to a greater extent (13.9% and 55% respectively) may suggest that they are not necessarily conscious of the prepositions occurring twice. Another similarity in the performance of native speakers and the EFL speakers who participated in this study is that the structures they judged as the least acceptable were those involving preposition omission, which could indicate that the omission of the preposition impedes comprehension, in contrast to doubling (Radford et al. 2012:409). Another striking

observation regarding the acceptability judgment task was that preposition stranding was more acceptable than pied-piping, despite the fact that the latter was the most frequent phenomenon observed in the oral production task. This could be attributed to the salience factor, which means that, since preposition stranding is more salient in oral speech, the participants might have been exposed to this phenomenon to a greater extent; thus, they consider it as more acceptable. Therefore, the suggestion that both salience and L1 transfer contribute to the acquisition of preposition placement (Almahammed et al. 2015:24) seems to be replicated by the findings of this study.

Clausal complexity seems to be a factor that affected the emergence of the phenomena in task A, since there was a statistically significant difference between the extent to which each phenomenon appeared in interrogatives and in relative clauses. However, clausal complexity did not affect the acceptability judgments of the participants in the acceptability judgment task to a great extent. Regarding the four phenomena, omission seems to be the phenomenon affected the most by clausal complexity. Specifically, in the oral production data elicitation task, omission emerged in relative clauses in a greater extent than in interrogatives (complex vs. simple clause, respectively) and it was also accepted as more acceptable in relative clauses as compared to interrogatives. As for the year of study of the participants, no significant differences have been observed between the performance of first- and fourth-year students, probably because, due to the nature of the university course, grammatical phenomena like preposition placement are not explicitly taught.

As for the limitations of the study, the nature of the oral production task, which targeted the elicitation of relative clauses, may have distorted the results. Specifically, since the phenomena of pied-piping and doubling could not emerge if the participants used structures with null complementisers or the complementiser *that* (Rezai 2006; Salehi 2011), the participants were reminded to use *which* or *who*. Nevertheless, having this in mind constantly may have discouraged them from pronouncing a preposition in front of the *wh*-word, that is, immediately after the end of the structure given to them. This could explain the limited emergence of doubling and pied-piping as well as the increase in stranding in relative clauses.

Lastly, it is worth noting that studies such as the current one, which investigate the acquisition of preposition placement by EFL speakers, can contribute to the field of teaching English as a foreign language but also to the fields of first and second language acquisition from a theoretical perspective. Particularly, EFL teachers of learners whose L1 does not allow stranding could explicitly indicate to the learners what is expected in formal writing and that in oral speech, where grammaticality is not such a concern as communication is, omitting the preposition may impede comprehension. As far as the theoretical consequences are concerned, providing two copies of the same preposition needs to be accounted for by syntactic theories such as the Minimalist Program, because there seems to be a failure in the movement of the copies. Moreover, spelling out the preposition twice seems to provide evidence in favour of multiple spell-outs. Lastly, amongst the tokens of doubling produced, it was observed that some speakers provided a certain preposition at the beginning of the clause, and ended it with a different one. This observation is in favour of the separation of the Phonological and the Logical Form (also known as the surface and deep structure, respectively), as the use of two different prepositions suggests that the features which are copied at the Logical Form may acquire a different Phonological Form (i.e. copying a word which is a preposition but pronouncing a preposition different than the one used earlier on).

6. Conclusion

The findings of this study reveal that, as expected, all four preposition placement phenomena (i.e. preposition stranding, pied-piping, omission, and doubling) emerged in the oral production data elicitation task and were accepted to some extent in the acceptability judgment task. Regarding the oral production data elicitation task, the most frequent phenomenon was preposition pied-piping, which could be attributed to L1 transfer and markedness, since the L1 of the participants does not allow stranding. In contrast, in the acceptability judgment task, preposition stranding was the most acceptable phenomenon, pointing to the fact that the salience of stranding in the input affected the participants' responses to a greater extent. Thus, as previously mentioned in the literature (e.g. Almahammed et al. 2015), various factors seem to be involved in the acquisition of preposition placement in this context. Clausal complexity was a factor affecting the emergence of the four phenomena in the oral production data elicitation task, but no striking clausal complexity effects have been observed in the acceptability judgment task. Regarding the year of study, no great differences were observed between the performance of 1st and 4th year students. Moreover, the study's main contribution to the literature is the fact that, to our knowledge, other studies on preposition placement involving EFL speakers have not reported the phenomenon of preposition doubling, as well as in the fact that no research has been done on preposition placement by L1-Cypriot-Greek EFL speakers. Therefore, it could contribute to the field of teaching English as a foreign language to L1-Cypriot-Greek speakers in particular and speakers whose L1 does not allow stranding in general, as well as provide useful insights regarding the process of acquiring a second language and its relevance to first language acquisition.

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Abbreviations

L1	First language	DP	Determiner phrase
EFL	English as a foreign language	TP	Tense phrase
C	Complementiser	vP	Verbal phrase
C ⁰	Empty complementiser	P	Preposition
CG	Cypriot Greek	PP	Prepositional phrase
CP	Complementiser phrase		

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Experimental evidence for the contextual acceptability of biased questions and tag questions in English

E Jamieson

I present the results of an experiment in which 113 English speakers were asked if they would prefer to produce matrix biased questions or tag questions in neutral and negative evidential contexts. Results show speakers prefer biased questions in negative contexts and tag questions in neutral contexts. Despite the close syntactic and semantic relationship between the two constructions posited in the literature, then, the results indicate that the two are distinct. I suggest an analysis for these results building on Reese & Asher (2006) and Gunlogson (2008).

1. Introduction

Research suggests a close relationship between matrix biased questions like (1) and canonical tag questions like (2).

- (1) Isn't Sarah coming too?
- (2) Sarah's coming too, isn't she?

Syntactically, (2) is simply a VP-elided version of (1) (Ladd 1981; van Rooij & Šafářová 2003; Sailor 2011; Malamud & Stephenson 2014; Krifka 2015). I only consider reverse polarity tag questions in this paper; same polarity tags such as (3) have difference licensing conditions and require separate study – see e.g. Malamud & Stephenson (2014).

- (3) Sarah is coming too, is she?

Considerably less work has been done on the semantics of canonical tag questions like (2) (Malamud & Stephenson 2014; Northrup 2014; Krifka 2015; Farkas & Roelofsen 2017) when compared to the work done on biased questions like (1) (Büring & Gunlogson 2000; van Rooij & Šafářová 2003; Romero & Han 2004; Trinh 2014; Northrup 2014; Krifka 2015; Romero 2015). Malamud & Stephenson (2014) acknowledge that there must be a close relationship between biased questions and tag questions semantically, but do not delve any deeper. Both

constructions are considered to be complex speech acts by Krifka (2015) and while Farkas & Roelofsen (2017) do not consider matrix biased questions, they also take examples like (2) to be complex speech acts in the same way Krifka does – combinations of REQUEST and ASSERT or DECL and INT operators.

Both constructions are permitted in contexts where the speaker has a prior belief p (e.g. is biased towards p), which is either being challenged by some counterevidence (a *negative evidential context*) or there is no evidence either for or against p (a *neutral evidential context*) (Ladd 1981; Sudo 2013; Domaneschi et al. 2017). Work has been done to establish that different forms of matrix question (Domaneschi et al. 2017) and tag question (Ladd 1981) are used depending on the combination of speaker beliefs and evidential biases, but no previous study has compared across the two types of constructions.

To that end, in the first half of this paper I set up an experiment (sections 2.1-3) in which 113 English speakers performed a forced choice task, selecting between biased questions and tag questions in situations where both are posited to be available. Results (section 4) show that speakers prefer biased questions in situations where there is counterevidence challenging their belief of p , and tag questions where there is no evidence challenging their belief. This is interesting as both constructions are argued to be permitted in both contexts; what can explain these preferences? Furthermore, this challenges the idea in the literature that these are semantically the same complex speech act construction – if they were, one would expect there to be no clear preferences between the evidential contexts.

In the second half of the paper, I present an analysis for these results (section 5). Firstly, I establish my position on the relevance of beliefs and biases for the semantic and pragmatic analysis of these constructions. I then provide an analysis for tag questions that builds on Reese & Asher (2006), in which the anchor and the tag are separate clauses with separate speech acts. Tag questions are VP-elided biased questions. The anchor clause provides a Known Answer to the biased question – p – as the speaker has already taken responsibility for it as an assertion on the QUD stack. I subsequently sketch a brief analysis for biased questions, which are true interrogatives without a Known Answer. I then compare the two constructions to show how the results of the experiment are derived. Key to this analysis is the idea that intonation affects whether or not acceptance of p to the Common Ground is *contingent* on the addressee's active acceptance, following Gunlogson (2008). This makes a tag question a more relevant move than a biased question in contexts where there is no counterevidence challenging the speaker's belief – as an interrogative, the tag looks for the addressee's involvement, but the acceptance of p is not contingent on it. The results also suggest that when each construction type is used in the context which is not their preferred context, they have specific pragmatic purpose. I explore this before concluding.

2. Experimental background

2.1. Acceptability of biased questions

It has been shown that cross-linguistically, different combinations of a speaker's epistemic beliefs and the evidence provided by the context surrounding the interaction license different types of matrix question (Sudo 2013; Domaneschi et al. 2017; Gaertner & Gyuris 2017), as well as different types of tag question (Ladd 1981; Heinemann 2010; Ertokritou 2014; Scheffler 2015). A number of authors have recently argued that production of biased questions is purely based on

	epistemic belief	evidential bias
Isn't Katie a vegetarian?	positive	-positive
Is Katie not a vegetarian?	none	+negative

Table 1: Negation forms in English questions by epistemic belief and evidential bias, following the results in Domaneschi et al. (2017)

the evidential context (Northrup 2014; Trinh 2014; Farkas & Roelofsen 2017). I believe that the experimental evidence from Domaneschi et al. (2017) and this paper, as well as the discussion in Jamieson (2018), shows that a model of interrogative production where speaker beliefs are semantically encoded is better, with evidential context simply providing the pragmatic backdrop that may prefer one type of question over another. I will discuss this in more detail in section 5.

For example, Domaneschi et al. (2017) tested 42 English speakers in the lab, presenting them with a short context that established a belief for the participant and gave an evidential context to the interaction. Participants were then asked to select and produce one of a possible four interrogatives that they would prefer to produce given their belief and the evidential context: an interrogative with low *not* negation or an interrogative with reduced *-n't* negation attached to the auxiliary (see Table 1), as well as a positive interrogative, and a construction expressing surprise: *really?!* followed by a positive question.

Domaneschi et al. (2017) found that participants strongly preferred to produce an interrogative with *-n't* in a situation where the participant was given a belief *p*, and then presented with either a neutral or negative evidential context surrounding the interaction. Domaneschi et al. (2017) argue there is some ambiguity in the negative evidential contexts, suggesting that there is an ‘inner’ e.g. true negation reading available for *-n't* negation, which shows different intonation patterns. However, they do not discuss specific contexts for these ‘true negation’ readings, nor which intonation pattern is claimed to match with this use. I will thus set this aside. On the other hand, participants preferred low *not* negation in a situation where they were given no prior belief, but presented with an evidential context that suggested $\neg p$ was true. This corroborates the results of Sailor (2013), who found that US English speakers preferred low *not* negation in situations where the speaker has no existing belief, but is presented with negative evidence. Sailor’s participants rejected high *-n't* negation in these contexts.

These results contradict the original claim of Ladd (1981), who suggested that there was an ambiguity with high *-n't* negation in that it could be interpreted either as a biased question where the speaker has a previous belief of *p*, or as a true negative question where they do not. Instead, the results seem to show that speakers produce different forms of matrix question (with different forms of negation) depending on the interaction of their existing beliefs and the evidential context. Following Sudo (2013), who divides the belief and bias spaces into [positive] and [negative] features which can either be [+] or [-], we can divide the space as in Table 1. The form *-n't* is used when the speaker has a prior belief *p*, and the evidential context does not provide evidence in support of *p*. The form *not* is used when the speaker has no prior belief of *p* or $\neg p$, and there is contextual evidence for the truth of $\neg p$.

2.2. Acceptability of tag questions

Tag questions are taken to be VP-elided biased question constructions (van Rooij & Šafářová 2003; Sailor 2011; Malamud & Stephenson 2014; Krifka 2015); where they exhibit variation is in terms of their intonation. Ladd (1981) identifies two patterns in the prosody of tag questions: nuclear tag questions, in which the tag has a separate nucleus to its anchor clause and falling intonation (4), and post-nuclear tag questions, where the tag does not have a separate nucleus and has rising intonation (5). Ladd's intuitions on intonation patterns and their relationship with the distribution of the nucleus was supported by evidence from Dehé & Braun's (2013) corpus study, where falling tag questions are the most common and have a separate nucleus. However, Reese & Asher (2006) also posit that rising intonation is possible on nuclear tag questions, and that post-nuclear tag questions are only used in a very particular set of cases. I will focus discussion on rising *nuclear* tag questions in this paper. However, as the stimuli for the participants presented in this experiment were in writing, it is possible that rising post-nuclear tag questions were also considered by some participants.

- (4) This is your book / isn't ↘it.
- (5) This is your book=isn't ↗it? (Ladd 1981)
- (6) This is your book / isn't ↗it? (Reese & Asher 2006)

Ladd (1981:167) notes that falling nuclear tags like (4) tend to be used as a sort of 'hedge' following a speaker's 'assumption'. On the other hand, post-nuclear tags like (5) convey 'real doubt or uncertainty', and are used to confirm the speaker's position is correct. Reese & Asher (2006) also take this to be the distinction between the two types of tag questions, suggesting that Ladd's falling nuclear tags are used for 'acknowledgment', while rising nuclear intonation tags like (6) are used for 'confirmation'. Thus, falling intonation is associated with acknowledgement/hedging while rising intonation is associated with confirmation.

Rephrased in terms of the belief and bias distinctions set out by Sudo (2013), we can state that falling nuclear tag questions are used when the speaker has a belief p , and the evidential context is neutral or positive. On the other hand, rising tags are used when the speaker has a belief, p , but the evidential context is negative, pointing towards $\neg p$. This can be seen in Table 2. The division of labour is therefore different in tag questions to the division between biased questions and negative questions (as seen in Table 1). However, it is notable that tag questions and biased questions are both available in evidential contexts that are [+negative] and [-negative, -positive] (neutral) contexts.

	epistemic belief	evidential bias
falling tag question	positive	-negative
rising tag question	positive	+negative

Table 2: Reverse polarity tag questions in English by epistemic belief and evidential bias, extending Sudo (2013).

2.3. Hypothesis

If tag questions are so closely related to matrix biased questions both syntactically and semantically, and both constructions are available in the same evidential contexts, there would be no reason to assume that speakers would have any preference for one construction over the other in either evidential context. However, as we have seen, English does distinguish forms *within* contexts, whether this is through the position of negation in biased questions or through intonation in tag questions. This suggests that there may be preferences across the construction types too.

The null hypothesis, therefore, is that there would be no difference in speakers' preference for biased questions or tag questions in either evidential context; both should be equally available. The alternative hypothesis is that, given that there is variation in forms *within* each context, there will be some preference regarding which construction is used in either evidential context. In the next section, I present an experiment designed at testing this hypothesis.

3. Methodology

I set up a short forced choice experiment using Qualtrics. In the test cases, participants were presented with a short, 1-2 line context that established a) a situation; b) a belief *p* for the participant; c) whether the evidential context was negative or neutral. After reading that short context, participants were asked to choose between a biased question or a tag question that they would produce following the given context. Of course, there may be other possibilities that speakers employ in any given situation – however, for the purposes of this experiment, a forced choice task was most appropriate.

In the English experiment, all the tag questions were canonical constructions consisting of an auxiliary verb combined with *-n't* negation and a pronominal subject, e.g. *isn't it*. Intonation was not indicated, so participants could choose to interpret the tag as either rising or falling – meaning that the tag should be possible in either context. All matrix biased questions used high *-n't* negation, following the results of Domaneschi et al. (2017). Again, intonation was not indicated. Examples of the types of contexts that participants judged are presented in (7) and (8), with [bel:] and [ev:] indicating where the belief and evidential contexts were established.

(7) **Neutral evidential context:**

You want to go and see the new Harry Potter film. A group of our friends went last week, and you're pretty sure I went with them [bel: *p*]. You want to find out what I thought of it [ev: \emptyset], so you say:

- a) Haven't you seen it?
- b) You've seen it, haven't you?

(8) **Negative evidential context:**

You think I won the marathon at the weekend [bel: *p*]. However, I start telling you that I am disappointed with my performance [ev: $\neg p$]. You say:

- a) Didn't you win the race?
- b) You won the race, didn't you?

Participants were presented with 10 examples where a belief, *p*, was presented followed by

a neutral evidential context, and 10 examples where a belief p was followed by a negative evidential context. There were therefore 20 test cases, plus 30 filler examples in which participants made forced choices between e.g. a true negative question and a biased question, or a tag question with a negative anchor and a true negative question. The order of the contexts was randomised, and within each context the two potential responses were randomised, so no participant saw the contexts or responses in the same order.

The experiment took between 10 and 15 minutes to complete.

3.1. Participants

Participants were recruited through official channels at the University of Edinburgh, as well as through shared posts on Facebook and Twitter. The only requirements were that the participant was over 18 years old and was a native speaker of English not from Scotland. Unlike standard English, where the standard negative form is $-n't$, Scottish English speakers use $-na(e)$. $-na(e)$ is not able to be used in interrogatives (Brown & Millar 1980; Thoms et al. 2013). Instead, speakers of Scottish English use low *no* negation (equivalent to standard English *not*) in both true negative questions and biased questions, rather than following the *not* vs. $-n't$ divide exhibited by standard English speakers in Domaneschi et al. (2017). The materials were thus not suitable for Scottish participants, and so they were not invited to take part in the study.

138 participants filled out the English version of the survey. 25 of those were incomplete; excluding the incomplete surveys left 113 complete responses.

Participants were asked to provide three pieces of demographic information: their age, their gender and where they grew up. All three pieces of information are relevant to potential variation in the results. Tottie & Hoffman (2006) find in their corpus study that older speakers use more canonical tag questions than younger speakers. Lakoff (1973) claims that women use more tag questions than men (though this claim was subsequently disputed in Cameron et al. (1988), who present evidence suggesting that if anything, men use more tag questions than women). Finally, Tottie & Hoffman (2006) also find that British English has more canonical tag questions than American English, and within the UK, Tagliamonte & Smith (2002) find that there is variation in use of $-n't$ in questions on a north-south continuum. There could therefore be UK-internal variation between northern and southern Englishes.

The age, gender and location distribution of participants can be seen in Tables 3, 4 and 5.

Age						
18-19	20-29	30-39	40-49	50-59	60-69	Total
3	69	30	6	2	3	113

Table 3: Age distribution of participants; mean age was 29.73.

Gender				
Female	Male	Other	Not given	Total
72	34	6	1	113

Table 4: Gender distribution of participants.

Location					
Australia	UK & Ireland	USA & Canada	Other	Total	
10	61	38	4	113	

Table 5: Participants' countries of origin.

4. Results

Regarding neutral evidential contexts like (7), where there was no negative evidence challenging the speaker's prior belief p , participants strongly chose tag questions over biased questions (see Table 6 and Figure 1). A chi-square test gives $\chi^2 = 355.71$, $df = 1$, $p < .001$. The null hypothesis, that there will be no difference between how often participants choose biased questions or tag questions, can thus be rejected.

	TQ	BQ
Neutral	882 (78.05%)	248 (21.95%)
Negative	344 (30.44%)	786 (69.56%)

Table 6: Raw numbers of tag questions and biased questions chosen across evidential contexts.

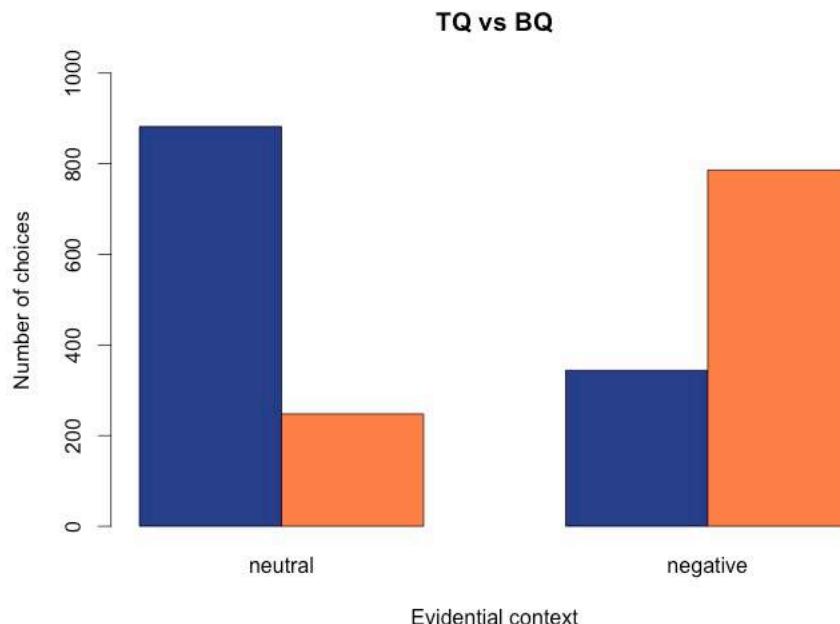


Figure 1: Overall choice of biased question or tag question by evidential context – tag questions represented in dark blue, biased questions represented in orange.

Regarding negative evidential contexts like (8), where there is some evidence challenging the speaker's prior belief p , participants strongly chose to produce a biased question over a tag question (see Figure 1). A chi-square test gives $\chi^2 = 172.89$, $df = 1$, $p < .001$. Again, the null hypothesis can be rejected.

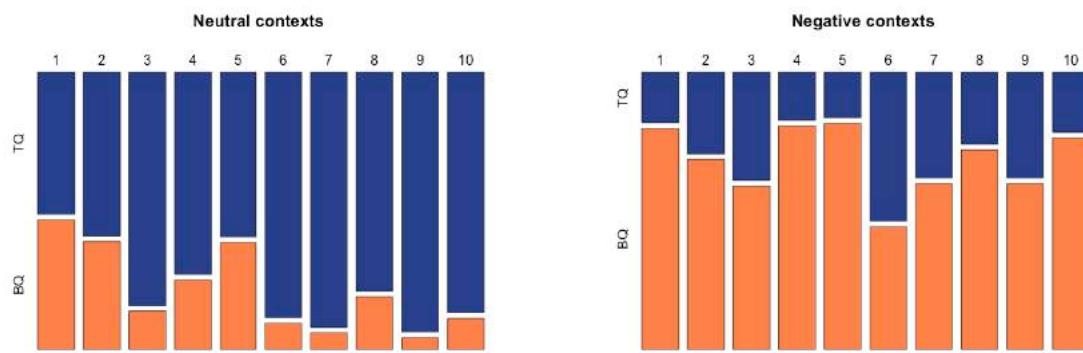


Figure 2: Results for individual examples in both neutral and negative evidential contexts

It is worth noting that it was not the case that certain participants consistently chose one variant over the other across contexts. Though some participants were unanimous within one of the contexts (e.g. selecting tag questions in all neutral contexts), no participant was unanimous across both contexts. Even within contexts, unanimity was rare: only around 14% ($N=16$) of participants unanimously selected tag questions in neutral contexts, and only around 7% ($N=8$) of participants unanimously selected biased questions in negative contexts. No participant unanimously selected biased questions in the neutral contexts or tag questions in the negative contexts.

It is also worth noting that there is some variation across contexts as to how strong the preference for biased questions or tag questions was (see Figure 2, in which each vertical bar represents an individual example that participants judged, numbered along the top). Certain contexts (e.g. neutral context #9) preferred tag questions almost entirely and others (e.g. negative context #1) preferring biased questions to a higher degree. An experiment looking at the preferences for biased questions or *oder* tag questions with German speakers showed very similar variation patterns – see Jamieson (2018) for more details. The variation here is interesting and I will discuss it below, though given the risks of discussing individual examples, this discussion will by necessity only be tentative.

4.1. Sociolinguistic variation

No effect of age, gender or UK-internal location (i.e. north vs south of England) was found. Regarding broader locations, recall that Tottie & Hoffman (2006) found that British English speakers used more canonical tag questions than American English speakers. There was no effect of overall location in the negative evidential contexts. In neutral evidential contexts, however, there was an effect of location ($p = .002$, Bonferroni correction applied, significance level = .008). Closer examination of the data shows that while UK and Ireland respondents pattern with the Australian respondents (both with 81% tag questions and 19% biased questions), US and Canadian respondents chose biased questions in neutral context more often. 28.42% of US and Canadian responses to neutral evidential contexts were biased questions, with 71.58% tag questions. The data therefore appears to corroborate Tottie and Hoffman's observation to

some extent: in situations where canonical tag questions are generally preferred, UK and Ireland respondents use more of them than US and Canadian speakers. However, US and Canadian speakers still also exhibit a clear preference for tag questions over matrix biased questions in the neutral evidential contexts, and so the main result still holds for those speakers, albeit less strongly.

5. Discussion

Despite both matrix biased questions and tag questions being available in both neutral and negative evidential contexts, speakers have preferences about which construction should be used in which evidential context. Specifically, the experiment I carried out found that speakers preferred matrix biased questions in negative evidential contexts that challenged the speaker's belief of p . They preferred tag questions in neutral evidential contexts where nothing was challenging p . These results thus build on the within-construction variation established in Ladd (1981) and Domaneschi et al. (2017); here, we see preferences across constructions.

Here, I present a potential analysis for the results. In section 5.1 I set up my position on the roles of epistemic beliefs and evidential biases. I discuss Sudo's (2013) comment that epistemic beliefs and evidential biases must be encoded in the semantics of the construction (see also Farkas & Roelofsen (2017)), as well as Northrup's (2014) argument that questions are licensed by evidence only. I argue that while beliefs are semantically encoded, the evidential context is a pragmatic base against which speakers choose the construction they wish to produce.

In the section 5.2, I develop an analysis for tag questions that builds on Reese & Asher (2006). I argue that tag questions are instances of VP-elided biased questions in which the anchor to the tag is a Known Answer to the question, as they do; however rather than incorporating intonation into the meaning of the tag, I argue that intonation is a separate unit which infers *contingency* (Gunlogson 2008), or lack thereof. Intonation does not contribute full speech act semantics, against what is argued by e.g. Truckenbrodt (2012) and Farkas & Roelofsen (2017).

In section 5.3, I briefly sketch an account for biased questions. I do not discuss the semantics of biased questions in detail here. Instead, I simply I will posit that they are truly questions with no Known Answer given. In section 5.4, I then compare the two analyses to account for the results. Tag questions' preference in neutral evidential contexts is a consequence of the fact that they provide a Known Answer. Tags with rising intonation have what the speaker assumes is a Known Answer in the anchor, but that they also ask the question $\{p, \neg p\}$, the answer to which is contingent on the addressee. Biased questions require the addressee's input by necessity as interrogatives and thus are more appropriate in negative contexts. However, they are also possible in neutral contexts – simply less relevant when the tag question is available.

5.1. Encoding evidence in the semantics?

In section 2.1, I assumed a position that followed Sudo (2013) in taking a combination of epistemic beliefs and evidential biases to license interrogative constructions. Here, I highlight issues with the opposing account – that only evidentiality affects biased question licensing – and set out how I believe the division of labour between semantics and pragmatics takes place.

5.1.1. Northrup 2014

Northrup (2014) argues that biased questions and tag questions are each only used in specific evidential contexts, not permitting any overlap between the constructions (this evidential-only licensing is also pursued by e.g. Trinh 2014 and Farkas & Roelofsen 2017). For Northrup, biased questions are used in contexts only where there is conflict between the speaker's prior evidential base p , and the current ($\neg p$) evidence presented which thus gives concurrent evidential base for $[p \vee \neg p]$ and $\neg p$. On the other hand, falling nuclear tag questions are used when a speaker has a prior evidential base for $[p \vee \neg p]$ – either is possible – and current evidential base for p due to the context. Rising tag questions are used when speakers have a concurrent commitment to $[p \vee \neg p]$ and to p , with no prior evidential base.

If these very specific combinations of evidential bases were required for the licensing of the three constructions, there should be no variation in what speakers prefer to choose; in particular, there should not be any significant variation by US and UK English. However, that is not what we find. While Northrup proposes his analysis based on US English, and acknowledges that it may be different for UK English, it is not the case that UK and US English speakers are behaving completely differently; rather, they behave in the same way, to different extents. This is not accounted for by Northrup's model.

Furthermore, I take it that a categorical analysis which suggests that there cannot be any overlap between the construction types is not the correct analysis. No context was unanimous in its licensing of biased questions or tag questions, and very few participants were unanimous in their selections based on the evidential context. Northrup's analysis cannot account for the apparent influence of non-epistemic biases, either.

Finally, I believe Northrup's key examples can be accounted for without appealing to evidential base shifts. For example, (9).

- (9) *Happy hour approaches; Zabi and Kazuko need a drink. Zabi can't easily recall where the brewery is.*
 Z: Do you remember where the brewery is? Never mind; it's on Swift, isn't it?
 (Northrup 2014:208)

Northrup argues that the openness commitment to $[p \vee \neg p]$ is based on Zabi's prior evidence base (signalled by the polar question at the beginning of his turn), and that Zabi also has a weak commitment to p as signalled by his current evidential base. As there is no change in contextual evidence, Northrup argues that the sudden ability to license the falling tag question comes from the shift from a prior and current evidence base for $[p \vee \neg p]$ to a prior base for $[p \vee \neg p]$ and a current base for p (i.e. the speaker remembered p). However, it seems as though this can adequately be accounted for in a belief and evidence based model: Zabi asks the polar question because he cannot remember where the brewery is, and there is no evidence to tell him that Kazuko can or cannot remember where it is. Importantly, *nevermind* serves as a repair and informs Kazuko that any answer to the question she might propose 'doesn't matter' or that Zabi 'won't care' about any answer (Couper-Kuhlen 2004). In effect, the polar question is cancelled; Zabi can then start again, announcing his belief of p ('the brewery is on Swift') in a neutral evidential context and using the falling nuclear tag question to indicate that Kazuko's opinion is still important and valued, but Zabi is confident in his own belief. Key examples for Northrup's model can thus be accounted for without looking to the evidential base shifts; as his model

cannot account for the results of this experiment, and his examples are able to be accounted for without it, I do not believe there is a need to build evidential base into the semantics of the constructions.

5.1.2. Beliefs in semantics, evidence in pragmatics

Sudo (2013) argues that for biased questions, both epistemic beliefs and evidential biases need to be *semantically* encoded in the question constructions in order to capture their distribution. While I agree that speaker's beliefs are semantically encoded in the question constructions, I posit that evidential contexts are *pragmatic*, and are always interpreted through the speaker's perspective.

I assume that evidence is something that conversation participants have *immediate* and *unproblematic* access to, and which is *public* – i.e., it is manifest to all discourse participants (Sperber & Wilson 1995). In principle, this evidence should be *objective*; however, given that the prior epistemic states of conversation participants inevitably vary, there will always be some degree of subjectivity to the strength of the evidence, even in examples which are fundamentally objective. Take example (10).

- (10) S believes that A bought a car recently. A mutual friend tells S that he saw A going into a car showroom at the weekend. S says:
 She just got a new car, didn't \she?
 She just got a new car, didn't ↗she?
 Didn't she just get a new car?

Here, S believes p - 'A bought a car recently'. This is an objective belief. S is then confronted by some contextual evidence: A was seen going into a car showroom at the weekend. This evidence is also objective. However, it is easy to imagine how the backgrounds of S and A can vary, and can subsequently affect the interpretation of the evidence produced by the friend. In a situation where both S and A are extremely wealthy businesswomen, the belief that A already owns a car does not necessarily preclude S from believing that A is shopping for a new car – she may well be buying a second. The fact that S believes A bought the car recently means that the evidence may be considered slight negative counterevidence to this prior belief – although the idea of A owning two cars is very much possible, why would she be shopping for another quite so soon? However, this evidence would not eliminate the possibility of S's belief being true. Both the biased question and the tag question with either intonation contour are possible responses to the context described in example (10) when the conversation participants' background is a wealthy one.

On the other hand, in a situation where both conversation participants are less than extremely wealthy, A's going to a car showroom would be strong negative evidence challenging S's belief that 'A bought a car recently'. Why would she be looking at a second car, *especially* so soon after she had bought a first? Though both constructions are still possible, the chances of producing a biased question like *Didn't she just get a new car?* are higher in this version of the world, where S's prior epistemic state leads them to judge the (identical) evidence as more negative than they would if they operated in a world where money was no object.

While this is an extreme example of how discourse participants' interpretations of the contextual evidence can vary, the basic principles are more broadly applicable: individual speakers'

interpretations of the contextual evidence will vary based on their background, culture and the assumptions about the world that they bring to the conversation. So, although evidence is in principle objective in question production, it can never truly be devolved from speaker perspective and interpretation. I therefore take evidence as the pragmatic backdrop for the interaction that allows speakers to choose which construction to use, rather than something which is semantically encoded in the question that they pose.

Armed with this information, we can now turn to build an analysis for tag questions.

5.2. An analysis for tag questions

Above, I posited an account for the results in this experiment that interprets evidential context as pragmatic; this accounts for the overall preferences seen in the results as well as leaving space for the variation between participants. Here, I present an analysis for rising and falling tag questions, adapting Reese & Asher (2006). In section 5.4, I show how this accounts for the results presented in 4.

Reese & Asher (2006) state that the anchor of the tag question is an assertion. This has the default speech act of communicating that the speaker believes p , with the goal that the addressee comes to believe p too. The tag itself has the default meaning of a question q , which is that the speaker believes an answer to the question. In the nuclear tag question with falling intonation, then, because the speaker asserts p in the anchor, the addressee infers that the speaker believes p , and therefore that p is the Known Answer to q in the tag. The addressee then accepts the belief of p , following the default goal of the anchor, and thus the move is an Acknowledgment move (Asher & Lascarides 2003). An utterance β is an acknowledgment move iff a relationship holds between segments α and β just in case answer i to β entails that the goal of α has been achieved. Given the anchor utterance α has the goal of adding p to the Common Ground as a shared belief, an affirmative answer i (e.g. ‘yeah’) to the tag question β entails that the goal of the anchor has been achieved – namely, the transfer of the belief from speaker to addressee.

Interestingly, Reese & Asher take this to be the default interpretation for tag questions, despite the fact that falling intonation is marked in polar questions generally (Banuazizi & Creswell 1999; Bartels 1999; Dehé 2017). They do not assign any meaning to the falling intonation, but present it in contrast to the meaning of rising intonation tag questions, which they describe as Confirm moves. Again, the speaker asserts a belief of p with their assertion in the anchor. However, the final rise on the question is taken to mean that the speaker believes that the proposition at the core of the question in the tag is *possible*. Therefore, between the assertion of the anchor (‘S believes p ’) and the final rise on the tag (‘S believes $\diamond \neg p$ ’), there is *inconsistency* and therefore the assertion is only *weakly asserted*. It is not possible for A to accept a belief of both p and $\neg p$ simultaneously: this thus blocks the Acknowledgment inference, because it is not possible for the goal of the anchor to follow from the conflicting information presented in the tag.

However, there are some issues with this analysis. Firstly, the broader conception of intonation as stating that the speaker believes the underlying proposition to be true cannot capture the difference between biased questions and true negative questions seen in Domaneschi et al. (2017) (and presented in Table 1), where both constructions have the surface form of a negative question but the underlying beliefs of the speaker are different. Secondly, the idea of the answer to a tag question as an Acknowledgment move cannot capture the difference in meaning in

canonical tag questions as discussed here and tags like *ok?*, the latter of which really does seem to request Acknowledgment of the assertion in the anchor when compared to canonical tags.

- (11) Dana is going to come over this weekend, isn't she?
- (12) Dana is going to come over this weekend, ok?

The analysis of tag questions I propose maintains the position of Reese & Asher (2006) that the tag question and the anchor clause are separate constructions, rather than being one complex speech act (as argued by e.g. Krifka 2015 and Farkas & Roelofsen 2017). However, the anchor is a Known Answer in both rising and falling tag questions to the extent that the speaker believes it to be true. The difference in meaning comes purely from the intonation, which is contributed separately – there is thus no need to posit that there are Acknowledgment and Confirmation moves; in both cases, tag questions are questions, but in the falling intonation case they are to some extent ‘defective’.

I follow Gunlogson (2008) in arguing that the contribution of rising intonation is *contingency*. Gunlogson defines the term as follows:

‘A discourse move μ by an agent α is contingent on a discourse condition δ if:

- (a) δ does not obtain at the time of μ ; and
- (b) It is inferrable from the discourse context that the update effected by μ is to be retained only if δ obtains after the discourse move immediately succeeding μ .’
 (Gunlogson 2008:129)

In falling intonation nuclear tag questions, then, the anchor proposition is a Known Answer to the question in the tag. The speaker has already put p forward, indicating that it is part of their beliefs, and that they wish for it to be added to the shared ground. However one wishes to formulate the semantics of a question, the speaker’s belief of what the answer should be is already given in the anchor assertion; the lack of rising intonation indicates that the continuation of the discourse is not contingent on the addressee’s next move e.g. whether or not the addressee confirms p . Furthermore, the question is answered by the speaker’s assertion, and so can be downdated from QUD to the Common Ground without requiring a full answer, explaining the unacceptability of restating the assertion after the tag question (Ginzburg 2012).

In the rising intonation case, the proposition in the anchor is still presented as a Known Answer to the question in the tag; the speaker has presented their willingness to take responsibility for p and to add p to the Common Ground. However, the rising intonation adds this *contingency*. The speaker is presenting a question, and though they have indicated that they believe there is a Known Answer that they wish to take responsibility for, the acceptance of the proposition is contingent on the addressee’s answer to the question.

5.3. A brief analysis for biased questions

I do not wish to present a detailed analysis for biased questions in this paper; see van Rooij & Šafářová (2003); Romero & Han (2004); Krifka (2015); Romero (2015) for possible seman-

tic analyses of question bias. Instead, I simply focus on the fact that biased questions are full interrogatives and require a response from the addressee before they can be downdated from the QUD stack. In presenting $\{p, \neg p\}$ to the addressee with rising intonation, they are fully contingent on the addressee's response, with no Known Answer presented to the QUD before the addition of the biased question to the stack. This fact, and the fact that the Known Answer quality differs from tag questions, can be seen here through what I will term *commitment revision*. When the addressee expresses to the speaker that they are unable to make any commitment toward p or $\neg p$, e.g. by replying with 'I don't know', with a tag question, a speaker can then revise their commitment to take full responsibility for the proposition p in the Common Ground with a tag question.

Examples of this can be seen in the British National Corpus, where following an assertion with a tag question, an addressee indicates they do not know the answer, and the speaker restates the assertion *without* the tag, thus taking full responsibility for p .

- (13) Paul: Wendy's just got Sky, hasn't she?
 Shelia: Eh?
 Paul: Wendy's got Sky in today. I went round. I got the lecture.
 (KR0, 4016, BNC)

This is, presumably, a falling intonation tag question – these are most common in the corpora investigated by Dehé & Braun (2013). If the tag were to have rising intonation, commitment revision would not be possible because the speaker has already made it clear that the downdating of p into the Common Ground is contingent on the addressee's confirmation of p .

This commitment revision is not possible with biased questions, regardless of the evidential context they appear in, indicating that it is not simply licensed due to a particular interaction between beliefs and evidence.

- (14) S thinks their friend J will be coming to the party tonight. However, S then notices on Facebook that J has clicked attending on a different event that is taking place at the same time.
 S: Isn't she coming?
 A: I don't know.
 S: #Well, she is.
 #I think she is.
 I thought she was.
- (15) S has got some spare tickets to a concert. S thinks their friend H already has a ticket but wants to check this information with A in case H is still looking for one.
 S: Didn't he get a ticket the other day?
 A: I don't know.
 S: # Well, he did.
 I think he did.
 I thought he did.

It is clear, then, that commitment revision is not simply a function of the evidential context that the construction is produced in; even in neutral evidential contexts, commitment revision is not permitted when a biased question has been produced.

This indicates that however one wishes to account for question bias in general, it remains the case that biased questions are interrogatives.

5.4. Accounting for the results

In section 5.2 and 5.3 I posited analyses for the semantics of tag questions and biased questions. In this section, I will show how these analyses account for the results we saw in section 4. Although both constructions *are* possible in both contexts, the differences in speaker preferences lie in the levels of contingency and what is expected from the addressee.

5.4.1. Neutral evidential contexts

In neutral evidential contexts, we see that tag questions are strongly preferred. This follows neatly from the analysis of tag questions given above. If a speaker has a belief of *p* and there is no challenging evidence, producing a tag question in which the Known Answer is indicated in the proposition is the most relevant move a speaker can make. The tag question still permits them to suggest that the addressee's input is desired, as it is an interrogative form, but the falling intonation means that the continuation of the discussion and the acceptance of *p* into QUD does not hinge on the addressee's acceptance.

Using a biased question in neutral context is also perfectly legitimate (see the results from Domaneschi et al. (2017) discussed in 2.1), but a less relevant move as it actually requires the speaker to be contingent on the addressee's response when they don't need to be. However, it is not the case that using a biased question in a neutral evidential context is not permitted. A speaker may choose to do so for a number of reasons, such as politeness e.g. (16).

- (16) S and A are a party with some people they have briefly met before. Nadia is a mutual friend of theirs, who had introduced them to her friend last weekend. S believes the friend's name is Farrah, and knows that A was told this too.
 A: There's Nadia's friend. I can't remember her name!
 S: Wasn't it Farrah?
 A: Oh yes!

In (16), a tag question with falling intonation would be considered rude; although there is no evidence challenging the speaker's belief of *p*, the biased question is a more relevant move here.

Speakers may also use biased questions in neutral evidential contexts because they interpret the strength of the evidence differently. For example, in neutral evidential context #1 (presented in (17)) participants were given a context in which they were discussing a friend who had recently moved. Participants were told they thought the friend had moved to Berlin, and then were asked to choose between 'She moved to Berlin, didn't she?' and 'Didn't she move to Berlin?'.

- (17) We are talking about a friend of ours who recently moved away. You are pretty sure she went to Berlin [bel: *p*]. [ev: Ø] You say:
 a) Didn't she move to Berlin?
 b) She moved to Berlin, didn't she?

This context, which was particularly underspecified in terms of whether there was any evidence challenging or supporting the proposition, was one of the neutral contexts which gathered a higher number of matrix biased question responses (see Figure 2). Adding further information to the context can strengthen the preference for one of the constructions over the other; for example, specifying exactly what we were discussing about our friend. If the addressee had said something like ‘She should have learned some German before she left’, this may have indicated that she was at least in Germany; however, if the addressee had made the same statement about French, this would have perhaps challenged the speaker’s assumption.

Neutral evidential contexts thus prefer tag questions because they allow the speaker to strongly express their opinion about their belief that p should be added to QUD. Biased questions are still permitted, but are less relevant moves unless the speaker particular wishes to defer to the addressee.

5.4.2. Negative evidential contexts

The results presented in section 4 indicate that biased questions are strongly preferred in negative evidential contexts, despite the fact that biased questions and tag questions are both available.

I posit that biased questions are most relevant in negative evidential contexts as the speaker indicates their belief of p through some form of question bias (e.g. Krifka (2015); Romero (2015)), but through both the fact that they do not present a Known Answer as an assertion and the fact that the rising intonation signals contingency of acceptance of p on the addressee, the speaker is still able to seek clarification on whether or not p should hold. Tag questions in negative evidential contexts are less common as in order to suggest that there is a Known Answer in the face of negative evidence, the speaker must be strongly of the opinion that p is, or should be, true.

I believe that this analysis accounts for the fact that overall, rising intonation tag questions are less common than falling intonation ones (Dehé & Braun 2013), as well as their distribution in negative evidential contexts. Rising intonation tags can be used in situations with challenging evidence (Ladd 1981), but in order to present a Known Answer in a situation with challenging evidence, a speaker must have an exceptionally high degree of belief in the proposition – or, rather, a strong bouleptic, deontic or teleological desire for p to be true. The lines between bouleptic, deontic and teleological modality can be fine: notably, all are evaluated against circumstantial modal bases (Hacquard 2011) rather than the speaker’s current epistemic state, and so can be clearly separated from simple cases of epistemic belief.

Looking at the cases where tag questions were chosen more frequently in the negative contexts above seems to indicate that, indeed, these were instances where a bouleptic/deontic/teleological desire could be invoked. For example, negative context #9 (presented in (18)), a context where the participant has made dinner, but the addressee looks unhappy and is reluctant to try it, received a particularly high concentration of tag questions responses, despite an overall preference for matrix biased questions.

- (18) You think I would like a really spicy dinner you have made [bel: p]. However, I’m pushing it around my plate and looking unhappy [ev: $\neg p$]. You say:
- a) Won’t you try it?
 - b) You’ll try it, won’t you?

I suggest that negative evidential contexts where the speaker has a strong desire for p to be true may be special contexts. Here, the speaker really *wants* to take responsibility for p in the Common Ground, but is being challenged. The speaker is thus willing to make the bold move of taking responsibility for p in the assertion of the anchor, but with rising intonation on the tag indicating that the move is contingent on the addressee's response to the tag question. Further work investigating the roles of these non-epistemic modalities on the choice of tag questions or biased questions would be extremely valuable.

In summary, biased questions in negative contexts are most relevant as the speaker indicates their belief of p , but through both the fact that they do not present a Known Answer as an assertion and the fact that the rising intonation signals contingency of acceptance of p on the addressee. Tag questions in negative evidential contexts are less common as in order to suggest that there is a Known Answer in the face of negative evidence, the speaker must be strongly of the opinion that p is, or should be, true. Rising intonation adds contingency to signal that the speaker is aware of the negative evidence and is placing the acceptance of p in the addressee's hands. Of course, tag questions may also be used when the evidence is interpreted differently relative to the addressee's position; as with the neutral contexts, some speakers may interpret identical evidence as more or less negative based on their existing beliefs and culture.

6. Conclusions

In this paper I presented the results of an experiment that tested whether 113 English speakers preferred to produce matrix biased questions or canonical tag questions in both neutral and negative evidential contexts. The results showed that participants strongly preferred tag questions in neutral contexts and biased questions in negative evidential contexts, despite the fact that according to the literature, both are available. However, it was not the case that only one construction was permitted per set of contexts; there was variation across constructions, and also between US and UK English. I posited an analysis for tag questions which builds on Reese & Asher (2006) but with a separate meaning for intonation, as Gunlogson (2008) does. This accounted for the preference of tag questions in neutral contexts, and suggested that tag questions in negative contexts would have specific import beyond simply 'requesting confirmation'. It appears this is true from the examples presented in this research; a full investigation of this would be valuable, and I leave this for future research. I analysed biased questions, which have rising intonation and thus contingency as standard, as true questions with no Known Answer presented; I did not take any position on the semantic import of biased questions, but suggested that while these are preferred in negative evidential contexts, they are also possible in neutral evidential contexts, perhaps for reasons of politeness or due to a difference in interpretation of the evidential context. Again, I leave the full details of this to future research.

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Negation in event semantics with actual and nonactual events

Timothée Bernard

The goal of this work is to provide a formal account of negation in a Davidsonian framework that (i) makes negative events available for the analysis of various constructions that are otherwise problematic (such as negative naked infinitives or adverbial modification) and (ii) exhibits reasonable logical properties. This is done by first distinguishing between actual and non-actual events and then introducing a *Neg* function sending any event-predicate *P* to *the not-*P* event* and obeying a single axiom.

1. Introduction

In event-based semantics (Davidson 1967b), action verbs (e.g., *walk*) have an implicit semantic argument that is interpreted as the event described by the verb, in addition to the traditional ones (e.g., the walker). The principal motivation for this move was its ability to treat adverbial modifications in the same fashion as adjectival ones, namely in a conjunctive way which immediately accounts for inferences such as:

- (1) *Mary left suddenly. ⇒ Mary left.*

Unfortunately, event semantics faces serious problems when dealing with negation, both at the syntax-semantics interface and at the purely semantics level itself. In this article, it is argued that these difficulties originate from the standard analysis of negation (henceforth ‘SAN’) in event semantics, according to which a negative sentence is interpreted as stating the non-existence of any event of some kind (for instance, $\llbracket \text{Mary did not leave} \rrbracket = \neg \exists e. \llbracket \text{Mary leave} \rrbracket(e)$), in contrast with positive sentences which assert the existence of some events.

Rejecting this view, I take negative verbal projections to introduce events, the so-called *negative-events*. While this idea is not new (Higginbotham 1983; Peterson 1997; Przepiórkowski 1999), it has never been fully formalised. The main contribution of this article is thus a formal definition of negative events that (i) are relevant to the analysis of various constructions such as perception reports or adverbial modification and (ii) exhibit reasonable

logical properties.

The text is organised as follows. Section 2 introduces event semantics and (some of) the issues encountered and questions raised when dealing with negation. Then, in Section 3, a couple of relevant alternatives to the SAN are discussed, namely Krifka (1989)'s maximal events and Higginbotham (1983, 2000)'s negative predicates. After that, I will present in Section 4 how a distinction between actual and non-actual events allows for a definition of negative events as the result of applying a *Neg* function to a set of events; the logic of these negative events will also be studied. Then, I will show in Section 5 how this definition can be used in the analysis of constructions that otherwise remained problematic in event semantics, before reviewing the main arguments that have been written against negative events.

2. Event semantics

2.1. What and why

It is usual, in the Montagovian tradition (Montague 1970), to represent the semantic contribution of a verb as a predicate with an arity equal to the number of syntactic arguments of this verb. Hence, the intransitive verb *walk* is represented as a unary predicate $\text{walk} : \langle e, t \rangle$, which allows one to represent the semantics of the sentence (2-a) as the logical formula in (2-b):

- (2) a. Mary was walking.
 b. $\text{walk}(\text{Mary})$

One problem with this analysis regards verbal modification, as in the following sentence:

- (3) Mary was walking at noon.

Montague models a modifier such as *at noon* with a predicate modifier $\text{at_noon} : \langle \langle e, t \rangle, \langle e, t \rangle \rangle$ that turns the predicate $\text{walk} : \langle e, t \rangle$ into another predicate, $\text{at_noon}(\text{walk}) : \langle e, t \rangle$. Sentence (3) can thus be represented as formula (4):

- (4) $\text{at_noon}(\text{walk})(\text{Mary})$

As is, however, this formula does not account for the natural entailment from sentence (3) to sentence (2-a). This can be solved by introducing a meaning postulate relating the interpretation of all entity predicates to their image by *at_noon*:

- (5) $\forall x, P. \text{at_noon}(P)(x) \rightarrow P(x)$

This solution works, but might be seen as inelegant as it relies on the introduction of not only one meaning postulate per such modifier, but much more if one aims at accounting for the logical equivalence of their various combination:

- (6) a. (i) Mary was walking at noon in the park.
 (ii) $\text{in_the_park}(\text{at_noon}(\text{walk}))(\text{Mary})$
 b. (i) Mary was walking in the park at noon.
 (ii) $\text{at_noon}(\text{in_the_park}(\text{walk}))(\text{Mary})$

Another possible way to represent the semantics of sentence (3) requires the introduction of a

new predicate *walk*, with an additional time argument:

$$(7) \quad \llbracket(3)\rrbracket = \text{walk}(\text{Mary}, \text{noon})$$

Unfortunately, this solution is even less economical than the previous one in terms of meaning postulates and predicates.

Alternately, the intuition behind event semantics is that sentence (3) states that there exists some event with two properties: it is a walking by Mary, and it happened at noon. This observation lead Davidson (1967b) to propose that action verb predicates simply have an *implicit event argument* in addition to the ones corresponding to the syntactic arguments of the verb. Now, sentences (2-a) and (3) are represented as:

- $$(8) \quad \begin{aligned} \text{a. } & \llbracket(2\text{-a})\rrbracket = \exists e. \text{walking}(e, \text{Mary}) \\ \text{b. } & \llbracket(3)\rrbracket = \exists e. \text{walking}(e, \text{Mary}) \wedge \text{at_noon}(e) \end{aligned}$$

These representations involve the same $\text{walk} : \langle v, \langle e, t \rangle \rangle$ predicate and account immediately for the entailment from sentence (3) to sentence (2-a) through the logical properties of conjunction, without the need of any meaning postulate. In addition, event semantics naturally scales to any number of verbal modifications, as shown in the following example from Davidson (1967b):

- $$(9) \quad \begin{aligned} \text{a. } & \text{Jones buttered the toast in the bathroom with a knife at midnight.} \\ \text{b. } & \exists e. \text{butter}(e, \text{Jones}, \text{the_toast}) \wedge \text{in_the_bathroom}(e) \wedge \text{with_a_knife}(e) \wedge \text{at_midnight}(e) \end{aligned}$$

It is interesting to note that in event semantics, verbs are treated similarly to nouns and adverbs are treated similarly to adjectives. In particular, it is the same *intersective* logical property that was used to predict that *Mary owns a red bike* entails *Mary owns a bike* (10) that now is also used to predict that sentence (3) entails sentence (2-a).

- $$(10) \quad \begin{aligned} \text{a. } & \exists x. \text{bike}(x) \wedge \text{red}(x) \wedge \text{own}(\text{Mary}, x) \\ \text{b. } & \exists x. \text{bike}(x) \wedge \text{own}(\text{Mary}, x) \end{aligned}$$

Two additional remarks. First, while Davidson conceived events as having a spatial and a temporal extension, his proposal has been subsequently extended to states (such as owning something or being happy; Parsons 1990) and more abstract objects. For instance, because one natural interpretation of *The Titanic sinking rapidly caused great loss of life* is that it was the rapidity of the sinking, more than the sinking itself, that was the cause of the great loss of life, Peterson (1997) introduces a sinking event e and another ‘event’ e' for the rapidity of e ; e' can then be put in causal relation with the semantic object reifying the great loss of life. Second, in the remainder of the text, the *neo-Davidsonian* analysis is followed (Parsons 1990): under this view, verb denotations are one-place predicates over events only (e.g., $\text{walk} : \langle v, t \rangle$) and the usual arguments are related to the event *via* thematic roles (Ag, Th, Exp, etc.):

$$(11) \quad \llbracket\text{Mary was walking}\rrbracket = \exists e. \text{walk}(e) \wedge \text{Ag}(e) = \text{Mary}.$$

2.2. Negation

Accounting for negated sentences in event semantics is notoriously difficult (Champollion 2011; Winter & Zwarts 2011; de Groote & Winter 2014). The standard analysis of negation (SAN) in event semantics takes a negative sentence such as (12-a) to express the *non-existence* of any event of the type described by the corresponding positive sentence, i.e., (2-a):

- (12) a. Mary was not walking.
 b. $\neg \exists e. \text{walk}(e) \wedge \text{Ag}(e) = \text{Mary}$

In such an analysis, the negation scopes over the event quantifier. This feature is of utmost importance, as reversing the two operators ($\exists e. \neg \text{walk}(e) \wedge \text{Ag}(e) = \text{Mary}$) results in the assertion of the existence of an event that is not a walking by Mary — a (quasi-)trivial statement that is not a possible interpretation of the sentence. The position of the event quantifier is not only an issue with respect to negation, but also with quantified NPs, as in (13):

- (13) a. Everybody danced.
 b. $\forall x. \text{someone}(x) \rightarrow \exists e. \text{dance}(e) \wedge \text{Ag}(e) = x$

The problem of compositionally predicting the correct position of the event quantifier has been dubbed the ‘Event Quantification Problem’ (EQP) by Winter & Zwarts (2011). As they explain, the problem can be seen as resulting from a mismatch between the type of verbs, which denote sets of events, and those of logical operators, which are defined in the propositional domain. In short, the puzzle is: if verbs denote sets of events while negation and quantifiers apply to propositions, what are the mechanisms involved in the derivation of negated and quantified sentences (at least, some verbal element must be converted to a logical proposition at some point)? A few kinds of solutions resolve or avoid this mismatch:

1. Redefining the logical operators so that they work with sets of events, as is done by Krifka (1989) who presents a term that does not turn a proposition into its logical negation, but a set of events into a well chosen set of events that is shown to capture some of the aspects of negation.
2. Interpreting verbal projections (i.e., verbal elements, from the verb up to the sentence level) not as sets of events (type $\langle v, t \rangle$), but as generalised quantifiers over events (type $\langle \langle v, t \rangle, t \rangle$). Champollion (2015) shows that then, the meaning of (linguistic) negation and quantifiers can be straightforwardly defined from their usual logical counterpart (i.e., \neg , \forall , etc.) without having to introduce any new notion (as is done by Krifka).
3. Having a clear separation in the grammar between two types of verbal projections, lower ones dealing with sets of events and higher ones dealing with propositions and to which logical operators apply, an *existential closure* term bridging the two (Winter & Zwarts 2011; de Groote & Winter 2014). In this approach, the problem is solved by formalising how the grammar introduces the existential closure at its correct position.

The latter two are elegant options concerning the syntax-semantic interface but do not question the SAN. Yet, this analysis also leads to results that are not entirely satisfying at the semantic level itself. Indeed, many constructions that can be straightforwardly analysed in event

semantics when no negation is involved suddenly pose problem once a negation is present. The remainder of this section reviews a few.

Causal statements In the spirit of Davidson (1967a), sentence (14-a) can be interpreted as stating a causal relation between the tiredness of Mary and her partying, an analysis accurately transcribed in formula (14-b).

- (14) a. Mary is tired because she partied (last night).
b. $\exists e_1. \text{tired}(e_1) \wedge \text{Exp}(e_1) = \text{Mary} \wedge \exists e_2. \text{party}(e_2) \wedge \text{Ag}(e_2) = \text{Mary} \wedge \text{cause}(e_1, e_2)$

However, when the cause or the effect is expressed with a negation, the SAN is such that no corresponding event is available for the causal relation, as illustrated in (15-a). Does this mean that the event-based analysis of causal statements is wrong? Not only was that analysis intuitively very appealing, but it has also been used to model other semantic phenomena such as some pseudoscope effects (Kratzer 1998). So, if it is not altogether wrong, why would it be only valid on the positive cases?

- (15) a. Mary is tired because she did not sleep (well).
b. $\exists e_1. \text{tired}(e_1) \wedge \text{Exp}(e_1) = \text{Mary} \wedge (\neg \exists e_2. \text{sleep}(e_2) \wedge \text{Ag}(e_2) = \text{Mary}) \wedge \text{cause}(e_1, ???)$

Perception reports According to Higginbotham (1983), a *naked infinitive* involved in a perception report existentially quantifies over an event — this event being the object of the report in question. While positive cases lend themselves easily to this idea (16), negative ones resist, at least if the SAN is followed (17).¹

- (16) a. I saw Mary leave.
b. $\exists e_1. \text{leave}(e_1) \wedge \text{Ag}(e_1) = \text{Mary} \wedge \exists e_2. \text{see}(e_2) \wedge \text{Exp}(e_2) = I \wedge \text{Th}(e_2) = e_1$
(17) a. I saw Mary not leave.
b. $(\neg \exists e_1. \text{leave}(e_1) \wedge \text{Ag}(e_1) = \text{Mary}) \wedge \exists e_2. \text{see}(e_2) \wedge \text{Exp}(e_2) = I \wedge \text{Th}(e_2) = ???$

Intersective adverbs Some adverbs such as (*un*)fortunately or (*un*)expectedly enter in negative constructions as well as in constructions without negation (Przepiórkowski 1999). Analysing them as event predicates accounts for the entailment patterns observed in positive constructions but does not seem compatible with the SAN, as illustrated in (18):

- (18) a. (i) Unexpectedly, Mary left. $\Rightarrow \text{Mary left.}$
(ii) $\exists e. \text{unexpected}(e) \wedge \text{leave}(e) \wedge \text{Ag}(e) = \text{Mary} \Rightarrow \exists e. \text{leave}(e) \wedge \text{Ag}(e) = \text{Mary}$
b. (i) Unexpectedly, Mary did not leave. $\Rightarrow \text{Mary did not leave.}$
(ii) $??? \Rightarrow \neg \exists e. \text{leave}(e) \wedge \text{Ag}(e) = \text{Mary}$

¹Not only do the semantics and philosophy literatures mention such negative perception reports (Barwise & Perry 1981; Higginbotham 1983) but Miller (2007) conducted a corpus search that revealed many attested occurrences from wide variety of sources.

For-adverbials One of the advantages of event semantics is that it allows for elegant treatments of duration, tense and aspect (Parsons 1990) through, for instance and among other tools, the introduction of a function τ sending an event to its runtime (when such an object exists).² In particular, *for*-adverbials can be accounted for as in example (19), by specifying the runtime of the event in question:

- (19) a. For two hours, Mary laughed.
 b. $\exists e. \text{laugh}(e) \wedge \text{Ag}(e) = \text{Mary} \wedge 2h(\tau(e))$

For-adverbials are perfectly acceptable with negative sentences as well, which Przepiórkowski (1999) takes as evidence that these sentences — as positive ones do — state the existence of some event too. Sentence (20-a), for example, is natural and is interpreted as stating that there is a two hours long period of time during which Mary did not laugh. Once again, in these cases the SAN does not provide any event the adverbial could specify the runtime of and must resort to more complex techniques (Krifka 1989; Champollion 2015):

- (20) a. For two hours, Mary did not laugh.
 b. $(\neg \exists e. \text{laugh}(e) \wedge \text{Ag}(e) = \text{Mary}) \wedge 2h(\tau(\text{????}))$

These reasons seem sufficient to justify the search for an alternative to the SAN. More precisely, this paper argues that negative sentences introduce events, so that negation can be defined on the event domain, and that these so called ‘negative events’ are available for causal statements, perception reports and adverbial modification. Before turning to this proposal, the next section reviews some relevant work on negation in event semantics.

3. Non-standard negation in event semantics

3.1. Krifka’s fusion-based negation

As mentioned earlier, Krifka (1989) introduces a term for negation that turns a set of events into another set of events, and this move was motivated by the analysis of *for*-adverbials.

In a first step, Krifka defines a ‘maximal event’ as an event that is the sum of all events whose runtime is included in a given period of time.³ This corresponds to a **MXE** predicate satisfying:

- (21) $\forall e. \text{MXE}(e) \leftrightarrow (\exists t. e = \mathbf{FU}_E(\lambda e. \tau(e) \subseteq_T t))$

Because such a maximal event e contains *all* events at t , if, for instance, there is no event of Mary laughing included in e , then it logically follows that Mary did not laugh at any moment during t . Negation of a predicate P can thus be expressed by stating that the maximal event at a given time does not contain any event satisfying P :

- (22) $\llbracket \text{not} \rrbracket_K = \lambda Pe. \text{MXE}(e) \wedge \neg \exists e'. (P(e') \wedge e' \subseteq_E e)$

While Krifka shows that this account of negation correctly predicts the two possible interpreta-

²In this article, tense and aspect are neglected for the sake of clarity.

³Krifka works in a *mereological* setting (Champollion & Krifka 2016), in which an event can be either *atomic* or a *sum* of other events. The symbol **FU_E** used in equation (21) refers to a function that returns the sum of all events satisfying the predicate given as argument, which is an event itself as in such a mereological setting, summation of events is defined as a function from sets of events to events.

tions of sentences such as (23), by having the temporal modifier *for two hours* (whose interpretation mainly amounts to $\lambda Pe. P(e) \wedge \exists h(\tau(e))$) scoping under or over the negation (leading to the paraphrases in (23-a) and (23-b) respectively), it suffers from serious limitations.

- (23) Mary did not laugh for two hours.

- a. There is no period of two hours during which she laughed. ($\neg > \exists$)
- b. There is a certain period of two hours during which she did not laugh. ($\exists > \neg$)

First, as shown in (24), negating twice a telic predicate P leads to unnatural interpretations. If $\llbracket \text{not} \rrbracket_K (\llbracket \text{not} \rrbracket_K P)$ is true of an event e , then for every sub-period of time t' of the runtime of e there exists an event (e'') satisfying P and whose runtime is included in t' ; this wrongly predicts that if yesterday Mary did not *not* reach the top of the mountain, then she reached it at every single hour, and every single minute, etc.

- (24) $\llbracket \text{not} \rrbracket_K (\llbracket \text{not} \rrbracket_K P)$

- a. $= \lambda e. \mathbf{MXE}(e) \wedge \neg \exists e'. (\mathbf{MXE}(e') \wedge \neg \exists e''. (P(e'') \wedge e'' \subseteq_E e') \wedge e' \subseteq_E e))$
- b. $= \lambda e. \mathbf{MXE}(e) \wedge \forall e'. (\mathbf{MXE}(e') \wedge e' \subseteq_E e \rightarrow \exists e''. (P(e'') \wedge e'' \subseteq_E e'))$

More importantly, Krifka's account of negation does not really introduce the kind of negative events suitable for causal statements, perception reports or adverbial modification. A maximal event e is the sum of everything that happened during some period of time t ; e therefore represents that sum and could possibly be used to represent — in negative — the sum of everything that did not happen during t , but it could not be used to represent any single event that did or did not occur during t . If Mary did not laugh yesterday and did not ride her bike during the same time, the same maximal event is invoked in Krifka's account. In particular, if Mary is sad because she did not ride her bike or if John saw her not laugh, it is not the maximal event mentioned that causes Mary's sadness nor that was seen by John.

3.2. Higginbotham's negative naked infinitives

Higginbotham (1983) suggests that the negation in a sentence such as (17-a) (repeated below as (25-a)) cannot simply lexicalise a logical negation (\neg), whatever its scope may be; in particular, (25-a) does not merely mean that I did not see Mary leave, nor that I saw something that did not involve Mary leaving.⁴ Because of the similarity between (25-a) and (25-b), Higginbotham postulates without providing any further precision that in some cases, negation combines with a predicate P to form a ‘not- P ’ event predicate.

- (25) a. I saw Mary not leave.
b. I saw Mary stay.

In later work (Higginbotham 2000), he mentions that negative events would be useful in analysing not only perceptual reports as in (25-a) but also temporal modification as in (23) above, causal statement as in (26-a) and negative noun-phrases as in (26-b).

⁴Indeed, the truth conditions of these candidates are not right. If I was alone at home playing the piano, for instance, then it is true that I did not see Mary leave, but it is false that I saw Mary not leave. Similarly, if, while playing the piano, I saw my cats chasing each other in the leaving room, then it is true that I saw something that did not involve Mary leaving, but it is still false that I saw Mary leave.

- (26) a. I kept the child awake by not turning out the light.
 b. Bill's non-departure

He then precises that the ‘not-*P*’ predicate, resulting from the interaction of negation and *P* and noted \bar{P} , should obey the following axiom:

$$(27) \quad \forall t. (\neg \exists e. (\tau(e) \subseteq_T t \wedge P(e)) \rightarrow (\exists e'. \bar{P}(e') \wedge \tau(e') = t))$$

This axiom means that when there is no event satisfying *P* with a runtime included in *t*, then there is an event satisfying \bar{P} with runtime exactly *t*. Therefore, if I did not turn out the light and if Mary did not laugh, the axiom provides the existence of events that might be suitable for the causal relation in (26-a) and the temporal predicate of (23) respectively. However, the meaning of the negation is not explicitly provided and is only supposed to be able to produce \bar{P} from *P*. Furthermore, because the implication is only left to right (in place of an equivalence), axiom (27) makes the predicate \bar{P} not very informative. Indeed, as is, the existence of a \bar{P} event does not entail anything about the (non-)existence of *P* events. As a result, the Mary-not-leaving event that I saw if sentence (25-a) is true could coexist with an event of Mary leaving, or in other words, I could have seen Mary not leave even though she left (at the same time *t*). We see that in this account, as it stands, negation does not get a satisfying logic. In the remainder of this section, I explain why Higginbotham’s approach has not (and probably cannot) be immediately and satisfyingly supplemented.

As mentioned above, Higginbotham explicitly refers to the similarity between a not-staying and a leaving. *Stay* and *leave* lexicalise a pair of ‘antonymic predicates’; other examples are *eat/fast, forget/remember* or *succeed/fail*. The idea behind Higginbotham’s negation is that it is able to switch from one predicate of the pair to the other.⁵ Following this analysis, the event I saw if sentence (25-a) is true is an *e* such that $\underline{\text{leave}}(e) \wedge \text{Ag}(e) = \text{Mary}$ (or equivalently with *stay* instead of *leave*). Now, a not-leaving by Mary does not entail the non-existence of all leavings altogether, only those by Mary. So strengthening Higginbotham’s axiom to a biconditional would lead to a wrong, overly strong prediction.

Still, one could hope to improve axiom (27) in order to predict that a not-leaving of Mary is incompatible with her leavings. The main difficulty one faces when trying to solve this problem is that the events that are precluded by a \bar{P} event *e* are not characterised only by *P* but also by some other properties of *e*. A non-leaving by agent *x* at time *t* seems to preclude all leavings by *x* with a runtime included in *t*, but for a not-eating, the ‘theme’ (what is not eaten) also has to be taken into account. If, for any *P*, there exists a definite set of dimensions (time, agent, theme, etc.) *D_P* such that a *P* event *e* is logically incompatible with any \bar{P} event *e'* with the dimensions in *D_P* assigned similarly (what is noted below as ‘ $B_P(e) = B_P(e')$ ’), then axiom (28) would be a good start:

$$(28) \quad \forall X. \neg \exists e. P(e) \wedge B_P(e) = X \leftrightarrow \exists e'. \bar{P}(e') \wedge B_P(e') = X$$

However, this formula does not handle the time dimension correctly: a non-leaving by Mary with runtime *t* does not only preclude the leavings by Mary with runtime *equal* to *t*, but all those with runtime *included* in *t*.

In conclusion, while this idea of antonymic predicates is intuitively appealing, it is not clear

⁵Few verbs in English have an antonymic counterpart, but this simply means that the corresponding antonymic predicates are not lexicalised, and only expressible through a negated verb.

how it could be properly formalised. However, the next section presents a proposal that is relatively close in spirit to the work of Higginbotham; only, instead of interpreting negation as turning a predicate P into the not- P predicate \bar{P} , it will be interpreted as turning P into the not- P event $\text{Neg}(P)$. This will allow one to consider a stronger and more informative axiom for negation, yielding a simple and coherent logic.

4. Defining negative events

4.1. Actuality of events

So far in this article, all the events considered were *actual*, in the sense that the *existence* of an event in the model (i.e., its inclusion in the event domain of the model) represented the *occurrence* of a corresponding event in the world described by the model. However, in order to account for negation, I propose to consider models including non-actual events, that is, entities representing events that have not and will never occur in the world.

Actuality and non-actuality of events are not particularly new concepts: in event semantics with possible worlds, one needs a way to distinguish between the events occurring in such or such worlds. For instance, if each possible world has its own event domain, *Maybe it is raining* can be translated as stating the existence of a raining event in some but not all accessible doxastic worlds. In such a setting, actuality in a given world can be seen as membership in the event-domain of this world. Because the analysis argued for in this paper does not require possible world semantics, I will simply postulate the existence of an *actual* predicate (which could be a primitive or, alternatively, be defined in terms of possible worlds semantics, for instance) and consider only one event domain.

With non-actual events in our models, sentence (29-a) cannot be taken as only stating the existence of a raining event, because this event could be non-actual; instead, it states the existence of an *actual* raining event.

- (29) a. It is raining.
 b. $\exists e. \text{actual}(e) \wedge \text{rain}(e)$

Similarly, sentence (30-a) does not necessarily state the non-existence of *all* raining events, but only of actual ones.

- (30) a. It is not raining.
 b. $\neg \exists e. \text{actual}(e) \wedge \text{rain}(e)$

The idea behind non-actual events is that for two predicates P and Q , if no P nor any Q events occurred, the interpretations of P and Q in the model can still be non-empty (because of possible non-actual events), and thus different; while in a semantics without non-actual events, both interpretations would be the empty set, which mean the two predicates would be indistinguishable.⁶

⁶In other words, non-actual events are a way to fight a form of extensionality.

4.2. The Neg function

At the core of the present proposal is a function $\text{Neg} : \langle\langle v, t \rangle, v \rangle$, sending a set of events P to some event $\text{Neg}(P)$, intuitively representing *the not- P event*.⁷ The interpretation of $\text{Neg}(P)$ events is governed by the following axiom:⁸

$$(31) \quad \text{Axiom of negation: } \forall P. \text{actual}(\text{Neg}(P)) \Leftrightarrow \neg \exists e. \text{actual}(e) \wedge P(e)$$

The *Neg* function can serve as a basis to define a negation working not on the propositional domain, but on sets of events, thus resolving (for negation) the mismatch at the source of the EQP.⁹ Indeed, sentence (30-a) (repeated below as (32-a)) can now be translated as (32-b). Because of the axiom of negation, this formula is logically equivalent to the one obtained with the SAN. What is new, however, is the availability of the not-rain event e , which, in contrast to the maximal events used by Krifka (1989), is specific to the negated predicate.

- (32) a. It is not raining.
- b. $\exists e. \text{actual}(e) \wedge e = \text{Neg}(\lambda e'. \text{rain}(e))$

4.3. Logic

In this section, I review a few theorems stemming from the axiom of negation defined above.

Law of excluded middle and law of non-contradiction For any event predicate P , either there exists an actual P -event, or $\text{Neg}(P)$ is actual, and not both:

$$(33) \quad (\exists e. \text{actual}(e) \wedge P(e)) \oplus \text{actual}(\text{Neg}(P))$$

(using exclusive disjunction \oplus). With, for instance, P referring to the set of (past) leavings by Mary, this corresponds to sentence (34-a-i) and its negation (34-b-i) being contradictory:

- (34) a. (i) Mary left.
- (ii) $\exists e. \text{actual}(e) \wedge \text{leave}(e) \wedge \text{Ag}(e) = \text{Mary}$
- b. (i) Mary did not leave.
- (ii) $\text{actual}(\text{Neg}(\lambda e. \text{leave}(e) \wedge \text{Ag}(e) = \text{Mary}))$

Theorem (33) is immediate from the axiom of negation.

Double negation With truth of an event predicate P being the existence of an actual event satisfying P , double negation always preserves truth:

⁷The interpretation of *Neg* in a model with event domain D_v and truth domain D_t is a function from the set $D_t^{D_v}$ to the much smaller (as soon as at least two truth values are considered) D_v . Hence, this function is either non-injective or partial. The latter view seems preferred, as linguistic utterances arguably only refer to a small number of the $|D_t|^{D_v}$ possible sets of events. Indeed, I take the set of possible sentences to be countably infinite while if the set of all events is also countably infinite, then the set of all sets of events is not countable.

⁸In case *Neg* is a partial function (see note 7), this axiom is restricted to the P s such that $\text{Neg}(P)$ is defined.

⁹Describing a syntax-semantics interface with negative events is out of the scope of the present paper — it is a topic investigated by Bernard (2017); Bernard & Champollion (forthcoming) —; nevertheless, here is a possible simple lexical entry for sentential negation: $\llbracket \text{not} \rrbracket \equiv \lambda Pe. e = \text{Neg}(P)$.

$$(35) \quad \text{actual}(\text{Neg}(\lambda e. e = \text{Neg}(\lambda e'. P(e')))) \Leftrightarrow \exists e. P(e) \wedge \text{actual}(e)$$

For instance, sentence (34-a-i) above and its double negation (36-a) are logically equivalent.

- (36) a. Mary did not *not* leave.
- b. $\text{actual}(\text{Neg}(\lambda e. e = \text{Neg}(\lambda e'. \text{leave}(e') \wedge \text{Ag}(e') = \text{Mary})))$

A proof of theorem (35) is given here:

$$\begin{aligned} & \text{actual}(\text{Neg}(\lambda e. e = \text{Neg}(\lambda e'. P(e')))) \\ & \Leftrightarrow \forall e. e = \text{Neg}(\lambda e'. P(e')) \rightarrow \neg \text{actual}(e) \\ & \Leftrightarrow \neg \text{actual}(\text{Neg}(\lambda e'. P(e'))) \\ & \Leftrightarrow \exists e'. P(e') \wedge \text{actual}(e') \end{aligned}$$

Downward entailment For any two event predicates P and Q , the negation of one of them entails the negation of their conjunction:

$$(37) \quad \text{actual}(\text{Neg}(\lambda e. P(e))) \Rightarrow \text{actual}(\text{Neg}(\lambda e. P(e) \wedge Q(e)))$$

For instance, sentence (34-b-i) above entails sentence (38-a).

- (38) a. Mary did not leave at 10 PM.
- b. $\text{actual}(\text{Neg}(\lambda e. \text{leave}(e) \wedge \text{Ag}(e) = \text{Mary} \wedge 10_PM(\tau(e))))$

A proof of theorem (37) is given here:

$$\begin{aligned} & \text{actual}(\text{Neg}(\lambda e. P(e))) \\ & \Rightarrow \forall e. P(e) \rightarrow \neg \text{actual}(e) \\ & \Rightarrow \forall e. P(e) \wedge Q(e) \rightarrow \neg \text{actual}(e) \\ & \Rightarrow \text{actual}(\text{Neg}(\lambda e. P(e) \wedge Q(e))) \end{aligned}$$

5. Discussion

5.1. Treating positive and negative constructions homogeneously

Causal statements With the Neg function, one is able to access negative events that fit naturally in the analysis of causal statements. I propose formula (39-b) as a logical representation of sentence (15-a) (repeated below as (39-a)). The use of negation in the description of the cause is straightforwardly reflected as a use of Neg in the construction of the event representing that cause:

- (39) a. Mary is tired because she did not sleep (well).
- b. $\exists e_1. \text{actual}(e_1) \wedge \text{tired}(e_1) \wedge \text{Exp}(e_1) = \text{Mary} \wedge \exists e_2. \text{actual}(e_2) \wedge e_2 = \text{Neg}(\lambda e. \text{sleep}(e) \wedge \text{Ag}(e) = \text{Mary}) \wedge \text{cause}(e_1, e_2)$

The analysis is similar for the example used by Higginbotham (2000):

- (40) a. I kept the child awake by not turning out the light.

- b. $\exists e_1. \text{actual}(e_1) \wedge \text{keep_awake}(e_1) \wedge \text{Ag}(e_1) = I \wedge \text{Th}(e_1) = \text{the_child} \wedge \exists e_2. \text{actual}(e_2) \wedge \text{Neg}(\lambda e. \text{turn_out}(e)) \wedge \text{Ag}(e) = I \wedge \text{Th}(e) = \text{the_light} \wedge \text{cause}(e_1, e_2)$

Perception reports In the same vein — if one allows these negative events to be observed by individuals — a perception report with a negated naked infinitive such as (17-a) (repeated below as (41-a)) can be analysed in a way similar to one not involving negation, as proposed by Higginbotham (1983):

- (41) a. I saw Mary not leave.
b. $\exists e_1. \text{actual}(e_1) \wedge e_1 = \text{Neg}(\lambda e. \text{leave}(e)) \wedge \text{Ag}(e) = \text{Mary} \wedge \exists e_2. \text{actual}(e_2) \wedge \text{see}(e_2) \wedge \text{Ag}(e_2) = I \wedge \text{Th}(e_2) = e_1$

Intersective adverbs Thanks to *Neg*, cases of intersective adverbs as in sentence (18-b-i) (repeated below as (42-a)) do not pose more problems with VP negation than in a construction without negation:

- (42) a. Unexpectedly, Mary did not leave. \Rightarrow Mary did not leave.
b. $\exists e. \text{actual}(e) \wedge \text{unexpected}(e) \wedge e = \text{Neg}(\lambda e'. \text{leave}(e')) \wedge \text{Ag}(e') = \text{Mary}$
 $\Rightarrow \exists e. \text{actual}(e) \wedge e = \text{Neg}(\lambda e'. \text{leave}(e')) \wedge \text{Ag}(e') = \text{Mary}$

For-adverbials Concerning the analysis of *for*-adverbials, the current proposal and the SAN face similar difficulties. Even if *Mary did not laugh* in sentence (20-a) (repeated below as (43)) introduced an event *e* equal to $\text{Neg}(\lambda e'. \text{laugh}(\text{Mary}))$, *e* would not be fit for temporal modification. Indeed, such $\text{Neg}(\lambda e'. \text{laugh}(\text{Mary}))$ is unique and whatever its runtime may be, its actuality would entail the non-actuality of all laughing events by Mary, independently of their runtime.

- (43) For two hours, Mary did not laugh.

A intuitive direction would be to suppose that *for two hours* is able to inject a time restriction inside the scope of *Neg*, in order to generate a formula akin to:

- (44) $\exists t. \mathcal{D}h(t) \wedge \exists e. \text{actual}(e) \wedge e = \text{Neg}(\lambda e'. \text{laugh}(e')) \wedge \text{Ag}(e') = \text{Mary} \wedge \tau(e') \subseteq t$

This formula gets the correct semantics. Unfortunately, it is doubtful that one can compositionally derive at the same time the correct formulas for the negative cases, for which the time restriction is of the form ‘ $\tau(e') \subseteq t$ ’ (‘there is no *P*-event with runtime *included* in *t*’), and for the positive cases, for which the time restriction is of the form ‘ $\tau(e) = t$ ’ (‘there is a *P* event with runtime *equal* to *t*’):

- (45) a. For two hours, Mary laughed.
b. $\exists t. \mathcal{D}h(t) \wedge \exists e. \text{actual}(e) \wedge \text{laugh}(e) \wedge \text{Ag}(e) = \text{Mary} \wedge \tau(e) = t$

However, only a couple of minor changes are required in order to interpret *for*-adverbials scoping over a negation as directly modifying the corresponding negative event, as advocated by Przepiórkowski (1999). The first change consists in defining the runtime of negative events, for instance with:

$$(46) \quad \tau(\text{Neg}(P)) = \bigcup_{\substack{e \text{ s.t. } P(e)}} \tau(e) \text{ (when } \tau \text{ is defined for all } e \text{ in } P)$$

The second one consists in introducing a mechanism using this runtime to coherently constrain which of the events are negated (i.e., precluded by the negative event). A possible solution is to define a lexical entry for negation that does not directly negate the predicate given as argument, but only a subset determined by the runtime of the negative event itself (e.g., $\llbracket \text{not} \rrbracket \equiv \lambda P e. e = \text{Neg}(\lambda e'. P(e') \wedge \tau(e')) \subseteq \tau(e)$) using a kind of ‘fixed point’ notation, or equivalently with an existentially quantified implicit time variable: $\llbracket \text{not} \rrbracket \equiv \lambda P e. \exists t. e = \text{Neg}(\lambda e'. P(e') \wedge \tau(e') \subseteq t)$). Then, sentence (43) can be translated as:

$$(47) \quad \exists e. \text{actual}(e) \wedge \exists h(\tau(e)) \wedge e = \text{Neg}(\lambda e'. \text{laugh}(e') \wedge \text{Ag}(e')) = \text{Mary} \wedge \tau(e') \subseteq \tau(e))$$

which, as expected, is true iff there exists a two hours period during which no laughing by Mary occurred.¹⁰ Please remark that these modifications do not interfere with the other analyses presented in this article.

5.2. Negative views on negative events

While the existence and availability of negative events have been argued for in the literature (Higginbotham 1983, 2000; de Swart 1996; Peterson 1997; de Swart & Molendijk 1999; Przepiórkowski 1999, among others) many arguments against them have been made.

According to Asher (1993, 2000), a negative NP such as *the nonarrival of the train* does not denote an event, as it is not compatible with *perfect nominal containers* (Vendler 1967):¹¹

$$(48) \quad * \text{The nonarrival of the train occurred at 10 A.M. (lasted many hours; took place at the station in Victoria).}$$

Here, the terminology seems crucial. The word *events* is sometimes used as a cover term for all the entities of a logical language (and their model-theoretic counterparts) that serve as implicit arguments of verbs, extending the Davidsonian analysis beyond action verbs — possibly to the whole set of verbs and sometimes even to other kinds of predicates (see for instance Peterson 1997). This use of the term gives emphasis to the logical representations of utterances, in which all these entities play the same role — hence a unique term —, but is not incompatible with further sorting of the event domain into ‘proper events’, states, etc., according to other considerations. On the opposite side, Asher (1993, 2000) aims at defining a *natural language metaphysics* and thus reserves ‘event’ for discourse entities of a specific kind.¹²

While Asher denies the existence of negative *events*, he takes *Mary didn’t swim* and *Mary*

¹⁰Here, the time restriction is handled explicitly in the logical language. The burden could be put on the semantic interpretation instead, using a function $\text{Neg}' : \langle \langle v, t \rangle, \langle v, t \rangle \rangle$ sending a set of events to another set of events along with an alternative axiom of negation:

(i) $\exists e. \text{actual}(e) \wedge \text{Neg}'(P)(e) \wedge \tau(e) = t \Leftrightarrow \neg \exists e'. \text{actual}(e') \wedge P(e') \wedge \tau(e') \subseteq t$

¹¹Following Higginbotham (2000) and according to a principle of economy, I believe that the same tools used to express the semantics of negative naked infinitives could be used to express the one of negative NPs. For instance, *the nonarrival of the train* could be expressed with Neg as $\text{Neg}(\lambda e. \llbracket \text{arrival of the train} \rrbracket(e))$.

¹²The other kinds of discourse entities studied by Asher are states, propositions and facts.

wasn't at home in the following sentences to refer to negative *states*:

- (49) a. After Mary didn't swim, she went home.
 b. While Mary wasn't at home, John cleaned up the house.

Events and states are generally grouped together as ‘eventualities’, and Przepiórkowski (1999) mainly uses that term (even though, following de Swart & Molendijk 1999, he claims that at least some negated clauses refer to events, not states). In the present article, ‘event’ has been used in the technical/logical sense, which means that no claim has been made concerning whether the images of *Neg* are truly events, states, or some other kinds of discourse entities. These distinctions are not relevant for the examples discussed here; rather, what is relevant is whether one can obtain semantic representations with satisfying entailment properties for a wide array of sentences by postulating that negation yields first-order entities (in the logical sense) in an event-based semantics.

Some authors, however, argue against any kind of negative eventualities, and instead, for what I will call the ‘positive events under negative descriptions’ view (henceforth ‘POUND view’). For instance, Miller (2007) claims that negation in perception reports amounts to a usual boolean negation and that *John saw Mary not leave* gets the same semantics as *John saw some eventuality that was not Mary leaving*; in other words, ‘the sentence turns out to be true whatever John saw as long as it was not a case of Mary leaving’ (p.299). The reasoning is that if *John saw Mary not leave* is true, then it seems the case that John saw something, and that this something might have been Mary drinking a glass of Chardonnay in the living room, eating some Camembert in the kitchen, etc., in short, any kind of usual eventuality that turns out to be described negatively. A similar analysis is defended by Varzi (2006).

The first issue with this view is that it does not readily explain why if John saw Mary not leave (and John does not suffer from hallucination), then Mary did not leave. Some pragmatic process can be invoked, but this idea is formalised neither by Miller (2007) nor Varzi (2006), while the same effect is directly achieved in the semantics presented here.

Varzi (2006) takes the POUND view quite far and claims, for the same reasons, that there is no failure nor omission eventuality. A consequence of this is that in case Al did not even try to turn off the gas, ‘strictly speaking [sentence (50)] is false, or at least not true. It is not true because the subject term, “Al’s failure to turn off the gas” (unlike the term “Beth’s turning on the light”), has no referent’ (p.144). I believe this is a pretty bad consequence, all the more that this line of reasoning can be applied similarly to forgetting, fasting, or even staying eventualities. Obviously, this might be fixed with the help of pragmatics, but I am sceptical about the benefit of trading a coherent and working semantics for an unstable system hoping for repair.

- (50) Al's failure to turn off the gas caused an explosion.

The POUND view seems to originate from the idea that it is hard to imagine what a truly negative eventuality is.¹³ Such argumentation is dubious. First, the fact that most people fail to mentally picture the nature of photons (behaving like particles in some conditions, like waves in others, but more generally like an excitation of the photon field) does not mean that there is no such thing as a photon. More importantly, as convincingly argued for instance by Asher (1993), natural language metaphysics does not need to equal ‘true’ metaphysics. In other words, there is no reason to postulate an isomorphism between the entities used to represent the meaning of

¹³This argument is also given by Asher (1993, 2000) against negative events specifically.

linguistic utterances and what is taken to exist in the world. Maybe there is no Mary-not-leave eventuality in the world, but people speak as if it was so, and as long as these entities do not introduce any inconsistency, there is no reason to refrain from using negative eventualities in semantic modelling.

Nevertheless, it is interesting to note that the POUND view can be accommodated in a purely semantic fashion by using a $\text{Neg}'' : \langle\langle v, t \rangle, \langle v, t \rangle\rangle$ function sending a set of eventualities (for instance the leavings by Mary) to the sets of its precluding eventualities (i.e., all eventualities the occurrence of which precludes the occurrences of all of her leavings, such as Mary drinking wine in the living room or eating cheese in the kitchen), along with the following axiom of negation:

$$(51) \quad \exists e. \text{actual}(e) \wedge \text{Neg}''(P, e) \Leftrightarrow \neg \exists e. \text{actual}(e) \wedge P(e)$$

In any case, the same way as I believe in the relevance of failing, forgetting, fasting, or omission eventualities for semantics, I believe that the sort of abstract negative eventualities handled with Neg are relevant too.

6. Conclusion

In this article, several problems faced by event semantics have been discussed. I have argued that the culprit was the standard analysis of negation, according to which a negated sentence expresses the non-existence of events satisfying a given predicate, instead of the existence of some event — as for a positive one.

After having reviewed a couple of alternatives, I have given a formal definition of negative event(ualtie)s. At the core of this definition lies the function $\text{Neg} : \langle\langle v, t \rangle, v \rangle$, that sends a set of events P to what is interpreted as the not- P event.

I have shown that the logic induced by the axiom of negation in (31) makes Neg suitable to express the semantics of natural language negation. In particular, we have seen how the negative events thus defined make it possible to analyse perception reports, causal statements, *for*-adverbials and other cases of adverbial modification homogeneously, independently of the presence of a negation in their argument(s). The solution proposed only adds a little complexity to the logical language and model, but simplifies greatly the analysis of negative constructions in a fashion that preserves (and extends in coverage) the inferential properties of event semantics that made it appealing in the first place.

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Reflexives and participants: a natural class

Louise Raynaud

This paper investigates restrictions on the occurrence of reflexive anaphors and 1st and 2nd person pronouns in double object constructions in French and in Swahili. It argues that 1st and 2nd person pronouns and reflexives form a natural class, characterized by its contextual dependency, formalized as an unvalued semantico-syntactic index feature [ID]. PCC effects and special licensing conditions arise from the need of such elements to get their reference valued in syntax via Agree.

1. Introduction

This paper looks into parallel restrictions on the occurrence of reflexive anaphors and 1st and 2nd person pronouns in double object constructions in French and in Swahili. Constraints on the distribution of 1st and 2nd person weak pronouns in such environments are known as the Person-Case Constraint (henceforth PCC), also known as the *me-lui* Constraint (Bonet 1991). The PCC states that in a ditransitive, when both objects are clitics (as is the case in French) or agreement markers (as will be exemplified further below with Swahili in section 2.2), the direct object cannot be 1st or 2nd person. In other words, in the presence of an indirect object (IO), the direct object (DO) can only be 3rd person, as (1) illustrates.

- (1) Ils le/*me/*te lui présentent.
3PL.NOM 3SG/1SG/2SG.ACC 3SG.DAT introduce.3PL
'They introduce him/me/you to him/her.' French

Such person restrictions have been attributed to the need of participants (1st and 2nd person) to be specially licensed, and in particular to a requirement of [PERSON] or [PARTICIPANT] φ -features, as captured for instance by the Person Licensing Condition (PLC) (Béjar & Rezac 2003; Anagnostopoulou 2003, 2005; Nevins 2007; Harbour 2007; Preminger to appear).

- (2) *Person Licensing Condition (PLC)*: An interpretable 1/2 feature must be licensed by entering into an Agree relation with a functional category. (Béjar & Rezac 2003:53)

Interestingly, in French, the 3rd person reflexive clitic *se* patterns with 1st/2nd person clitics for PCC effects, thus also banning the combination of an indirect object and a reflexive direct object in a clitic cluster.

- (3) *Il **se** **lui** présente.
 3SG.NOM 3REFL.ACC 3SG.DAT introduce.3SG
 'He introduces himself to him/her.'

French is not the only language in which a reflexive weak element is subject to the PCC. Swahili, a Bantu language widely spoken in eastern Africa, has a special form of agreement for reflexives, dubbed anaphoric agreement (Woolford 1999), also found in other languages such as Southern Tiwa (Rosen 1990) or Chichewa (Baker 2008). This reflexive agreement morpheme is conventionally glossed RFM, for *reflexive marker*, as opposed to OM (*object marker*) in the Bantuist literature, a convention that I will follow throughout this paper.

- (4) a. Ahmed a- na- **m/*ji-** penda **Halima**.
 1Ahmed SM1- PRES- OM1/*RFM- love 1Halima
 'Ahmed loves Halima.' Swahili
 b. Ahmed a- na- **ji/*m-** penda **(mwenyewe)**.
 1Ahmed SM1- PRES- RFM/*OM1- love (himself)
 'Ahmed loves himself.' (Vitale 1981:137 in Woolford 1999:264)

As will be made explicit in section 3.2, the anaphoric agreement morpheme *-ji-* is subject to the PCC in the same way than 1st/2nd person object agreement markers. 1st and 2nd person pronouns and reflexives thus seem to form a natural class when it comes to PCC effects, as evidenced by the paradigms below, in which the grey boxes designate all categories subject to this constraint. 1st and 2nd person pronouns and reflexives must then have something in common, to the exclusion of other 3rd person elements, that accounts for their symmetrical restrictions.

(5) *Direct object clitics in French*

	Pronoun	Reflexive
1SG	me	
2SG	te	
3SG	le/la	se
1PL	nous	
2PL	vous	
3PL	les	se

(6) *Object agreement markers in Swahili*

	Pronoun	Reflexive
1SG	-ni-	-ji-
2SG	-ku-	-ji-
3SG	-m(u)-	-ji-
1PL	-tu-	-ji-
2PL	-mu-	-ji-
3PL	-wa-	-ji-

The objectives of this paper are to revisit the French data, already reported in some of the literature on the PCC, and to introduce new data from Swahili showing that reflexives in at least one other non-Indo-European language are also subject to PCC effects (sections 2 and 3). Anaphoric agreement will be given special attention, and it will be shown that this instance of agreement cannot be analysed in terms of φ -features. In section 4, I propose that it calls instead

for a semantico-syntactic type of feature, namely, index or [ID]-features (Adger & Ramchand 2005; Hicks 2009; Arregi & Hanink 2018; Sundaresan to appear) to be involved in anaphoric agreement and Binding at large. Section 5 argues that the similar behavior of 1st/2nd person and reflexives arises from their inherent referential deficiency, i.e. their need to get their reference valued in syntax by a functional head or another argument. I will propose a syntactic implementation of this in terms of referential [ID] features: reflexives and 1st/2nd person pronouns are born with an unvalued [ID:_] feature which needs to get valued against an antecedent or a syntactic representation of Speech Act Participants (SAP) respectively. The PCC follows from the fact that indirect objects in double object constructions act as interveners and prevent such valuation. Section 6 concludes and presents the empirical predictions and broader theoretical consequences of this account.

2. The Person-Case Constraint and Person Licensing

2.1. French clitics

The Person-Case Constraint (PCC) states, in its strong variant, that in a ditransitive, when both internal arguments are realized as phonologically weak elements, the direct object must be 3rd person.¹

- (7) *The PCC (strong version): if IO, then DO 3rd person*
 In a combination of a weak direct object and a weak indirect object [clitic, agreement marker or weak pronoun], the direct object has to be 3rd person.

(after Bonet 1991:182)

This is the case in French, which in clitic clusters bans 1st/2nd direct objects in the presence of an indirect object (of any person value), as shown in (8b) and (8d). On the other hand, 3rd person direct objects are always licit in such clitic combinations, as (8a) and (8c) illustrate. Note that the relative surface order of clitics varies in French and is not tied to their grammatical role or feature specification. While the reasons for this are unclear, the ordering of clitics in French does not seem to bear on the person restrictions just observed (unlike in Slovenian for instance, as discussed in Stegovec to appear). The French pattern is summed up in table (9).²

- | | | | |
|-----|----|---|----------------|
| (8) | a. | Ils le lui présentent.
3PL.NOM 3SG.ACC 3SG.DAT introduce.3PL
‘They introduce him to him/her.’ | 3 IO > 3 DO |
| | b. | *Ils me/te lui présentent.
3PL.NOM 1SG/2SG.ACC 3SG.DAT introduce.3PL
Int: ‘They introduce me/you to him/her.’ | *3 IO > 1/2 DO |

¹Other variants include the Weak PCC (Bonet 1991; Anagnostopoulou 2003), the Super-Strong PCC (Haspelmath 2004), the *Me*-First PCC (Nevins 2007) or the Reverse PCC (Stegovec 2015).

²The French data in this paper, unless reported otherwise, comes from the native speaker intuitions of the author. It must be stressed that the patterns reported here have been frequently reported in the literature, see for instance Kayne (1975, 2000); Bonet (1991); Anagnostopoulou (2005).

- c. Ils **me/te** **le** présentent.
 3PL.NOM 1SG/2SG.DAT 3SG.ACC introduce.3PL
 ‘They introduce him to me/you.’ 1/2 IO > 3 DO
- d. *Ils **me/te** **te/me** présentent.
 3PL.NOM 1SG/2SG.ACC 2SG/1SG.DAT introduce.3PL
 Int: ‘They introduce me/you to you/me.’ *1/2 IO > 1/2 DO

(9) *PCC effects with 1st/2nd person clitics in French*

IO	DO	French
3	3	✓
3	1/2	✗
1/2	3	✓
1/2	1/2	✗

2.2. Swahili agreement markers

The same pattern obtains in the Bantu language Swahili.³ I start by providing some background information on the agreement system of the language, before showing that 1st/2nd person agreement markers are subject to the PCC, as reported in Riedel (2009) and confirmed by consultants.

Swahili has object markers (OMs) agreeing with objects in person, number and noun class. The status of object marking in Swahili and other Bantu languages (as of Bresnan & Mchombo (1987) for Chichewa) has been hotly debated and has been analyzed either as full-fledged verbal agreement or as pronominal cliticization or incorporation. In this paper, I will follow Riedel (2009) and references therein and treat Swahili OM as agreement markers.⁴ OMs are obligatory with (i) 1st/2nd person pronouns (often dropped themselves), exemplified by (10), (ii) proper names, humans and animates, roughly subsumed by class 1/2, exemplified by (11), and (iii) when the object is dropped.

- (10) A- li- *(**ku**)- ona (wewe). (11) A- li- *(**mu**)- ona Tom.
 SM1- PST- OM2SG- see you SM1- PST- OM1- see 1Tom
 ‘He saw you.’ ‘He saw him (Tom).’

Otherwise, OMs are optional, as is the case for instance with an inanimate, class 3 object like *mti* ‘tree’.

- (12) A- li- (**u**)- ona mti.
 SM1- PST- OM3- see 3tree
 ‘He saw the tree.’

³The Swahili data, when not indicated otherwise, comes from original data collection undertaken by the author in 2017-2018. The data was collected in Brussels (Belgium) and Göttingen (Germany) with 3 native speakers of Swahili from different regions (the North Kivu region of the Democratic Republic of Congo and the Kilimanjaro region of Tanzania).

⁴Note that analyzing OMs as agreement markers or clitics does not affect the analysis, as PCC effects obtain with agreement markers and clitics alike, and clitics can be analysed as probes (see Van der Wal 2015).

Swahili allows only one object marker (OM) to be expressed in ditransitives. Two OMs cannot co-occur, as (13a) illustrates. This indicates that there is only one slot for object agreement. In ditransitives, this slot is occupied by an OM indexing the indirect object (13b), while an OM indexing of the DO is ungrammatical (13c).⁵ This is presumably due the fact that the IO is structurally closer to the agreeing head than the DO.

- (13) a. *Ni- li- **ki-** m- nunulia **mwanangu** kitabu.
SM1SG- PST- OM7- OM1- buy.APPL 1child.POSS.1SG 7book
Int: 'I bought it/something for my child.' (Riedel 2009:88)

b. Ni- li- **m-** nunulia **mwanangu** kitabu.
SM1SG- PST- OM1- buy.APPL 1child.POSS.1SG 7book
'I bought the book for my child.'

c. *Ni- li- **ki-** nunulia Maya **kitabu.**
SM1SG- PST- OM7- buy.APPL 1Maya 7book
Int: 'I bought the book for Maya.'

As a result of there being only one agreeing slot, most direct objects that would require OM in simple transitive clauses (e.g. direct objects that refer to humans and are class 1/2) do not require OM if they appear as the DO of a ditransitive. For instance, the class 1 object *Maya* triggers obligatory agreement when it is the DO of a simple transitive clause as in (14a), but is no longer marked when it is the DO of a ditransitive as in (14b).

- (14) a. A- li- *(mu)- ona **Maya**.
 SM1- PST- OM1- see 1Maya
 ‘He saw Maya.’

b. U- li- **wa-** onyesha **watoto** Maya.
 SM2SG- PST- OM2- show 2children 1Maya
 ‘You showed Maya to the children.’

However, 1st/2nd person DOs pattern differently in this type of configuration: if the DO of a ditransitive is 1st/2nd person, like *wewe* ‘you’ in (15), it cannot be left unmarked to the benefit of the IO, unlike 3rd person DOs like *Maya* above.

Furthermore, in order to express this meaning grammatically, it is not enough to just mark the 1st/2nd DO on the verb. Indeed, if a 1st/2nd person object is marked on the verb in the presence of a 3rd person overt object, the 1st/2nd person agreement cannot be interpreted to refer to the DO. It can only be interpreted as referring to the IO.

⁵Marking of the DO is ungrammatical for Riedel (2009:80) but accepted by some of my consultants. In this particular set of sentences, the IO being human (triggering obligatory OM) and the DO inanimate (optional OM) might be a confounding factor. More research is thus needed to establish the availability of agreement with the DO in ditransitives.

- (16) Ni- li- **ku-** onyesha Maya.
 SM1SG- PST- OM2SG- show 1Maya
 ✓ 'I showed Maya to you.' 1/2 IO > 3 DO
 *'I showed you to Maya.' *3 IO > 1/2 DO

The latter meaning can be expressed by introducing the IO as a PP, which no longer counts as an intervener, as it is no longer introduced by the verb itself, but by a lower preposition, allowing the DO to agree with the verb freely.

- (17) Ni- li- **ku-** onyesha kwa Maya.
 SM1SG- PST- OM2SG- show PREP 1Maya
 'I showed you to Maya.'

Note the contrast with combinations of two 3rd persons, where the two readings are available.

- (18) Adam a- li- **mu-** onyesha Maya.
 1Adam SM1- PST- OM1- show 1Maya
 ✓ 'Adam showed **Maya** to him/somebody.' (Maya = DO), 3 IO > 3 DO
 ✓ 'Adam showed him/somebody **to Maya**.' (Maya = IO), 3 IO > 3 DO

This is a clear instantiation of the PCC: if there is an IO, then the DO must be 3rd person. It seems that 1st/2nd person direct objects *must* Agree with the verb but this agreement is blocked in the presence of a 3rd person indirect object. This pattern, summarized in table (21), mirrors the one already observed for French and described by the PCC. Riedel (2009) reports that Swahili, unlike French, is only subject to the weak version of the PCC as defined in (19).

(19) *The PCC (weak version)*

In a combination of a weak direct object and a weak indirect object, if there is a third person indirect object, then the direct object should also be third person.

(after Bonet 1991:182)

Swahili indeed seems to disallow *3 IO > 1/2 DO combinations as shown by (15) and (16) above, but allows combinations of two 1st or 2nd person objects 1/2 IO > 1/2 DO, as (20) illustrates. (21) sums up the PCC pattern observed in Swahili.

- (20) A- li- **ku-** onyesha mimi.
 SM1- PST- OM2SG- show me.
 'He showed me to you.' (Riedel 2009:152)
- (21) *PCC effects with 1st/2nd agreement markers in Swahili*

IO	DO	Swahili
3	3	✓
3	1/2	✗
1/2	3	✓
1/2	1/2	✓

For the purposes of this paper, I will only consider cases of intervention by a 3rd person indirect objects and propose a unified analysis for these patterns in French and Swahili. The account

presented here makes no particular predictions with regard to the parametrization of various versions of the PCC. Nevertheless, this issue should be examined in further research as an extension of the present proposal.

2.3. The standard hypothesis: participant features are responsible for the PCC

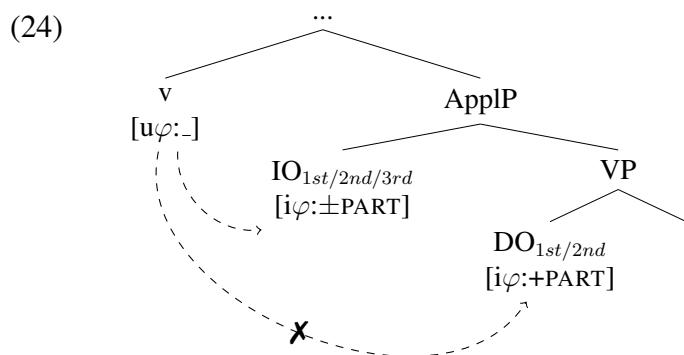
In order to account for these restrictions on 1st/2nd person, several syntactic explanations of the PCC have been proposed. A prominent trend in the literature relies on the idea that the Person-Case Constraint arises in a one probe-two goals configuration, where two arguments, the direct object and the indirect object, stand in an Agree relation with one and the same agreeing head (like little *v*) (Béjar & Rezac 2003; Anagnostopoulou 2003, 2005; Adger & Harbour 2007; Nevins 2007; Stegovec to appear). This is indeed the case in French, where both objects are thought to agree with *v* when they are cliticized, and in Swahili, where both objects are goals for object agreement. Furthermore, indirect objects are taken to be generated higher than direct objects (e.g. in a low ApplP), and thus are closer to *v* and stand between it and the DO.

Accounts of the PCC must also capture the fact that 1st and 2nd person pronominal elements seem to be more restricted in their distribution than 3rd person. This behavior is attributed to a special licensing requirement for 1st and 2nd person, formalized by Béjar & Rezac (2003) as the Person Licensing Condition or later reformulated by Preminger (to appear) among others.

- (22) *Person Licensing Condition (PLC)*: An interpretable 1/2 feature must be licensed by entering into an Agree relation with a functional category. (Béjar & Rezac 2003:53)
- (23) A [PARTICIPANT] feature on a DP that is a canonical agreement target must participate in a valuation relation. (Preminger to appear:7)

In other words, [PARTICIPANT] features are required to enter into an Agree relation with a functional head such as *v* in order to be *licensed*, a requirement that does not hold of 3rd person elements, which do not bear [PARTICIPANT] features.

Given the structure that was just outlined, the situation schematized in (24) arises.



According to the existing analyses, IOs act as interveners for this indispensable Agree relation between *v* and the DO, due to the presence of a [±PARTICIPANT] feature on all IOs, including 3rd person IOs which are taken to be [-PARTICIPANT] (Anagnostopoulou 2003, 2005; Adger &

Harbour 2007). The *v* head cannot enter the agreement relation with the [PARTICIPANT] feature on the lower object (the DO). Since a 1st/2nd person DO *must* enter in an Agree relation with *v* in order to be licensed, an intervening IO makes the derivation crash. Only DPs that do not need to Agree with *v* can survive in such configurations, i.e. 3rd person DPs, which are assumed to have no [PARTICIPANT] features.

There are however some conceptual problems with this approach. First of all, IOs, including 3rd person IOs, must be assumed to have a [PARTICIPANT] feature themselves if they are going to act as proper interveners, with little motivation but to yield the intervention effect. Furthermore, person features on DPs are normally inherently valued and interpretable, e.g. [i φ :PARTICIPANT], hence making them goals. One might wonder why they need to enter an Agreement relation seeing as they are already valued (see Kratzer 2009). On the other hand if we take them not to be valued, how does the functional head (being a φ -probe) have a [PARTICIPANT] value to give them?

Aside from the conceptual problems, we will see in the following section that the behavior of 3rd person reflexive clitics and agreement markers casts further doubt on the empirical validity of equating Person Licensing with agreement in [PARTICIPANT] features.

3. Reflexives and the PCC

3.1. French *se*

As already outlined in the introduction, French 3rd person reflexive clitic *se* patterns like 1st/2nd person in double object constructions: it cannot be a direct object in the presence of an indirect object clitic. Examples (25) to (27) systematically compare the distribution of 3rd, 1st/2nd and reflexive direct object clitics in combination with 3rd person IOs (25), 1st/2nd person IOs (26) and reflexive IOs (27) respectively. Like 1st/2nd person, *se* reflexive clitics are disallowed in combinations with any indirect object (3rd, 1st/2nd or reflexive). Table (28) sums up these results.

- | | | | |
|------|----|--|------------------|
| (25) | a. | Il le lui présente.
3SG.NOM 3SG.ACC 3SG.DAT introduce.3SG
‘He introduces him to him/her.’ | 3 IO > 3 DO |
| | b. | *Il me/te lui présente.
3SG.NOM 1SG/2SG.ACC 3SG.DAT introduce.3SG
Int: ‘He introduces me/you to him/her.’ | *3 IO > 1/2 DO |
| | c. | *Il se lui présente.
3SG.NOM 3REFL.ACC 3SG.DAT introduce.3SG
Int: ‘He introduces himself to him/her.’ | *3 IO > REFL DO |
| (26) | a. | Il me/te le présente.
3SG.NOM 1SG/2SG.DAT 3SG.ACC introduce.3SG
‘He introduces him to me/you.’ | 1/2 IO > 3 DO |
| | b. | *Il me/te te/me présente.
3SG.NOM 1SG/2SG.ACC 2SG/1SG.DAT introduce.3SG
Int: ‘He introduces me/you to you/me.’ | *1/2 IO > 1/2 DO |

(28) *PCC effects with 1st/2nd person and reflexives in French*

IO	DO	French
3	3	✓
3	1/2	✗
3	REFL	✗
1/2	3	✓
1/2	1/2	✗
1/2	REFL	✗
REFL	3	✓
REFL	1/2	✗
REFL	REFL	✗

Although they very clearly pattern with 1st/2nd person clitics and not with other 3rd person clitics like *le*, *se* reflexives are nevertheless uncontroversially 3rd person elements. Proof is that they are unambiguously restricted to 3rd person antecedents, as illustrated by the ungrammaticality of a 1st person antecedent in (29).

- (29) *Je **se** vois dans le miroir.
 I REFL see.1SG in the mirror
 Int.: 'I see myself in the mirror.'

This suggests that *se* is itself 3rd person, since anaphors typically match their antecedent's φ -features.⁶ As to the number or gender of *se*, they are taken to be unspecified as there is no reason to stipulate otherwise. Indeed *se* does not discriminate between plural and singular or masculine and feminine antecedents, and does not have distinct forms for these either. We then have a 3rd person reflexive element patterning with 1st/2nd person, a fact that is not predicted by standard accounts of the PCC. As the following section will demonstrate, French is not the only language

⁶ 1st/2nd person reflexives *me/te/nous/vous* (1SG/2SG/1PL/2PL) have the same form as 1st/2nd person pronouns and are taken to be nothing else than regular pronouns (Déchaine & Wiltschko 2010). Therefore they will not be discussed separately here.

in which non-1st/2nd person, reflexive elements are subject to the PCC.

3.2. Swahili anaphoric agreement

3.2.1. Verbal reflexive markers

In Swahili, as in many other Bantu languages (e.g. Chichewa, Lubukusu, Shona, Ndebele etc.), reflexives are expressed by a verbal reflexive marker (RFM) that occurs in the position of the object marker (OM). This special type of anaphoric agreement surfaces when the object is a reflexive anaphor. Regular class 1 object agreement morphology -m- is then prohibited and replaced by the anaphoric agreement morpheme (RFM) -ji- in (30b).

- (30) a. Ahmed a- na- **m**/*ji- penda **Halima**.
 1Ahmed SM1- PRES- OM1/*RFM- love 1Halima
 ‘Ahmed loves Halima.’
- b. Ahmed a- na- **ji**/*m- penda (**mwenyewe**).
 1Ahmed SM1- PRES- RFM/*OM1- love (himself)
 ‘Ahmed loves himself.’ (Vitale 1981:137 in Woolford 1999:264)

An overt anaphor *mwenyewe* ‘self’ may co-occur with the RFM, as in (30b), but is most often omitted. Expressing this anaphor overtly yields an empathic reading. Furthermore, *mwenyewe* is used elsewhere as an emphatic modifier, for instance in the subject position. For these reasons, I take the reflexive anaphor to be a covert *pro* which can be further modified by the emphatic adjectival modifier *mwenyewe*. Object drop, as we have seen previously, is common in Swahili and Bantu languages at large, especially when licensed by agreement. For the rest of the paper, the presence of a covert reflexive object will be indicated as *proREFL*.

Like regular OMs, the RFM can co-index the indirect object of a ditransitive, as illustrated in (31b) where -ji- agrees with a reflexive indirect object.

- (31) a. Ni- li- **m**- nunulia **mwanangu** kitabu.
 SM1SG- PST- OM1- buy.APPL 1child.POSS.1SG 7book
 ‘I bought the book for my child.’
- b. Ni- li- **ji**- nunulia *proREFL* kitabu.
 SM1SG- PST- RFM- buy.APPL 7book
 ‘I bought a book for myself.’ (Riedel 2009:88)

Regular OMs and RFMs are in complementary distribution with each other, as illustrated by the following examples, inspired by Sikuku (2012) on Lubukusu RFMs. This suggests that they are in the same functional position; in this case that they are both agreement markers.

- (32) a. *Maya a- li- **mu**- **wa**- pend- ezesha.
 1Maya SM1- PST- OM1- OM2- like- CAUS
 Int: ‘Maya made him like them.’ *OM+OM
- b. *Maya a- li- **mu**- **ji**- pend- ezesha.
 1Maya SM1- PST- OM1- RFM- like- CAUS
 Int: ‘Maya made him like herself.’ *OM+RFM

- c. *Maya a- li- **ji-** **ji-** pend- ezesha.
 1Maya SM1- PST- RFM- RFM- like- CAUS
 Int: 'Maya made herself like herself.' *RFM+RFM

Anaphoric agreement thus seems to be able to fulfill the same functions and occupy the same functional head as regular object agreement. As such, it is taken to be a bona fide agreement morpheme.⁷

3.2.2. -*ji-* and the PCC

Having established the status of anaphoric agreement, we can now examine its behavior in double object constructions. Like 1st/2nd person OMs (see section 2.2), marking of the RFM -*ji-* is obligatory in double object constructions: it cannot be left unmarked.

- (33) a. Ni- li- **ji-** nunulia kitabu.
 SM1SG- PST- RFM- buy.APPL 7book
 'I bought a book for myself.'
- b. *Ni- li- **ki-** nunulia mimi mwenyewe.
 SM1SG- PST- OM7- buy.APPL me self
 Int: 'I bought it for myself.'

Furthermore, if there is a reflexive object marked on the verb and another overt object, then the reflexive cannot be interpreted as the DO. In other words, as observed above (section 2.2) with 1st/2nd person, if there is an IO, then the DO must be 3rd person, not 1st/2nd person and not reflexive. As was also the case with 1st/2nd person, the interpretation of the reflexive as the DO can be rescued by introducing the IO as a PP.

- (34) a. A- li- **ji-** julisha Juma.
 SM1SG- PST- RFM- describe Juma
 ✓ 'He described Juma to himself.'REFL IO > 3 DO
 *'He described himself to Juma.'*3 IO > REFL DO
- b. U- li- **ji-** julisha kwa Juma.
 SM2SG- PST- RFM- describe PREP Juma
 'You described yourself to Juma.'

(35) PCC effects with 1st/2nd person and reflexives in Swahili

IO	DO	Swahili
3	1/2	✗
3	REFL	✗
3	3	✓
1/2	3	✓
REFL	3	✓

Reflexives (including 3rd person reflexives) and 1st/2nd person can thus be shown to pattern

⁷On the controversial status of OMs in Swahili and Bantu, see for instance Bresnan & Mchombo (1987); Seidl & Dimitriadis (1997); Nicolle (2000); Riedel (2009).

uniformly across French and Swahili in PCC configurations. Since they behave the same, 1st/2nd person and reflexives must have something in common to the exclusion of other 3rd person, most likely, they must share a feature. The next section aims at determining which feature this should be.

4. What features are in an anaphor?

4.1. The features of *se*

Let us start by thinking about the features of the French reflexive *se*. What person features should *se* have in order to derive its properties? Recall that classical accounts of the PCC take [PARTICIPANT] features to be responsible for person restrictions. According to these accounts, *se* would then have to be assumed to have some version of a [PARTICIPANT] feature in order to be subjected to the same restrictions as 1st and 2nd person items. Two possibilities are in order, both of which I will show are problematic.

The first possibility would be to work within a privative feature system, in which there are only two possible person values: [PARTICIPANT] (with further specification for speaker and addressee) or [\emptyset] (null-specification). *Se* would then bear a simple [PARTICIPANT] value. However, this would fail to restrict *se* to 3rd person antecedents. Indeed, anaphors have to match their antecedents' features (Kratzer 2009; Reuland 2011; Rooryck & Vanden Wyngaerd 2011), and *se* only takes antecedents with 3rd person, i.e. [\emptyset]-person.

Another option is to work in an enriched feature system, where person can have three different values [\emptyset], [-PARTICIPANT] or [+PARTICIPANT]. This proposal effectively entails that there are two different kinds of 3rd person, respectively [\emptyset] and [-PARTICIPANT], as originally proposed by Benveniste (1966) and since then implemented in many works on person (Bonet 1991; Taraldsen 1995; Ritter 1995; Kayne 2000; Anagnostopoulou 2003, 2005; Adger & Harbour 2007; Sundersan to appear). [+PARTICIPANT] is reserved to 1st and 2nd person items. If we take *se* to be [+PARTICIPANT], we again fail to restrict it to 3rd person antecedents (because of the feature mismatch with the antecedent). In this system, the other option is to take *se* to be [-PARTICIPANT]. This seems like a possible solution, if we assume that Person Licensing/PCC targets *all* values of [\pm PARTICIPANT] (a position defended by Sundersan (to appear)). Regular, i.e. non-reflexive 3rd person, would then be unspecified for person features altogether, i.e. have a [\emptyset] person feature, excluding them for the scope of PCC effects.

However, although this is a technically workable solution, there are a number of problems with such an account. First, we need to assume that all non-anaphoric 3rd persons are [\emptyset] for person, for them to be exempt of the PCC. Recall that datives, for instance, are often also assumed to have [\pm PARTICIPANT] features too, such that they intervene for person licensing (Anagnostopoulou 2003; Adger & Harbour 2007), although they can be and often are non-anaphoric. The range of 3rd person elements specified for [-PARTICIPANT] thus appears to be rather heterogeneous and arbitrary. Second, such an approach does not fit well with φ -feature sharing accounts of binding: a 3rd person DP or pronominal antecedent, assumed to be underspecified for person [\emptyset], cannot transmit a [-PARTICIPANT] feature to the anaphor. Finally, assuming [-PARTICIPANT] features on (non-1st/2nd person) reflexives, albeit deriving the correct pattern relatively successfully, seems like an *ad hoc* solution, devised to make reflexives fit standard accounts of the PCC, and which lacks independent motivation.

Taking a wider angle, the behavior of 3rd person reflexives raises questions about the Person

Licensing Condition. In particular, the data presented in this paper questions whether the PLC makes the appropriate generalization. The fact that 3rd person elements fall within the scope of the PCC leads us to question the role [PARTICIPANT] φ -features in the PCC. Furthermore, these 3rd person elements have the additional property of being anaphoric, i.e. syntactically dependent. This allows us to envisage the problem posed by the PCC in another perspective. Could 1st/2nd person and reflexive pronouns share any overarching commonality that would be linked to syntactic dependency? This paper contends that they do. As will be further developed in section 5, 1st/2nd person and reflexive pronouns are all elements that are context-sensitive, in the sense of a narrow syntactic context. A further problem with the PLC is that in its current formulation, it merely states that participants need to be licensed and *how* they are licensed (i.e. by entering into an Agree relation involving [PARTICIPANT] features) - not *why*. In what follows, I will propose that the need of person to be licensed can be made sense of if we consider why reflexives themselves need licensing, namely because they are referentially deficient, and that this calls for a reformulation of the PLC. But before we get there, let us have a look at Swahili anaphoric agreement and see whether it can help us getting more insight into the features of reflexive elements and help us formulate a better theory.

4.2. The features of *-ji-*

It has been seen earlier that the Swahili RFM *-ji-* is an agreement morpheme, which reflects agreement with the reflexive object. I have also established that this reflexive object is a *pro* reflexive, that can optionally be strengthened by the emphatic modifier *mwenyewe*. What features should we attribute to this anaphor such that they are reflected in anaphoric agreement?

The first thing that is noticeable is that *-ji-* is not part of the regular φ -paradigm of OMs and is not attested elsewhere in the agreement paradigm of the language, reproduced in (36).

(36) *Object agreement paradigm*

	SG	PL
1st person	ni	tu
2nd person	ku	mu
Class 1/2	m	wa
Class 3/4	u	i
Class 5/6	li	ya
Class 7/8	ki	vi
Class 9/10	i	zi
Class 11	u	
Class 15	ku	

Moreover, *-ji-* is φ -invariant and surfaces with anaphors and antecedents of all person, number and noun classes, for instance, 2nd person singular or plural antecedents.

- (37) U- na- **ji-** penda.
SM2SG- PRES- RFM- love
'You love yourself.'

- (38) Tu- li- **ji-** ona.
SM1PL- PST- RFM- see
'We saw ourselves.'

Since it does not covary with its controller, it could be argued that *-ji-* is actually default agree-

ment, an option that is argued to hold for the Bantu language Shona by Storoshenko (2016). However, this does not seem to be the case in Swahili. First of all, default agreement morphemes are generally recruited from the regular φ -paradigm, from which we have seen that *-ji-* is absent. Furthermore *-ji-* is not the OM that surfaces in contexts where we could expect default agreement, e.g. with coordinated objects with mismatching φ features as (39), where default agreement seems to be null, or with impersonal subjects as in (40), where Class 9 agreement surfaces.

- (39) A- li- Ø- ona mti na nyumba.
 SM1- PST- Ø- see 3tree and 9house
 ‘He saw the tree and the house.’

(40) I- na- andik- wa: u- si- ue.
 SM9- PRES- write- PASS SM2SG- NEG- kill
 ‘It is written: you shall not kill.’

Looking at the theoretical side of things, it appears even more difficult to take anaphoric agreement to be φ -agreement. Indeed, if we assume φ -sharing accounts of Binding (Rooryck & Vanden Wyngaerd 2011; Reuland 2011), where Binding is reduced to an Agree operation between an anaphor and its antecedent, φ -features only do not succeed in deriving the contrast between *-ji-* and other φ -agreement. If the reflexive anaphor was still unvalued for φ -features at the stage where it controls agreement on v , as represented in (41a), it would be unable to control φ -covarying agreement and would trigger default agreement (null exponent as in (39) or class 9 as in (40)), contrary to fact.

If the anaphor was on the other hand fully valued for φ -features, either inherently or via agreement with its antecedent, it would be able to trigger φ -agreement on a functional head like v , as (43a) illustrates. We would then not expect any difference between the reflex of agreement with a pronoun, as in (42), and agreement with an anaphor as in (43a), contrary to fact.

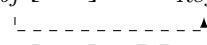
So both from an observational and a theoretical point of view, anaphoric agreement cannot be taken to be φ -agreement, which suggests that the anaphor that controls it must possess some other type of features that it must additionally be able to share.

4.3. Referential [ID]-features as an alternative

Attempts to formalize Binding in terms of a featural dependency have gone either in the direction of φ -features, as just discussed, or of referential features that take indices as values, capitalizing on the behavior of anaphors as bound variables. Such a proposal has been developed by Hicks (2009), who uses [VAR]-features, and by Sundaresan (2013), who uses [DEP]-features. In the remainder of this paper, I will use the label [ID]-feature, for index or identity, as it will allow us to build on the insight of [VAR] and [DEP]-features while departing from certain aspects and generalizing them to a broader range of phenomena. [ID]-features have also been implemented in other areas of syntax, see for instance Adger & Ramchand (2005) about wh-dependencies and Arregi & Hanink (2018) about switch reference in Washo.

The crucial properties of [ID]-features (as of [VAR] and [DEP] features) is that they allow DPs to enter the derivation with information about their referential possibilities. To do so, they take indices (i, j, k , etc.) or integers ($1, 2, 3$, etc.) as values, which they acquire either upon selection by the numeration or by valuation by another DP. In this system, anaphors enter the derivation with an unvalued [ID: $_$] feature that get valued by an antecedent with a valued [ID: i] via an Agree relation, as is illustrated by (44).

(44) **Anaphor:**

- a. *Step 1:* $DP_{Subj} \text{ [ID:}i\text{]} \dots DP_{Refl} \text{ [ID:}_]\text{}$

- b. *Step 2:* $DP_{Subj} \text{ [ID:}i\text{]} \dots DP_{Refl} \text{ [ID:}i\text{]}$

Non-anaphoric DPs, on the other hand, enter the derivation with an index of their own, as in (45), which cannot be valued by an Agree relation with another DP and which is usually distinct from that of other DPs in the clause (by virtue of Principle B and C).

(45) **Pronoun/R-expression:** $[\text{ID:}i] \dots DP_{Refl} \text{ [ID:}j\text{]}$

I assume that all DPs bear [ID]-features, in line with Hicks (2009) but diverging from Sundaresan (2013). However, unlike Hicks' [VAR]-features, I assume that the role of [ID]-features extends to both interfaces (PF and LF), allowing them to be morphologically spelled-out in languages which have the morphological means to do so. In what follows, I develop such a proposal using [ID]-features.

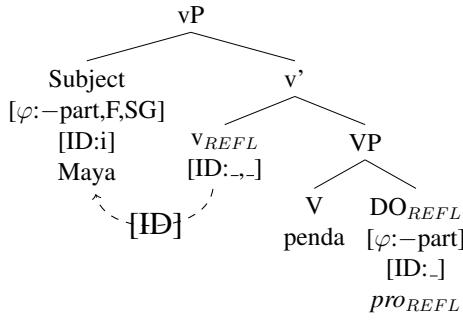
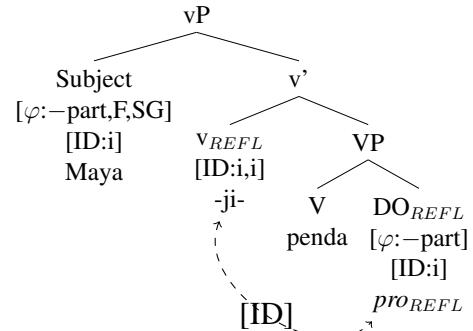
4.4. Deriving anaphoric agreement

We now have at our disposition a feature that (i) is distinct from φ , (ii) can enter Agree relations and (iii) can encode co-reference of arguments, i.e. reflexivity. [ID]-features thus seem ideal candidates to derive anaphoric agreement. In this section, I will develop such an account. Before proceeding, some assumptions about the formalization of reflexivity need to be laid out. I take v_{REFL} , a reflexive Voice head, to be the locus of reflexivity. This reflexive Voice head requires coindexation of two arguments (Reinhart & Reuland 1993), which it encodes as a paired value [ID: i,i]. The French reflexive *se* and the Swahili anaphoric agreement morpheme *-ji-* are obligatorily subject-oriented, i.e. the subject has to be a member of the coindexed pair. Subject-oriented reflexivity is derived as follows: v_{REFL} first agrees with the subject that immediately

c-commands it and with the reflexive object (Ahn 2015). We can now model the derivation of a simple reflexive sentence in Swahili like (46).

- (46) Maya a- na- **ji-** penda *pro_{REFL}*.
 Maya SM1- PRES- RFM- love
 'Maya loves herself.'

Upon merger of the subject in the derivation, the *v_{REFL}* agrees with it for its [ID] feature (step 1). Then as a second step, the *v_{REFL}* head Agrees with the anaphor and transmits the [ID] value of the subject and inherits in return the reflexive's newly acquired [ID] feature, thus yielding the paired-value [ID:*i,i*] and deriving anaphoric agreement (step 2).

(47) *Step 1*(48) *Step 2*

Anaphoric agreement surfaces when the two values on *v_{REFL}* match. When the two values do not match, i.e. when the agreeing object does not share an index with the subject, the derivation crashes, as *v_{REFL}* requires matching values. Anaphoric agreement is then the result of feature matching/absence of feature conflict, as is argued by Arregi & Hanink (2018) for switch reference in Washo (and based on Harbour 2007, 2011). (49) represents the morphological spell-out of *v_{REFL}* in Swahili.

- (49) *v_{REFL}* [ID:*i,i*] ↔ -*ji-*

Anaphoric agreement is the morphological expression of matching [ID]-features on a functional head. [ID]-features thus allow agreement to spell-out (non)-distinctiveness between various DPs, in a way that is orthogonal to φ . [ID] features successfully derive anaphoric agreement in Swahili. If anaphoric agreement is indeed the spell-out of [ID]-features, this represents a strong argument for the presence of referential features in Binding relations and against φ -Agree as the only mechanism behind anaphoricity.

4.5. *Interim conclusions*

Our initial puzzle was to figure out what brings 1st and 2nd person and reflexives together, to the exclusion of other non-reflexive 3rd person. In previous sections, I have shown that φ -features, and especially [PARTICIPANT] features, are not able to successfully derive the behavior of reflexives in PCC context.

In particular, we have examined in detail the possible featural composition of French reflexive *se* and Swahili anaphoric agreement *-ji-*. We have established that deriving the Person Licensing Condition and the Person-Case Constraint with [PARTICIPANT] φ -features does not account satisfactorily for the behavior of French *se* in double object constructions. Furthermore, we have seen that φ -features are not enough to account for Swahili anaphoric agreement, which is also subject to the PCC. Anaphoric agreement was then analysed as the morphological expression of matching [ID]-features on a functional head. This allowed us to introduce and provide a motivation for referential [ID]-features in Binding, which got us new insight into the featural composition of anaphors in two unrelated languages. Based on this, I will extend [ID]-features to French anaphors and assume that Binding is achieved through agreement in [ID]-features in both French and Swahili.

For the rest of the paper, my objective will be the following: instead of making reflexives fit accounts of the PCC based on [PARTICIPANT] φ -features, I will develop an analysis that proposes to explain the behavior of 1st/2nd person weak pronouns through binding and [ID]-features.

5. *Proposal*

The insight argued for in this paper is that the property shared by reflexives and 1st/2nd person is that they are contextually dependent elements. This means that they must get their referential value from another element in the local syntactic context, i.e. a grammatical antecedent or a syntactic representation of the context, such as a Speech Act Phrase. I contend that referential dependency, in the form of an unvalued feature, is responsible for the PCC and constitutes the special licensing requirement of 1st/2nd person, thereby motivating the special needs of 1st/2nd person weak pronouns and agreement markers. I further propose to implement this dependency through referential [ID]-features, thus using for 1st/2nd person the same features that have been shown to underly binding relations. The theoretical upshot of this proposal is that person licensing gets equated with binding, in the spirit of Baker (2008), who treats 1st/2nd person agreement as a bound variable requiring a special structural configuration to come about. In this section, I will first motivate why 1st/2nd person can be thought of as locally bound elements, before formalizing this binding relation using [ID]-features. Based on this, I will then proceed to derive the PCC first for 1st/2nd person, and then for reflexives.

5.1. *Motivating the need for person to be locally bound*

The core idea of the present analysis is that 1st/2nd person weak pronouns are bound elements, on a par with reflexives. There are indeed reasons for this assumption. First of all, intuitively, 1st/2nd grammatical persons instantiate discourse participants and get their reference directly from the context (speaker or addressee of the utterance situation). In that sense, they are context-dependent elements: they need to be anchored in the utterance context, on which their interpretation and reference is dependent (Ritter & Wiltschko 2009, 2014; Gruber 2013; Delfitto & Fiorin 2014), very much in the same way as the reference of an anaphor is dependent on that of a local antecedent. This anchoring is argued to be syntactic, i.e. 1st/2nd person must Agree with a syntactic representation of utterance participants. This is what differentiates them from non-

reflexive 3rd person pronouns, which get their reference pragmatically through the discourse, not the syntax.

Furthermore, beyond person restrictions in ditransitive contexts, 1st/2nd person have been shown to have other special properties. Person agreement, for instance, is subject to strict structural conditions. Baker (2008) describes these conditions in detail and subsumes them under the Structural Condition for Person Agreement (SCOPA).

(50) *Structural Condition On Person Agreement (SCOPA):*

(A head) F can agree with XP in +1 or +2 only if a projection of F merges with a +1 or +2 element and F projects. (Baker 2008)

A key finding of Baker (2008) is that person agreement is only possible on certain grammatical categories. For instance, person agreement is found on verbs across the world's languages, but seems to be consistently absent on categories such as adjectives (see section 6.2 for more details). Baker (2008) formulates the SCOPA as the principle that encompasses such cross-linguistic generalizations: person agreement can occur only when the controller of agreement merges directly with the agreeing head or a projection of it, thus capturing its restricted occurrence. According to the SCOPA, 1st/2nd person agreement is a very *local* type of agreement. Such locality is attributed by Baker (2008) to the status of 1st/2nd person agreement as *bound variables*. 1st/2nd person agreement is analysed in terms of operator-variable agreement: all 1st/2nd person elements must be bound by a designated operator, either directly or indirectly through other elements bound by the same operator. This in effect equates 1st/2nd person agreement with anaphoric binding.

A direct prediction of Baker's account as well as of the present analysis is that anaphoric agreement should be restricted to the same categories as person agreement. This prediction is borne out in Swahili, as illustrated by the following examples. As can be observed below, 2nd person *pro* triggers 2nd person agreement on the verb, but not on the adjective, which only inflects for number and gender (Cl.1: singular, animate). Similarly, a reflexive *pro* triggers anaphoric agreement on the verb but not on the adjective. Such a restriction does not seem to impact 3rd person objects.

(51) a. Ni- me- **wa-** fanya (Simba) wa-we **wa-** kali.

SM1SG- PERF- **OM2-** make 2lions CL2-be **CL2-** fierce
'I made the lions/them fierce.'

b. Ni- me- **ku-** fanya *pro_{2SG}* u-we **m/*u-** kali.
SM1SG- PERF- **OM2SG-** make 2SG-be **CL1/*2SG-** fierce
'I made you fierce.'

c. Ni- me- **ji-** fanya *pro_{REFL}* kuwa **m/*ji-** kali.
SM1SG- PERF- **RFM-** make be.INF **CL1/*RFM-** fierce
'I made myself fierce.'

This data strengthens the claim that participants and reflexives form a natural class and that its effects can be observed in several areas of syntax.

5.2. Formalizing binding for 1st/2nd person

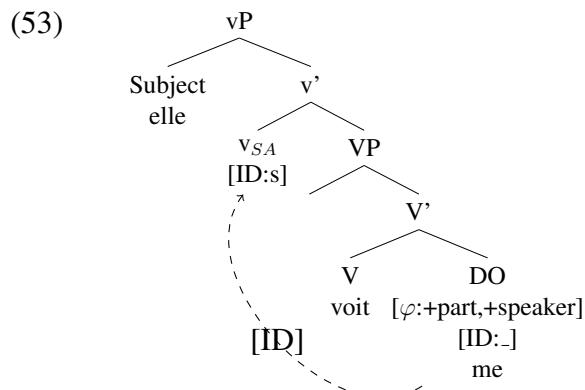
Since there are empirical as well as conceptual grounds to conceive person licensing as binding, I propose that [ID]-features, which have been seen to be at work in binding, also participate in person licensing. Importantly, I assume that the context is syntactically represented in the clausal spine, in the form of a Speech Act Projection (SAP) or an intermediate functional head fulfilling the same function locally. The value of 1st/2nd person elements comes from such a syntactic representation of discourse participants.

Concretely, I assume a Speech Act Projection (SAP) to be present in the CP domain, which contains representations of the speaker and the addressee (Speas & Tenny 2003; Baker 2008; Delfitto & Fiorin 2014; Miyagawa 2017; McFadden 2017). I also assume an intermediate projection to be present lower in the clause, in the spirit of PartP (Kaur 2016; Chandra & Kaur 2017) or functional categories like Infl or D, which act as anchors to the utterance situation for participants, but also time or location (Ritter & Wiltschko 2009, 2014; Gruber 2013). I take v_{SA} (for Speech Act) to be the relevant functional head acting as the intermediate anchor for my current purposes, meaning that v_{SA} bears [ID]-features inherently valued with the speaker's and addressee's indices.

We are now ready to derive the licensing of 1st/2nd person DO pronouns. They are born with fully specified φ -features and an unvalued [ID]-feature, which needs to be valued by the valued [ID]-feature on v_{SA} , representing the speech act participants. Having its [ID]-feature valued before Spell-Out is necessary to enable reference, and an [ID] that remains unvalued will make the derivation crash. Let us take the French example below.

The 1st direct object probes to value its [ID:_] feature against the [ID] present of v_{SA} . Since the DO is specified for [φ :+PARTICIPANT,+SPEAKER], it presuppositionally restricts the probing for an [ID]-feature to the speaker of the utterance. When it meets a valued [ID]-feature indexing the speaker ([ID:s]) present on v_{SA} , the 1st person DO inherits the index of the speaker. The DO gets correctly valued and will be allowed to cliticize above v_{SA} .

- (52) Elle **me** voit.
she 1SG.ACC see.PRES.3SG
'She sees me.'

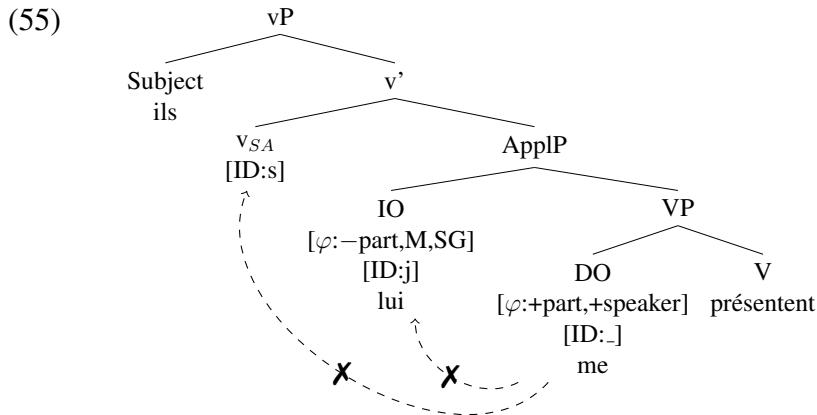


5.3. Deriving the PCC with [ID]: 1st/2nd person

Having established the mechanism for person licensing in simple transitives, we can now explain what goes wrong in double object constructions and with the PCC, where a 1st/2nd person DO is disallowed in the presence of an indirect object clitic. Consider the example below:

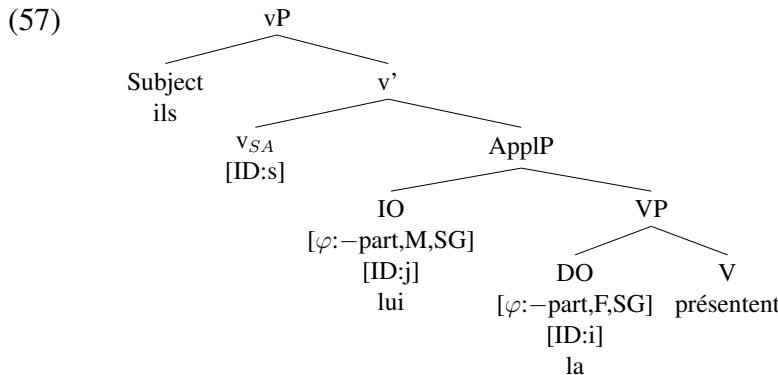
- (54) *Ils **me** **lui** présentent.
 3PL.NOM 1SG.ACC 3SG.DAT introduce.3PL
 Int.: ‘They introduce me to him/her.’ *3 IO > 1/2 DO

The DO merges first, and probes up for an [ID] feature that matches the presuppositional requirements of its φ -features, i.e. that stands for the speaker. In this configuration, the closest available goal with an index is the IO, which does not have matching φ -features. The v_{SA} head is too far away to transmit its [ID] value to the DO: the derivation crashes since the DO’s [ID] is unvalued at Spell-Out.



We can contrast this with what happens for 3rd person. The 3rd person DO already has an inherently valued [ID]-feature. Therefore the intervention of the IO is of no consequence and the derivation can unfold successfully.

- (56) Ils **la** **lui** présentent.
 3PL.NOM 3FSG.ACC 3SG.DAT introduce.3PL
 ‘They introduce her to him/her.’ 3 IO > 3 DO



5.4. Deriving the PCC with [ID]: reflexives

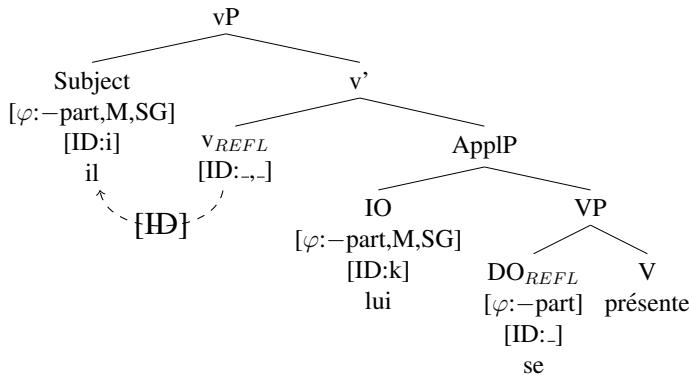
Finally, let us now derive the ban on reflexives in double object constructions. Consider the following example.

- (58) *Il **se** **lui** présente.
 3SG.NOM 3REFL.ACC 3SG.DAT introduce.3SG
 Int.: ‘He introduces himself to him/her.’

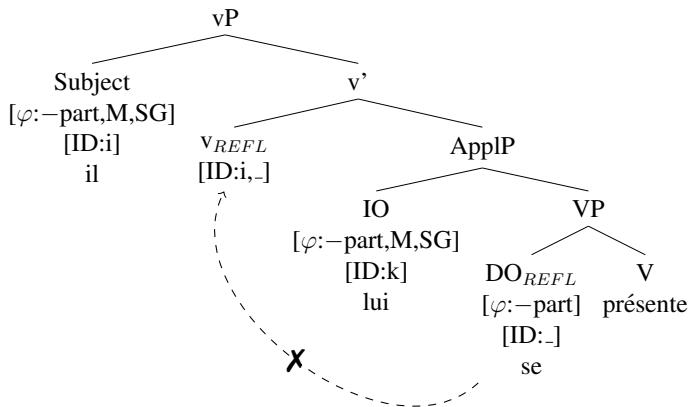
*3 IO > REFL DO

I assume here a structure for reflexives exactly parallel to the one we used for anaphoric agreement, with a v_{REFL} that takes a pair of identical values [ID:i,i]. When the subject merges, the v_{REFL} agrees with it for its [ID]-feature (step 1). The reflexive DO is in a position in which it looks value its [ID]-feature: the closest available goal is the IO, which can potentially have matching φ -features if it is 3rd person. However, this combination gets ruled out independently. v_{REFL} requires a pair of identical values, which its only accessible goal cannot yield: agreeing with the IO will result in [ID:i,k]. The DO is too far away to agree with v_{REFL} , as the IO intervenes between them. There can be no binding through v_{REFL} and the derivation crashes.

- (59) *Step 1*



- (60) *Step 2 X*



DO object *se* reflexives in double object constructions thus do not essentially get ruled out not by their inability to value their [ID]-feature against a appropriate goal, like it was the case with 1st/2nd person DOs. The derivational crash is due, instead, to the failure of the reflexive *v* head to obtain a pair matching of [ID] values. Note that the other side of this coin is that the *v* head is too far away to transmit the [ID] value of the subject to the DO, which in French and Swahili is obligatorily subject oriented. PCC effects with 1st/2nd person and reflexives are nevertheless

unified, as they come about as a result of the intervention by the IO and their common need to be referentially valued in syntax.

6. Conclusions

6.1. Summary of the findings

This paper has investigated the question of what 1st/2nd person and reflexives have in common that restricts their distribution in double object constructions. I have examined data from French as well as introduced new data from Swahili anaphoric agreement showing (i) that reflexives in two unrelated languages are subject to PCC effects and (ii) that anaphoric agreement calls for referential [ID]-features to be involved in binding. The main insight is that the symmetric behavior of 1st/2nd person and reflexives arises from their inherent contextual dependency, i.e. translated by their need to get their reference valued from the syntactic context. I have proposed a syntactic implementation of this in terms of referential [ID]-features: 1st/2nd person and reflexives are born with an unvalued [ID:_] feature which needs to get valued against an antecedent or a syntactic representation of Speech Act Participants. Datives arguments in double object constructions act as interveners and prevent such valuation, yielding ungrammaticality, albeit in slightly different ways. They prevent valuation of the unvalued [ID]-feature of the 1st/2nd person DO, and in the case of reflexives, valuation of the paired-value of the v_{REFL}, which is necessary to yield a reflexive interpretation.

6.2. Empirical predictions

Such an account, which unifies the behavior of 1st/2nd person and reflexives under a featural commonality, predicts that both type of elements are expected to pattern similarly across languages and for different syntactic phenomena. I briefly outline some data that suggests that this prediction indeed seems on the right track.

First of all, we have seen in section 5.2 that anaphoric agreement in Swahili is restricted to the same categories as 1st/2nd person agreement. This shows that the effects of the unified featural requirement of 1st, 2nd and reflexive elements have repercussions beyond PCC effects, for instance in the categorial distribution of agreement.

Furthermore, French and Swahili are not the only two languages where reflexives have been reported to pattern like 1st/2nd person for PCC effects. Rosen (1990) reports similar patterns in Southern Tiwa. Southern Tiwa, a language of the Kiowa-Tanoan family, has portmanteau agreement morphemes which index all arguments of the verb. Like Swahili, Southern Tiwa has a special form of agreement for reflexives objects in monotransitive predicates, which can be thought of as anaphoric agreement. Rosen (1990) and Harbour (2009) report that Southern Tiwa exhibits PCC effects with 1st/2nd person and reflexive direct objects. In ditransitives, portmanteau agreement morphemes disallow the combinations SUBJ > IO > 1/2.DO and SUBJ > IO > REFL.DO, i.e. the direct object can only be 3rd person and non-reflexive. This restriction takes the form of a gap in the agreement paradigm and requires that the language resort to ‘repair’ strategies, such as syncretism and object incorporation. Similarly, Anagnostopoulou (2003, 2005) reports that person restrictions in dative-nominative constructions in Icelandic apply to the reflexive *sig*. In constructions with a quirky dative subject, 1st, 2nd and 3rd person reflexive nominative objects

are disallowed, unlike other, non-reflexive 3rd person objects. Finally, Kaur (2016, 2017) reports PCC-like effects in Punjabi, an Indo-Aryan language, involving the 3rd person clitic *-suum* (see also Kaur & Raynaud 2018). The licensing restrictions for participants and reflexives in PCC-like contexts thus seem to span over a range of typologically diverse languages.

Finally, in many Indo-Aryan languages like Punjabi, 1st/2nd person pronouns as well as reflexives pronouns require to be marked with the Differential Object Marking (DOM) case marker *-suum*, in contrast to 3rd person objects, which can only optionnally bear DOM, as illustrated in the set of minimal pairs below.

(61) *Punjabi*

- a. o-ne tai-*(nuu) vekhyaa
3SG-ERG 2SG-DOM see.PERF.MSG
'He saw you.'
- b. o-ne apneaap-*(nuu) vekhyaa
3SG-ERG self-DOM see.PERF.MSG
'He saw himself.'
- c. o-ne kuRii-(nuu) vekhyaa/vekhii
3SG-ERG girl-DOM see.PERF.MSG/see.PERF.FSG
'He saw the girl.'

(Gurmeet Kaur p.c.)

While the above-mentioned data deserve to be investigated more in depth, it is indicative of the fact that 1st/2nd person and reflexives might be subject to similar licensing requirements across languages and across syntactic phenonema.

6.3. Broader theoretical consequences

This account has broader theoretical consequences. Firstly, it leads us to rethink to role of φ -features and in particular [PARTICIPANT] features in the PCC, in binding and in person licensing at large. The present analysis moves away from identifying the need for 1st and 2nd person to be licensed with [PARTICIPANT] φ -feature. It proposes instead to reanalyse person licensing as a requirement for contextual anchoring, and offers a syntactico-semantic motivation for the need of person to be licensed, going beyond the PLC as a factual statement. By doing so, it aims at distinguishes between purely syntactic φ -features and syntactico-semantic [ID]-features, which in the present case pertain to referentiality and context-sensitivity.

Other accounts in the literature have strayed away from φ -features when looking at person restrictions. For instance, Charnavel & Mateu (2015) and Pancheva & Zubizarreta (2017) have developed accounts of the PCC in terms of anti-logophoricity and perspective. They argue that 1st and 2nd, as well as certain 3rd person elements, are characterized by the fact that they are point-of-view centers, and that the PCC is ultimately concerned with the encoding of perspective. The present account, by dealing with more local dependencies, is complementary to such proposals. Moreover, the implementation proposed here in terms of referential [ID]-features could be extended to the notion of perspective. Sundaresan (2013) for instance has proposed that [DEP]-features, which share similarities with [ID]-features, are behind perspectival dependencies. Further research could therefore go towards the unification of [ID]-features and perspectival restrictions in the spirit of Pancheva & Zubizarreta (2017).

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Object clitics in French second language acquisition

Chandeera Gunawardena

This paper investigates syntactic knowledge of object clitics by native adult English L2 French speakers. In French, object pronominalization can be realised through clitics and French clitics precede inflected verbs. However, English has only strong pronouns and they occur post verbally. These differences related to object pronominalization cause learnability problems for L2 learners (Hamann et al. 1966; Jakubowicz & Rigaut, 2000; Perez-Leroux et al. 2009). This study shows that the L2 learners accepted object omitted constructions in which clitics were also omitted. Similar results have been reported by Grüter & Crago (2011) by examining L2 child French.

1. Introduction

This paper reports on a pilot study that investigated syntactic knowledge of object clitics by native adult English L2 French speakers. Learning object clitic constructions is believed to be difficult, which appears to be true for all speakers, including native speakers (Hamann et al. 1966; Jakubowicz & Rigaut, 2000; Perez-Leroux et al. 2009) as well as child and adult L2 speakers (Herschensohn 2004; White 1996). Previous second language acquisition (SLA) studies confirm that L2 speakers acquire object clitic constructions much later than other functional categories (Adiv 1984; Crago 2011; Grüter 2006, 2009; Grüter & Crago 2011; Herschensohn 2004; White 1996).

The recent SLA studies also show that omission of object clitics is more frequent than placement errors (Grüter 2006, 2009; Paradis 2004). It has also been observed that object clitic pronouns are acquired fairly late in child French (Clark 1985:714). Jakubowicz and Rigaut (2002) found that their participants used subject clitics productively. However, they report that throughout the study the children did not produce object clitics frequently. White (1996) also reports similar results. They found that at the age of 3.3, the participants produced only 44.1% object clitics in obligatory constructions. However, the objective of the present study is to study placement errors and omission errors of French object clitics in L2 adult development.

2. Object pronominalization in French and English

When an argument denotes a referent that is salient in the discourse, either through previous mention or visual presence, it is typically expressed as a pronoun (Grüter & Crago 2011). As illustrated in (1) the referential pronoun is expressed overtly in English. In some languages, overtly expressed referential pronouns are obligatory. This is explained with an example from English in (2) (Note the ungrammaticality of the sentence without an overtly expressed pronoun).

- (1) Speaker A: Do you read the newspaper?
 Speaker B: Yes, I read it.

- (2) Speaker A: Do you read the newspaper?
 Speaker B: *Yes, I read \emptyset .

In French, as in most of the Romance languages, object pronominalization is realized through a clitic or a weak pronoun. The object clitics are categorised into two groups: direct object clitics and indirect object clitics. For the purpose of this study, the focus is on direct object clitics. Examples (3) and (4) illustrate that French clitics precede inflected verbs similar to other Romance languages. As a result, the canonical post-verbal argument position remains phonetically empty (as shown in (4)). Based on this observation, Sportiche (1996) argues that in clitic constructions, the post-verbal argument position is filled by *pro* and *pro* must be licensed by an overt preverbal clitic. Thus, the absence of an overt clitic leads to ungrammaticality as in (5).

- (3) Speaker A: Est-ce que tu lis le journal?
 Q you read.PRS.2.SG the newspaper
 ‘Do you read the newspaper?’

- (4) Speaker B: Oui, je le lis (pro).
 yes I it read.PRS.1.SG
 ‘Yes, I read it.’

- (5) Speaker B: *Oui, je lis (pro).
 yes I read.PRS.1.SG
 ‘Yes, I read.’

In some languages, pronominalization can be realized through the omission of the relevant argument. In these languages, referential object pronouns can be omitted as shown in examples from Chinese, which allows both overt and null referential pronouns. The examples (7) and (8) show this phenomenon.

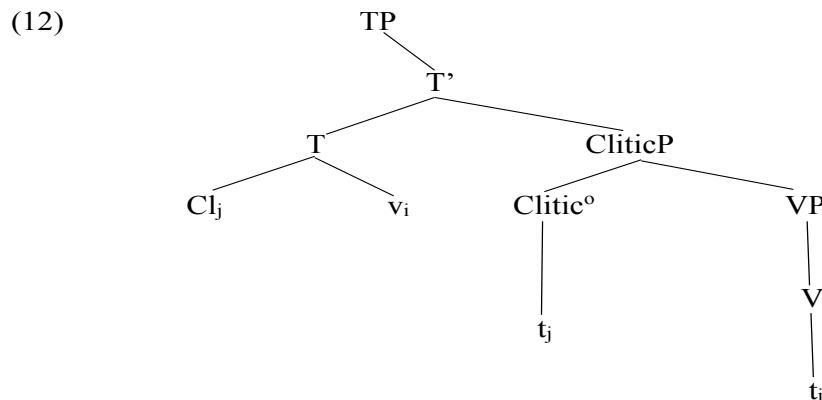
- (6) Speaker A: Zhangsan kanjian Lisi le ma?
 Zhangsan see.PST.3.SG Lisi le Q
 ‘Did Zhangsan see Lisi?’

- (7) Speaker B: ta kanjian ta le.
he see.PST.3.SG him le
'He saw him.'
- (8) Speaker B: ta kanjian pro le.
he see.PST.3.SG le
'He saw.' (Huang 1984:533)

English and French have the same canonical word order: SOV. However, rather than placing the DP pronouns after the finite verb head as English, French clitics occur before their heads, immediately before verbs as in (10) or any auxiliary as in (11).

- (9) Vous mangez la pomme?
you eat.PRS.1.PL the apple
'Do you eat the apple?'
- (10) Oui je la mange.
yes I it eat.PRS.1.SG
'Yes, I eat it.'
- (11) Je l' ai mangée.
I it have.AUX eat.PTCP
'I have eaten it.'

Object clitic constructions in French have been the topic of a number of studies (Borer 1983; Kayne 1975; Rowlett 2007; Sportische 1996). Borer (1983:73) argued that clitics are 'based generated in their surface position' and Kayne (1975:153) argued that clitics moved from underlying XP position. However, for the purpose of the present study, we will focus on the account proposed by Rowlett (2007). Rowlett (2007:89) explains that clitics head their own maximal Projection to CliticP. Therefore, clitics undergo movement. Clitic heads project above VP and below TP as in (12) (Rowlett 2007:91).



3. Parametric difference between English and French

Cross-linguistic differences related to pronominalization can be summarised as follows. First, in French, object pronominalization can be realized through object clitics. They always occur preverbally and the canonical object position may remain phonetically empty only in the presence of a preverbal clitic. Second, the referential object pronoun is expressed overtly in English. Third, both languages do not allow null referential object pronouns as in Chinese. These parametric differences between English and French are believed to cause learnability problems for L2 speakers (Adiv 1984; Grüter 2006, 2009; Grüter & Crago 2011; Herschensohn 2004; White 1996).

3.1 Research questions and hypotheses

The following research questions and hypotheses are formulated considering the cross-linguistic differences mentioned in the previous section.

- | | |
|-------------------------|--|
| Research question (i): | Can L2 speakers acquire the target-like clitic placement in French? |
| Research question (ii): | Do L2 learners of French detect the ungrammaticality of null referential pronouns in comprehension? |
| Hypothesis (i): | L1 English L2 French speakers will accept post-verbal clitics (as in (13)) in French (due to L1 transfer). |
| Hypothesis (ii): | L1 English L2 French speakers will allow null referential object pronouns (as in (14)) in French. |

Hypothesis (ii) is based on previous studies which claim that ‘L2 learners initially hypothesise that French accepts null objects’ (Towell & Hawkins 1994:137). They argue that L2 speakers initially hypothesise that French has object *pro*, on the basis of the absence of phonetically specified pronouns in the post-verbal position.

- (13) a. Jean-Paul: Est-ce que Simon va parler à sa sœur?
 Q Simon go.PRS.3.SG talk.INF to his sister
 ‘Is Simon going to talk to his sister?’
- b. Marie-Claire: *Oui, il va parler la.
 yes he go.PRS.3.SG speak.INF her
 ‘Yes, he is going to speak to her.’

- (14) a. Jean-Paul: Est-ce que Simon va parler à sa sœur?
 Q Simon go.PRS.3.SG talk.INF to his sister
 ‘Is Simon going to talk to his sister?’
- b. Marie-Claire: *Oui, il va parler ce matin.
 yes he go.PRS.3.SG talk.INF this morning
 ‘Yes, he is going to talk this morning.’

4. Participants

The research design included an experimental group and a control group. The experimental group included L1 English L2 French speakers ($n=12$) and the control group had L1 French speakers ($n=8$). Both groups were recruited from the University of York, United Kingdom. By the time the L2 speakers were recruited, they were studying French in their first year at the university. They were all intermediate learners of French. The participants are summarized in table 1.

Group	<i>n</i>	Age
		Mode (Range)
L2 Speakers	12	18 (18-54)
Native Speakers	08	21(20-35)

Table 1. Summary of group profiles

5. Research Design

The present study employed a written acceptability judgment task, a preference task and a production task to investigate knowledge of object clitic constructions in French. The experiment commenced with the written acceptability judgment task and then it was followed by the preference task and the production task. The participants took approximately 50 minutes to complete the three tasks.

5.1 Acceptability judgement task

The written acceptability judgment task included 20 experimental tokens and 16 fillers. The tokens and the fillers were displayed on a screen. Each experimental token consisted of a two-person short dialogue in French. One person replies to a question or a statement that the other person makes. The participants were asked to judge the acceptability of the statements given by the second person in the dialogues. The grammatical tokens consisted of 5 tokens with a preverbal object clitic (S-Cl-V) as in (15) and 5 tokens with a DP object (S-V-O) as in (16). The ungrammatical tokens consisted of 5 tokens with a post-verbal object clitic (S-V-Cl) as in (17) and 5 tokens in which object clitics were omitted (S-V) as in (18). The filler focused on adverb placement in French as in (19) and (20). The judgments of the participants were measured on a five-point Likert scale with endpoints defined as ‘unacceptable’ and ‘acceptable’.

- (15) a. Jean-Paul: Est-ce qu'ils vont reciter le poème ?
 Q they go.PRS.3.PL recite.INF the poem
 ‘Are they going to recite the poem?’
- b. Marie-Claire: Oui, ils vont le reciter.
 yes they go.PRS.3.PL it recite.INF
 ‘Yes, they are going to recite it.’

- (16) a. Jean-Paul: Est-ce qu'ils vont reciter le poème?
 Q they go.PRS.3.PL recite.INF the poem
 ‘Are they going to recite the poem?’
- b. Marie-Claire: Oui, ils vont reciter le poème
 yes they go.PRS.3.PL recite.INF the poem
 ‘Yes, they are going to recite the poem.’
- (17) a. Jean-Paul: Est-ce qu'il va faire sa valise?
 Q he go.PRS.3.SG do.INF his suitcase
 ‘Is he going to pack his suitcase?’
- b. Marie-Claire: Oui, il va faire la
 yes he goes.PRS.3.SG pack.INF it
 ‘Yes, he is going to pack it.’
- (18) a. Jean-Paul: Est-ce que Simon va parler à sa sœur?
 Q Simon goes.PRS.3.SG talk.INF to his sister
 ‘Is Simon going to talk to his sister?’
- b. Marie-Claire: Oui, il va parler ce matin.
 yes he goes.PRS.3.SG talk.INF this morning
 ‘Yes, he is going to talk this morning.’
- (19) a. Jean-Paul : Quand est-ce que Simon fait ses devoirs?
 when Q Simon do.3.PRS.SG his homework
 ‘When does Simon do his homework.’
- b. Marie-Claire: Il fait toujours ses devoirs le matin.
 he do.3.PRS.SG always his homework the morning
 ‘He always does his homework in the morning.’
- (20) a. Jean-Paul: Quand est-ce que Simon fait ses devoirs?
 when Q Simon do.3.PRS.SG his homework
 ‘When does Simon do his homework.’
- b. Marie-Claire: Il toujours fait ses devoirs le matin.
 he always do.3.PRS.SG his homework the morning
 ‘He always does his homework in the morning.’

5.2 Preference task

The second task was a written preference task. The task consisted of 20 experimental tokens and 10 fillers. The experimental tokens in this task tested: preverbal object clitic constructions (S-Cl-V) and constructions in which the obligatory object clitic is missing (S-

V) as in (21). The filler focused on adverb placement in French as in (22). The participants were presented with two-person dialogues on a screen. Contrary to the previous task, the participants were presented with two versions of the second person's response: version (i) and (ii). The two versions differed only in syntactic form. The participants were asked to choose the version that they preferred. However, the answer grid was organized in such a way that the participants were able to select other answers: they could accept or reject both answers and they could also mention that versions (i) and (ii) were not relevant.

- (21) a. Jean-Paul: Est-ce qu' ils vont reciter le poème ?
 Q they go.PRS.3.PL recite.INF the poem
 'Are they going to recite the poem?'

- b. Marie-Claire: (i) Oui, ils vont le reciter.
 yes they go.PRS.3.PL it recite.INF
 (ii) Oui, ils vont reciter.
 yes they go.PRS.3.PL recite.INF
 'Yes, they are going to recite it.'

- (22) a. Jean-Paul: Est-ce que Pierre regarde la télé le soir ?
 Q Pierre see.3.PRS.SG the television the evening
 'Does Pierre watch TV in the evening?'

- b. Marie-Claire: (i) Oui, il regard toujours la télé le soir
 yes he see.3.PRS.SG always the television the evening
 (ii) Oui, il toujours regard la télé le soir
 yes he always see PRS.SG the television the evening
 'Yes, he always watches TV in the evening'

5.3 Production Task

The final task was the production task. It included 25 tokens. 15 tokens were experimental tokens whereas the other 10 were fillers. The tokens were presented on a slide, and on each slide, there was a picture of a person or people engaged in an activity. The participants were asked a question about pictures that they saw on the slides as illustrated in figure (1) and (2). The questions were presented both orally and in writing on a screen as illustrated in (23) and (24). The participants were instructed to use the words on the slides when answering the questions posed by the researcher. The answers of the participants were audio recorded and then transcribed. The fillers focused on adverb placement in French as in (25) and (26).

- (23) Charlotte achète une soupe.
 Charlotte buy.PRS.3.SG a soup
 'Today, Charlotte has bought a soup.'

- (24) Qu'est-ce qu' elle fait avec sa soupe?
 Q she do.PRS.3.SG with her soup
 'What is she doing with her soup?'



maintenant
Figure 1. Clitic test item

- (25) Simon adore son chien
 Simon adore.PRS.3.SG his dog
 'Simon loves his dog.'

- (26) Est-ce qu'il lave son chien?
 Q he bath.PRS.3.SG his dog
 'Does he bath his dog?'



Figure 1. filler test item

6. Results

Table 2 summarizes the results of the written acceptability judgment task. The results showed that the L1 speakers and L2 speakers rejected post-verbal object clitic tokens (S-V-Cl). The native speakers had a high mean rating ($M=1.82$, $SD= 0.20$) for the preverbal object clitic tokens (S-Cl-V) and a low mean rating ($M=-1.70$, $SD= 0.33$) for the tokens in which objects were omitted (S-V). However, L2 speakers had low mean ratings for both conditions: S-Cl-V ($M=0.72$, $SD= 0.55$) and S-V ($M=0.30$, $SD= 0.72$). The paired sample t -test was conducted for the two conditions (S-Cl-V and *S-V). The result for the native speakers was statistically significant ($t(8)=24.1$, $p <.001$). However, in contrast to the native speakers, the paired sample t -test result of the L2 speakers was not statistically significant ($t(12)=1.28$, $p=.228$).

	Native Speakers		L2 Speakers	
Word order	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
S-Cl-V	1.82	0.20	0.72	0.55
S-V-O	1.80	0.21	1.82	0.20
*S-V-Cl	-2.00	0.00	-1.93	0.10
*S-V	-1.72	0.33	0.30	0.70

Table 2. Mean ratings in Written Acceptability judgment task (scale = -2–+2)

The preference task tested preverbal object clitic constructions (S-Cl-V) and constructions in which the compulsory object clitic was omitted (*S-V). The participants were presented with two sentences that differed only in syntactic form (cf. section 6.2). The participants were asked to choose one sentence that they preferred. However, the answer grid was organized in a way that the participants could accept or reject both sentences or they could also mention that versions (i) and (ii) were not relevant. Table 3 reports S-Cl-V and *S-V choices in percentages.

	L2 Speakers	Native Speakers
S-Cl-V	65	99
*S-V	23	01
a) and b) are equally good or bad	10	00
Neither a) nor b)	02	00

Table 3. Preference task results: S-Cl-V and *S-V choices in percentages

The native speakers showed a strong preference for S-Cl-V order with an acceptance rate of 99% while L2 speakers showed a low preference for S-Cl-V order with an acceptance rate of 65%. The L2 speaker's preference for *S-V was relatively high (23%). The two groups were

significantly different. Table 4 summarizes the results of the production task. In the production task, L2 speakers performed significantly different from the native speakers. 42% of the L2 data contained the construction in which the object clitic was omitted. Only 35% L2 data consisted of preverbal object clitic constructions. In general, the L2 speakers, unlike the native speakers, produced both grammatical (S-Cl-V) and ungrammatical (*S-V) orders. 23% of L2 data contained S-V-O order and it was an indication that L2 speakers were uncertain about the position of object clitics.

	L2 Speakers	Native Speakers
S-Cl-V	35	100
*S-V	42	00
S-V-O	23	00

Table 4. Production task results: S-Cl-V, *S-V and S-V-O choices in percentages

7. Discussion and conclusion

The present study endeavours to test two very strong hypotheses which I will revisit now:

- (i) L1 English L2 French speakers will accept post-verbal clitics in French
- (ii) L1 English L2 French speakers will allow null referential object pronouns in French.

The results clearly did not support hypothesis (i). In the written acceptability judgment task, L2 speakers attributed a very low mean rating for S-V-Cl order ($M=-1.93$, $SD= 0.10$) and in the production task, they did not produce post-verbal object clitic constructions. However, the results support hypothesis (ii). The L2 speakers attributed a relatively high mean rating for S-V ($M=0.30$, $SD= 0.72$) order. Their distinction between the grammatical condition (S-Cl-V) and the ungrammatical condition (*S-V) was not statistically significant.

In the preference task, they also showed a relatively high preference for *S-V order (23%). Thus, the most significant result was recorded in the production task. They showed a strong preference for object clitic omitted constructions (42%).

It is important to discuss why L2 speakers produced and accepted null object constructions which are neither grammatical in English nor in French. The results of the present study are compatible with parameter mis-setting hypothesis proposed by Towell & Hawkins (1994). Towell & Hawkins (1994:137) argue that L2 speakers ‘initially hypothesise that French has object *pro*, based on the absence of phonetically specified pronouns in the post-verbal position’. They point out that there is enough evidence in the input to confirm this hypothesis, based on constructions like (27).

- (27) a. Jean-Paul : Est-ce qu' il recite le poème ?
 Q he recite.PRS 3.SG the poem
 ‘Does he recite the poem?’
- b. Marie-Claire : Oui, il le recite (pro).
 yes he it recite.PRS 3.SG
 ‘Yes, he recites it’

Towell & Hawkins (1994:137) argue that L2 speakers should comprehend the ‘biconditional relation between’ an empty post-verbal position and a clitic. An empty post-verbal position is licenced only if there is a clitic in preverbal position. The results suggest that L2 speakers have not yet established the biconditional relationship between empty post-verbal positions and clitics. The L2 participants in this study were intermediate learners of French. Therefore, the present study suggests that null objects are permitted by intermediate interlanguage grammar.

Abbreviations

1SG	First Person Singular	INF	Infinitive
2SG	Second Person Singular	PRS	Present
3SG	Third Person Singular	PST	Past
PTCP	Participle Q Question		
AUX	Auxiliary		

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Necessity, directives, and three types of imperatives

Shun Ihara

In Japanese, dictionary (i.e. end) form sentences and *yooni* form sentences can represent ‘directive’ (or ‘command’) speech acts, just like the typical imperative form imperatives. This study investigates properties of three types of imperatives in Japanese: Morphological Imperatives (MIs), Dictionary form Imperatives (DIs), and *Yooni* Imperatives (YIs). What is the difference among MIs, DIs, and YIs? Specifically, (i) how do they semantically differ from one another? and (ii) what makes the difference among these three imperatives? I argue that the difference depends on whether they encode a weak necessity modal (Silk 2013, 2016) and a directive presupposition operator (Kaufmann 2012) or not.

1. Introduction

Japanese has a so-called imperative morpheme (i.e. *-e* or *-ro*) which makes a sentence an imperative and thus allows it to be used as a directive speech act, as shown in (1). I will refer to this canonical type of imperatives as *Morphological Imperatives* (henceforth ‘MIs’).

- (1) Hayaku ik-e!
quickly go-IMP
'Go quickly!'

On the other hand, some Japanese sentences can function as imperatives without including an imperative morpheme. One of such sentences is referred to as *Dictionary form Imperatives* (henceforth ‘DIs’, cf. Noguchi 2016; Ihara & Noguchi 2018), where a verb stem is followed by the present tense affix *-(r)u*, as shown in (2).

- (2) Hayaku ik-u!
quickly go-PRESENT
'Go quickly!'

The third type of imperatives that I will take into consideration is *Yooni* Imperatives (henceforth ‘YIs’), where a verb is followed by the particle *yooni* ‘in order to’, as exemplified in (3).

- (3) Hayaku ik-u yooni!
 quickly go-PRS YOONI
 ‘Go quickly!’

Considering existence of these different kinds of imperatives, two of the big questions which one might pose are: (i) how they semantically differ from one another and (ii) what makes the difference among them. This paper investigates these two questions and, by proposing semantic and syntactic structures for the two types of imperatives, argues that the difference among MIs, DIs and YIs depends on whether or not they encode *the weak necessity modality* (Silk 2013, 2016) and *the directive operator* (or ‘imperative operator’, Kaufmann 2012). More specifically, I contend that (i) MIs encode both the weak necessity and the directive operator, (ii) DIs only clause-externally represent the directive operator (without including any necessity modality), and (iii) YIs clause-internally encode the weak necessity modal, but do not encode the directive operator.

This paper is organized as follows. In Section 2, I present some key data which indicate asymmetries among MIs, DIs and YIs in Japanese. Section 3 lays out the semantic analyses of Silk (2013, 2016) on the weak necessity modality. Based on the discussion in the foregoing sections, in Section 4 I present my proposal on logical forms for the three types of imperatives. In Section 5, I describe how the present proposal accounts for the puzzles shown in Section 2. Section 6 concludes the paper.

2. Key data: motivating the proposal

This section presents some data which are crucial for my argument. Specifically, I indicate that the three types of imperatives behave in different manners with respect to (i) weak readings, (ii) embeddability, (iii) addressee-orientation of subjects, and (iv) temporal immediacy.

2.1. Weak readings of imperatives

I first observe ‘weak’ readings in Japanese imperatives. It has been pointed out in the literature that English imperatives can pattern with both ‘strong’ readings (e.g. directive) and all kinds of ‘weak’ ones (e.g. advice, permission, wish) (See Portner 2007, Condoravdi & Lauer 2012, Kaufmann 2012 for approaches to these readings). Relevant examples are shown in (4) and (5). Note particularly that the imperatives in (5a) and (5b) are contextually forced to be construed as advice and permission, respectively, due to the clause following it i.e., ‘but you *can* also take the bus’ in (5a) and ‘if you are hot’ in (5b).

- (4) Strong reading:
 (out-of-the-blue context)
 Go to bed! [directive]

(5) Weak reading:

- a. (OK,) Take the train! But you can also take the bus. [*advice*]
- b. Open the window, if you are hot! [*permission*]

Unlike imperatives, on the other hand, sentences with the strong necessity modal in English *must* can only pattern with strong readings, not with weak ones. In other words, sentences including the strong modal cannot be interpreted as advice or permission but can be only as strong readings, as exemplified in (6) and (7).

(6) Strong reading:

You must go to bed!

(7) Weak reading:

- a. # You must take the train! But you can also take the bus. [*advice*]
- b. # You must open the window, if you are hot! [*permission*]

Bearing these differences in mind, let me now observe how Japanese imperatives behave with respect to weak readings.¹ Japanese MIs and YIs can show weak readings, as do English imperatives (cf. (5)). Relevant examples are shown below:

- (8) a. Densha-ni nor-e yo. Basu-mo a-ru kedo ne.
 train-to take-IMP SFP bus-too exist-PRS but SFP
 ‘Take a train. But there’s also a bus.’
- b. Mosi atui-no nara, mado-o ake-ro.
 if hot-C then windo-ACC open-IMP
 ‘Open the window, if you are hot.’

- (9) a. Densha-ni nor-u yooni. Basu-mo a-ru kedo ne.
 train-to take-PRS YOONI bus-too exist-PRS but SFP
 ‘Take a train. But there’s also a bus.’
- b. Mosi atui-no nara, mado-o ake-ru yooni.
 if hot-C then windo-ACC open-PRS YOONI
 ‘Open the window, if you are hot.’

On the other hand, however, Japanese DIs cannot indicate any kind of weak reading, in the same manner as English sentences including *must* (cf. (7)), as exemplified in (10).

- (10) a. # Densha-ni nor-u! Basu-mo a-ru kedo ne.
 train-to take-PRS bus-too exist-PRS but SFP
 ‘Take a train! But there’s also a bus.’
- b. # Mosi atui-no nara, mado-o ake-ru!
 if hot-C then windo-ACC open-PRS
 ‘Open the window, if you are hot.’

¹Since it is self-evident that the three imperatives in Japanese (i.e., MIs, DIs, and YIs) can show strong readings (cf. (4)), we will not here deal with strong readings of them.

The present observation thus indicates that MIs and YIs have both weak and strong readings while DIs have only strong readings.

2.2. *Embeddability*

The second property of the three types of Japanese imperatives has to do with embeddability. First of all, both Japanese MIs and YIs can be embedded as an indirect quotation, which is headed by the quotation marker *to* (Kuno 1973, Saito & Haraguchi 2012), as in (11) and (12). It is worth noting that the *to*-clause in (11) and (12) is interpreted as an indirect quotation, not a direct one, since the pronominal element in the embedded clause (i.e. *kanojo* ‘she’) is co-indexed with *Aya* in the matrix clause, construed from the viewpoint of the speaker of the quotation (i.e. *Ken*).

- (11) Ken-ga Aya_i-ni [kanojo_i-no haha-o tetuda-e to] it-ta.
Ken-NOM Aya-to she-GEN mother-ACC help-IMP C say-PST
‘Ken told Aya to help her mother.’
- (12) Ken-ga Aya_i-ni [kanojo_i-no haha-o tetuda-u yooni to] it-ta.
Ken-NOM Aya-to she-GEN mother-ACC help-PRES YOONI C say-PST
‘Ken told Aya to help her mother.’

(13) indicates, on the other hand, that Japanese DIs, unlike MIs or YIs, cannot be embedded as an indirect quotation (Noguchi 2016). Notice that the embedded clause can be naturally understood as an assertion (declarative), as the translation suggests; of importance here is that it cannot be interpreted as an imperative.

- (13) Ken-ga Aya_i-ni [kanojo_i-no haha-o tetuda-u to] it-ta.
Ken-NOM Aya-to she-GEN mother-ACC help-PRS C say-PST
~ ‘Ken told Aya that he will help her mother.’
✗ ‘Ken told Aya to help her mother.’

The current data lead us to conclude that Japanese DIs and MIs/YIs are different in whether they can be embedded under indirect discourse or not.

2.3. *Addressee-orientation of subjects*

I observe the third property of Japanese imperatives in terms of their subjects. Interestingly, subjects in Japanese MIs and YIs can be co-indexed not only with an addressee (i.e. the 2nd person *omae* ‘you’) but also with the 3rd person *aitsu* ‘he/she’, as indicated in (14) and (15).²

²Note that the sentences in (14) and (15) are interpreted as ‘desiderative’ or ‘complaintive,’ rather than directive. I will not mention this point any longer, since it is irrelevant to the present discussion. I refer interested readers to Ihara & Noguchi (2017) for details of this property.

- (14) a. (Omae) hayaku ik-e!
 you.2nd quickly go-IMP
 ‘Go quickly!’
- b. (Aitsu) hayaku denwa-ni de-ro!
 that.man.3rd quickly phone-to take-IMP
 [Lit.] ‘Pick up the phone quickly!’
- (15) a. (Omae) hayaku ik-u yooni!
 you.2nd quickly go-PRS YOONI
 ‘Go quickly!’
- b. (Aitsu) hayaku denwa-ni de-ru yooni!
 that.man.3rd quickly phone-to take-PRS YOONI
 [Lit.] ‘Pick up the phone quickly!’

This property, however, cannot be found in Japanese DIs. Specifically, subjects of DIs can only refer to the 2nd person, or an addressee, as exemplified in (16).

- (16) a. (Omae) hayaku ik-u!
 you.2nd quickly go-PRS
 ‘Go quickly!’
- b. # (Aitsu) hayaku denwa-ni de-ru!
 that.man.3rd quickly phone-to take-PRS
 [Lit.] ‘Pick up the phone quickly!’

Thus, from the current data, we can see an asymmetry in what kind of subjects the three imperatives can take.

2.4. *Temporal immediacy*

I finally point out the (in)felicitousness of uttering the three imperatives with respect to immediate contexts. As the examples in (17) and (18), it is quite natural to utter MIs and DIs in contexts where the speaker gives the addressee an immediate/urgent order.

- (17) [Context: the speaker is a college football coach. During the game, he yells to his team player]
 (Sassato) pasushi-ro!
 right.now pass-IMP
 ‘Pass it over there (now)!’
- (18) [The context in (17)]
 (Sassato) pasusu-ru!
 right.now pass-PRS
 ‘Pass it over there (now)!’

As (19) below shows, YIs cannot be used in such contexts; they can indeed be uttered as imperatives (cf. (3)), but the data suggests that contexts in which they can be felicitous are restricted to non-immediate situations.

- (19) [The context in (17)]

(Sassato) pasusu-ru yooni!
right.now pass-PRS YOONI
'Pass it over there (now)!'

2.5. Summarizing the behavior

I have so far confirmed that there exist empirical asymmetries among the three types of Japanese imperatives, namely MIs, DIs and YIs. More specifically, the three imperatives in Japanese are different in terms of the possibility of weak readings, embeddability, addressee-orientation of subjects, and temporal immediacy. Those asymmetries are organized into Table 1. In the following section, I propose semantic structures for the three imperatives in Japanese.

	weak readings	embeddability	addressee-orientation	temporal immediacy
MIs	✓	✓	2nd/3rd	✓
DIs	*	*	2nd/*3rd	✓
YIs	✓	✓	2nd/3rd	*

Table 1: The properties of the three imperatives

3. The semantics of weak necessity

In this section I briefly introduce the semantics of weak necessity for the current analysis as a preliminary for the analysis. In this paper, I adopt the analysis of Medeiros (2013) that imperative morphology (in other words, MI) semantically represents the modal content called *weak necessity modal* ' \square_{wn} ' (Silk 2013, 2016) which is roughly equivalent to *ought* or *should* in their interpretation, and operates independently of the imperative speech act operator. Specific analysis of imperatives therefore depends completely upon the formal analysis of weak necessity. While Silk's formalism itself is not crucial for the analysis, the formalization is convenient to make explicit the comparison between strong and weak necessity. Moreover, this formalism is more directly comparable to the semantics of imperative presupposition operator adopted by Kaufmann (2012) (that I will introduce in Section 4) as compared to the theory of weak necessity suggested by von Fintel & Iatridou (2008), since the latter introduces a third ordering source (Medeiros 2013).

Silk's model of weak necessity depends upon premise sets P , which simplify the interaction of modal base and ordering source within Kratzerian modal semantics (Kratzer 1981, 1991). Premise sets P describe functions that the context supplies for the interpretation of modals. The

value of P given a world of evaluation is a saturated premise set $P(w)$.³ Within this model, strong necessity *must* is defined as follows:

$$(20) \quad \llbracket \text{must}(p) \rrbracket = 1 \text{ iff } \cap P(w) \subseteq \llbracket p \rrbracket \quad (\text{Silk 2013, cf. Silk 2016})$$

That is, the truth of ‘*must(p)*’ is checked by comparing whether the conditions in the evaluation world w are such that the premise set $P(w)$ verifies the necessity of p . The truth of strong necessity thus simply depends on the value of P at w .

Silk then relates weak necessity to strong necessity in terms of conditional or contingent necessity; weak necessity therefore defines what is necessary if certain conditions hold. Weak necessity *ought* and *should* is defined as (15).

$$(21) \quad \llbracket \text{ought}/\text{should}(p) \rrbracket = 1 \text{ iff } \forall w' \in \mathcal{H}(w, \chi) : \cap P(w') \subseteq \llbracket p \rrbracket \\ \text{where } \mathcal{H} \text{ is a selection function which selects a set of } \chi\text{-worlds that are closest to } w. \quad (\text{Silk 2013})$$

A selection function \mathcal{H} picks out a set of relevant worlds that are *preferred* in some contextually relevant sense, i.e., most normal, expected, desirable worlds. Given the definition above, ‘*ought/should(p)*’ is true if and only if the contextually preferred worlds w' verify the necessity of p , namely if and only if p follows from the relevant P at every $w' \in \mathcal{H}(w, \chi)$. In other words, weak necessity ‘*ought/should p*’ makes a claim about the necessity of p at all closest relevant χ -worlds, for some contextually supplied condition χ .

Under this model, weak necessity is contingent necessity. Medeiros (2013) therefore suggests that under the right contextual circumstances, MIs in many languages (including e.g. English) can pattern both with weak readings (e.g. permission, advice), and can have strong readings like *must*, as I have shown in Section 2.

4. Proposal

4.1. The semantics of the presupposition of imperatives

Before moving on to illustrate my proposal, I give some assumptions of (canonical) imperatives in Japanese. First, Japanese imperative morphology (i.e. *-e/ro*) encodes weak necessity just as that of English does (Ihara & Noguchi to appear). Second, clauses with verbs that bear imperative morphology do not define a proper subset of any clause type (Medeiros 2013). In short, ‘directive’ (or imperative speech act) force is represented independently of imperative morphology; instead, the directive force appears as directive force operator ‘*dir*,’ which requires the presupposition of imperatives, and ensures the performative effect of directive speech acts, as shown in (22) (Kaufmann 2012, Medeiros 2013). Note that Kaufmann (2012) proposes an

³Silk (2013: 18, footnote 9) provides the explanation of the relationship between premise sets P and Kratzer’s conversational backgrounds as follows:

‘[...] what follows from $P(w)$ can be understood as short for talk about what follows from all maximally consistent subsets of $f(w) \cup g(w)$, where $f(w)$ is a modal base that describes some set of relevant background facts and $g(w)$ is an ordering source that represents the content of the relevant ideal evaluation world.’

imperative operator with propositional modal and presuppositional ingredients.⁴ In this respect Kaufmann's system stands in contrast to the system that Medeiros (2013) proposes, in which the propositional and presuppositional elements are separated in terms of their semantic representation.

- (22) Directive operator *dir* is defined only iff:

- a. $\neg(t < c_T) \wedge$
- b. $f, g \in \text{AUTH}'(c_S)(c) \wedge$
- c. For the precontext c' of c :
 $c_S(c') \subseteq \lambda w. (\exists w' \in \text{Bel}'_{c_S}(c'_T)(w))(\exists w'' \in \text{Bel}'_{c_S}(c'_T)(w))$
 $[\neg P(t)(w') \& P(t)(w'')] \wedge$
- d. Either (i) in c there is a salient decision problem $\Delta(c) \subseteq P(w)$ such that in c the imperative provides and answer to it, g is any prioritizing ordering source, and the speaker and addressee consider g the relevant criteria for resolving $\Delta(c)$;
or else, (ii) in c there is no salient decision problem $\Delta(c)$ such that the imperative provides an answer to it in c , and g is speaker bouletic.

(Kaufmann 2012:162)

First, the presupposition (22a) ensures that the imperative can or will occur in the future (more formally, at or following utterance time). Second, the presupposition (22b) ensures that the speaker in c in an 'epistemically privileged position' with respect to the conversational backgrounds f and g (cf. Zimmermann 2000).⁵ The third presupposition in (22c), the presupposition of epistemic uncertainty, ensures that the speaker believes that fulfillment of the imperative is possible, but not a foregone conclusion. Finally, the presupposition (22d) ensures that the ordering source g must be prioritizing or speaker bouletic (see Kaufmann (2012:158–161) for some crucial data).⁶ I do not go into further details due to limitations of space, but this approach works well enough to derive the difference among the three imperatives.

⁴Kaufmann does not mention any reason why they have to be 'presuppositions'; one may think about a possibility that they are conversational implicature (CI), in line with Grice (1975), Potts (2007), McCready (2010), rather than presuppositions. Although it may be worth demonstrating some tests e.g., projection tests or cancelation tests to show they are actually presuppositions, the valid tests for the case in imperatives (i.e., the tests to diagnose whether the meaning of imperatives are presuppositions or not) are still unclear since these 'tests' have exclusively drawn attention to the case in declaratives. What might 'cancel' or 'projection' in imperatives be? What we need to do in the future is to extend these terminologies to the analysis of behaviors of speech act operators.

⁵Kaufmann follows Zimmermann (2000) who employs it in a similar way to explain epistemic authority in connection with free choice disjunctions. The condition in (22b) is strong enough to derive what Zimmermann (2000:286) calls the *authority principle*, which says that if an authority takes p to be possible then the authority believes p .

⁶For example, given the presupposition (22d), the infelicity of example (i) below becomes obvious. At the same time, it is not ruled out that the speaker personally does not care about the outcome of the decision problem (as in advice, consider B in (ii)), or even that he personally dislikes the outcome of the decision process, as long as he acknowledges that the addressee is applying the right set of criteria.

- (i) Call Mell! #But I don't want you to call her.
- (ii) A: How do I get to Harlem?
B: Take the A-train.
B': #Take the A-train but I don't want you to do this.

Given these assumptions, the meaning of canonical form imperatives can be divided into the two-part semantics: (i) the ‘modal’ meaning which shows the speaker’s weak necessity modality and (ii) the speaker’s (actual) directive ‘speech act’ meaning conveyed by the directive operator, as illustrated below.

- (23) Go straight!

- ~(i) The speaker believes that the addressee should go straight.
- ~(ii) The speaker gives the addressee an order to go straight.

4.2. *Imperatives with/without weak necessity*

In this section, I propose an analysis of the three imperatives: MIs, DIs, and YIs. First, for the analysis of MIs in Japanese, I basically maintain Medeiros’s (2013) analysis of canonical form imperatives, as shown in (24).

- (24) The LF of MIs (in command contexts):

$$[\text{SAP } \textit{dir} [\text{TP (or ModalP)} \square_{wn} [p : [\dots v_{imp} \dots]]]]$$

Departing from Medeiros, I represent the directive operator at Speech Act Phrase (SAP; Speas & Tenny 2003, among many others). I assume that any element which occurs at the level of SAP cannot be embedded under indirect quotation (see Saito & Haraguchi 2012). For instance, Japanese sentence final particles like *yo* or *ne*, which Saito & Haraguchi (2012) claim head SAP, cannot appear in an indirect quotation clause (see also Deng (2015) for Chinese sentence-final particle *ba*). The key here is that the representation in (24) contains the two components at different positions: the presuppositional content ‘*dir*’ is located clause-externally at SAP on the one hand and weak necessity modality ‘ \square_{wn} ’ is located at clause-internal level (namely at TP) on the other.⁷

I now propose the LF of DIs in (25). The representation in (25) differs from the one in (24) in that it is not modalized; it only encodes the directive operator at SAP. That is, while the existence of the directive operator *dir* is not the necessary condition for realization of MIs (as I will discuss in Section 5), the existence of *dir* is essential for sentences with a dictionary form verb to become a directive. In other words, the illocutionary force of dictionary form sentences depends on the presupposition operator which arises at the level of SAP: it gets an imperative force iff the presupposition of *dir* is fulfilled. If not, it obtains an assertion force. In this respect, DIs are ‘marked.’

- (25) The LF of DIs:

$$[\text{SAP } \textit{dir} [\text{TP} [p : [\dots v_{dic} \dots]]]]$$

I argue that the differences between MIs and DIs (that I have pointed out in Section 2) can be explained by focusing on whether or not they contain the weak necessity operator.

What, then, is the LF of YIs like? I propose that unlike MIs and DIs, YIs lack the directive operator, as represented in (26).

⁷Note that my proposal also allows the weak necessity modal to be placed ModalP, above TP. While I do not pursue a syntactic distinction between modals here, Isac (2012) shows that if a high/low distinction is to be made, the imperative modal would be high.

- (26) The LF of YIs:

$$[\text{SAP } \textit{assert} [\text{TP(or ModalP)} \square_{wn} [p : [\dots v_{\textit{pres}} \text{YOONI} \dots]]]]]$$

The representation of YIs in (26) and the one of MIs in (24) shares weak necessity modality clause-internally, but the forms differ with respect to presuppositional content i.e., the directive operator. I argue that instead of containing the directive content ‘dir,’ YIs represent the assertion operator ‘assert’ at SAP. In that sense, YIs could be characterized as ‘pseudo-imperatives.’⁸ Independent evidence for the view that YIs are assertive (or that at least they are not ‘true’ imperatives but ‘pseudo’) is provided by the data below: their inability to function in question/answer pairs.⁹

- (27) A: What did you order Mary to do?

B:

a. *Imperative*

Hashir-e.

run-IMP

‘Run.’

b. *Assertion*

Hashiru-no-o meiji-ta.
run.PRS-NMLZ-acc order-PAST

‘I ordered her to run.’

c. *Yooni-sentence*

Hashi-ru yooni.
run-PRS YOONI

‘I ordered her to run.’

Obviously, the assertion in (27b) characteristically serves to answer the given question, and the imperative in (27a) would not do so. Interestingly, the sentence with *yooni* (i.e. YI) in (27c) can felicitously answer the question uttered. In addition to this, it would be more explainable to assume that YIs are (at least) not ‘true’ imperatives (and thus not encode directive operator) when considering the data of immediacy (cf. (17)–(19)), as I will discuss in the next section. The task to develop detailed analyses to confirm whether or not YIs are really a variety of assertions is beyond the scope of the current work and will be left to future research; it is worth emphasizing, however, that YIs (and MIs) are modalized as weak necessity, unlike DIs.

⁸I would have to note that the LF of YIs in (26) is still incomplete. Since the LF in (26) has an assertive operator but has no directive operator, YI has no presuppositions in (22). It is then predicted that YIs can be used even if (22a–d) is not fulfilled, which is apparently not the case. (I would like to thank a reviewer for pointing out this problem.) One solution to overcome this problem is that the operator generated in a YI is not simply ‘assert’, but rather an assertive operator which has directive-like presuppositions. For example, an operator which is intuitively interpreted as ‘I order you/him/her’ may require some presupposition as in (22), which predicts that YIs should not be used if the presuppositions are not fulfilled. The task to develop this will be left to future research.

⁹See Zanuttini & Portner (2003) for the case in exclamatives.

5. Analysis

Section 5 shows how the current proposal can handle the contrast among the three types of imperatives.

5.1. Deriving the weak readings property

First, I give an account for the fact that MIs/YIs and DIs are different in the property of weak readings. Recall that while MIs and YIs can pattern with any weak reading like permission or advice, uttering DIs in such contexts becomes odd (cf. (8)–(10)). I argue that this is simply because the existence of a weak necessity modal enables sentences to have weak readings. As predicted, MIs and YIs can be uttered as weak imperatives since they contain weak necessity modality (cf. (24), (26)). This analysis supports the common view that strong/weak readings among (canonical form) imperatives should be understood at the level of semantics since they all share the meaning of ‘requiring’ (Portner 2010; Kaufmann 2012).

On the other hand, DIs can only have strong readings i.e., cannot have weak readings because of the lack of any necessity modal (cf. (25)). Then why can they have strong readings? I argue that the directive operator makes them possible to be a directive utterance. The task of discussing whether the directive operator in DIs is phonologically overt or not is beyond the scope of the current work and will be left to future research; it is worth noting, however, that disregarding intonation, a DI in Japanese can be interpreted either imperative or declarative. In order for the sentence to get an imperative interpretation, it has to be pronounced with a special intonation, where originally high-accented moras in the verb get a higher accent (Noguchi 2016). Although some more phonological analysis is needed, we could assume that the directive operator in DIs is marked by the special sentence final intonation.¹⁰

One may think that there still remains a possibility that DIs encode strong necessity which is interpreted like *must*. This possibility, however, will be eliminated once we pay attention to the data of embedded imperatives, as I will show in the next section.

5.2. Interpreting embedded imperatives

I have shown in Section 2.2 that while MIs and YIs can be embedded as an indirect quotation, DIs cannot: DIs can only be embedded under direct discourse. I suggest that this property can also be explained by focusing on the existence of the weak necessity. First, both MIs and YIs can induce imperative-like meanings even when they are indirectly embedded since they contain weak necessity modal clause-internally (cf. Kaufmann 2012), as the illustration in (28) and (29) show (cf. (11), (12)).

¹⁰Heim et al. (2014) claim that intonation can head SAP and is responsible for determining an illocutionary force of a sentence. Based on that, it can be said that the special intonation of a DI occupies the head of SAP and is responsible for the directive force.

- (28) Ken-ga Aya-ni [MI/YI $\Box_{wn} p$] to it-ta.
 Ken-NOM Aya-to C say-PST
 ‘Ken told Aya that $\Box_{wn} p$.’
 [MI/YI $\Box_{wn} p$] \rightsquigarrow ‘it is necessary that p ’

As for DIs, since they lack a necessity modal operator, they cannot be embedded in an indirect discourse with imperative meanings. This analysis correctly predicts that when a dictionary form sentence is indirectly embedded, its interpretation is limited to an assertion (a declarative), as shown in (29) (cf. (13)). Recall that the directive operator operates at the level of SAP and thus cannot be embedded under indirect quotations (see section 4.2).

- (29) Ken-ga Aya-ni [Dic-form clause p] to it-ta.
 Ken-NOM Aya-to C say-PST
 ‘Ken said Aya that p .’
 [Dic-form clause p] \rightsquigarrow ‘it is the case that p ’
 ([Dic-form clause p]: $\not\rightsquigarrow$ ‘it is necessary that p ’)

Moreover, the alternative analysis that DIs encode strong necessity would end up providing a prediction that embedded sentences with a dictionary form verb in (29) must convey a strong necessity meaning since there is no reason to exclude a strong necessity modal from indirect-embedding, contrary to the fact.

5.3. Directive performativity and the property of addressee-orientation

Next, I show that the addressee-orientation property of imperatives can be understood within the current proposal. I assume that in the model of this paper, MIs (at least in Japanese) are not inherently addressee-oriented in terms of their semantic or syntactic representation. Rather, the property of addressee-orientation is the property of *directive speech acts*. In other words, the directive operator demands the subject to be the addressee, namely the 2nd person, but the imperative morphology itself does not.

Let me handle the behavior of DIs first. As I have shown in Section 2.3, a subject in DIs can be co-indexed only with the 2nd person addressee. I explain this fact by arguing that since DIs must come with the directive operator, which enforces the presupposition of the existence of the addressee, they cannot occur with subjects other than the 2nd person. It is worth noting, however, that the question of why DIs can only pattern with *true* directive speech acts which require existence of the addressee still remains unclear: Is the addressee-orientation property of DIs a feature of the dictionary form itself, a feature of the special sentence final intonation, or the compositional feature of ‘dictionary form + special intonation’? For the first step we need to investigate a full description of correlation with intonations and the semantic/pragmatic status of a dictionary form verb in Japanese, to which little attention has been paid. I leave this issue to future study.

In contrast to DIs, since the existence of the directive operator is not a necessary condition for realization of MIs and YIs, their subjects can be co-indexed not only with the addressee (i.e. the 2nd person) but also with the 3rd person: while in directive contexts, the directive presupposition requires that subjects of MIs be the 2nd person, in non-directive contexts (such

as ‘desiderative’ or ‘complaintive’; See Ihara & Noguchi 2017: Section 1), where the addressee-orientation presupposition does not have to be fulfilled, their subjects are not limited to the 2nd person but can also be the 3rd person. As for YIs, there exists no reason to restrict their subjects since the operator that appears in YIs is in fact the assertion (cf. (26)).

Under the current analysis, the difference with respect to person-orientation of imperative subjects is pushed into *language-specific* morphological systems (cf. Medeiros 2013). The fact that Japanese morphological imperatives, namely MIs, allow both 2nd and 3rd person subject is a property of Japanese, not imperatives. At the same time, the fact that English imperatives take only 2nd person subjects is a property English, not imperatives.

5.4. Temporal immediacy and directiveness

Finally, I give an account for the fact that while MIs and DIs can felicitously pattern with immediate contexts, YIs cannot. I argue that the felicitousness in immediate contexts can be explained by assuming that the existence of the directive operator *dir* enables sentences to be immediate directives; without the directive operator, sentences cannot obtain the property of temporal immediacy.

For example, assume that t^c is a future time in c and t_{imm}^c is an immediate future in t^c ($t_{imm}^c \subset t^c$). Then, sentences with *dir*, namely ‘true’ directives, can make a command which occurs at any future time in t^c including t_{imm}^c , whereas sentences without *dir* (which can be characterized as ‘non-canonical imperatives’ (cf. Grosz 2012 and the references therein) such as YIs or assertions with necessity modals) can only make a request about non-immediate future time $t^c - t_{imm}^c$.

Based on this, an explanation of the temporal property of the three imperatives is straightforwardly given as follows: both MIs and DIs can be an immediate directive since they encode the directive operator, whereas YIs are infelicitous in immediate contexts since they lack the operator, as the LF in (26) suggests. To be more specific, YIs are (at least) not true directives, but rather they are more like modalized assertions. For example, consider the utterance ‘Stop it!’ in (30)-(32), which is typically used in an urgent situation.¹¹

- (30) Yame-ro!
stop.it-IMP
‘Stop it!'
- (31) Yame-ru!
stop.it-PRS
‘Stop it!'
- (32) # Yame-ru yooni!
stop.it-PRS YOONI
‘Stop it!'

The prediction is borne out: since the directive operator enables sentences to be immediate directives, DIs and MIs are felicitous (30)-(31), while YIs are not (32).

¹¹I would like to thank an anonymous reviewer for providing me with these examples.

6. Conclusion and outlook

Little work has been devoted to the semantic/pragmatic difference among MIs, DIs and YIs. In this study, I have proposed a new analysis for non-canonical form imperatives that certain types of imperatives can lack the necessity modality or the presuppositional content, even if they are typologically rare. What we need to capture their behavior is to focus on the two operators: the weak necessity operator ‘ \square_{wn} ’ which enables sentences to pattern with weak readings (i.e. permission and advice), and the directive operator ‘*dir*’ which enables sentences to pattern with immediate readings.

The present analysis therefore supports the view that imperatives *do* contain an operator which is interpreted like the necessity modal (Kaufmann 2012), and that the propositional and presuppositional element, namely the weak necessity modal and the directive operator, are separated in terms of their semantic representation (Medeiros 2013). Primary goals for future development of this account are to unify the account of DIs and YIs more fully with some non-canonical form imperatives in the other languages (e.g. German, Hebrew, Greek), which share similar properties to them. Cross-linguistically, for instance, some non-canonical form imperatives can only be used as strong directives like DIs, not allowing the weak readings (cf. von Fintel & Iatridou 2017). Moreover, examining how the contrast among the three imperatives could be accounted for from the viewpoint of a ‘minimal’ analysis of imperatives (Portner 2007), which does not assume any modal content for the denotation of imperatives, will be implemented in the future.

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