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# Syntactically marked Switch-Reference

## Evidence from German

Katja Barnickel

This paper makes two claims: first I will show that languages have the strategy to mark switch-reference (SR) syntactically. This finding is interesting because traditionally switch-reference marking has been considered to be a typically morphological phenomenon. I provide evidence from a corpus-based study that in German SR is marked by the order of the matrix clause and the subordinate clause (linearization). Secondly I account for the observation that SR marking in German does not seem to be a fully grammaticalized phenomenon, but that nevertheless it is reflected in clear statistical tendencies. I provide a modeling of the statistically preferred option to mark SR in the framework of Stochastic Optimality Theory.

### 1. Introduction

The term *switch-reference (SR)* refers to the presence of a verbal marker that indicates if the subject of a clause is coreferent with the subject of an adjacent clause within the same syntactic structure. Coreference is marked by a same-subject-marker (SS) (see (1)), whereas non-coreference is marked by different-subject-marker (DS) (see (2)).

- (1) *Mojave (Munro 1979:145)*
- a. nya-isvar-**k** iima-k  
when-sing-**SS** dance-Tns  
'When  $he_i$  sang,  $he_i$  danced.'
  - b. nya-isvar-**m** iima-k  
when-sing-**DS** dance-Tns  
'When  $he_j$  sang,  $he_i$  danced.'

The phenomenon of switch-reference was first described by Jacobsen (1967) and is primarily found in North American and Papuan languages. It also appears in South America, in the Caucasus and in East Asia, but it seems to be restricted to languages with the word order OV.

As it can be seen in (1) and (2), SS/DS-marker always show up at the verb and they differ morphologically.<sup>1</sup>

Although morphological switch-reference marking typically does not arise in Indo-European languages, it has been found that SS and DS contexts are encoded within these languages as well. That the encoding of switch-reference does not have to be obligatorily morphological can be seen in (2). In Latin switch-reference is marked syntactically: the ablative in ablative-absolutive-constructions marks DS contexts.

(2) *Latin* (Haiman 1983:117)

a. *Same subject*

Aristides<sub>i</sub> [ $CP$  pro<sub>i</sub> patria pulsus] Lacedaemonium fugit.

‘Being expelled from his home country, Aristides escaped to Lakedaimon.’

b. *Different subject*

[ $CP$  Aristide<sub>i</sub> patria pulso] Persae<sub>j</sub> Graecos aggressi sunt.

‘When Aristides was expelled from his home country, the Persian attacked the Greek.’

In Standard German switch-reference does not seem to be a grammaticalized phenomenon, what means that a reference change within a subordinate clause does not have to be marked obligatorily.<sup>2</sup> However, the observation that in Latin ablative constructions serve as DS/SS markers, provides evidence that Indo-European languages do have a possibility to mark switch-reference non-morphologically but syntactically.

Based on this observation I will show that German, which apparently does not have verbal switch-reference markers, marks the change of subject by structural variation. This structural variation is the linearization of matrix clause and subordinate clause. In German a subordinate clause can follow its matrix clause ( $CP_{mtx}$  -  $CP_{sub}$ , see (3)) or it can precede it ( $CP_{sub}$  -  $CP_{mtx}$ , see (4)).

(3)  $CP_{mtx}$  -  $CP_{sub}$

- a. [ $CP_{mtx}$  **Der Mann**<sub>i</sub> sah die Frau,<sub>j</sub>] [ $CP_{sub}$  als **er**<sub>i</sub> sich umdrehte].  
the man saw the woman when he himself turned

‘The man<sub>i</sub> sah the woman, when he<sub>i</sub> turned around.’

(SS)

- b. [ $CP_{mtx}$  **Der Mann**<sub>i</sub> sah die Frau<sub>j</sub>,<sub>j</sub>] [ $CP_{sub}$  als **sie**<sub>j</sub> sich umdrehte].  
the man saw the woman when she herself turned

‘The man<sub>i</sub> saw the woman<sub>j</sub>, when she<sub>j</sub> turned around.’

(DS)

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<sup>1</sup>For an analysis of switch-reference based on binding theory see Finer (1985) and Watanabe (2000), for switch-reference as an agreement relation Camacho (2010) and Assmann (2012), for a coordinate structure account Keine (2012) and for a movement analysis Georgi (2012).

<sup>2</sup>It has been assumed that switch-reference does not only occur in subordinate clauses, but in coordinated sentences as well (see Weisser 2012) or that switch-reference affects coordinated structures only (see Keine 2012). Concerning German, I will only deal with subordinated clauses.

- (4)  $CP_{sub}$  -  $CP_{mtx}$
- a.  $[CP_{sub} \text{ Als } er_i \text{ sich umdrehte,}] [CP_{mtx} \text{ sah der Mann}_i \text{ die Frau.}]$   
when he himself turned saw the man the woman  
'When he<sub>i</sub> turned around, the man<sub>i</sub> saw the woman.'(SS)
  - b.  $[CP_{sub} \text{ Als } sie_j \text{ sich umdrehte,}] [CP_{mtx} \text{ sah der Mann}_i \text{ die Frau}_j.]$   
when she herself turned saw the man the woman  
'When she<sub>j</sub> turned around, the man<sub>i</sub> saw the woman<sub>j</sub>.'(DS)

The subjects in (3-a) and (4-a) are coreferent. In (3-a) we have anaphoric reference, whereas in (4-a) it is cataphoric reference. In (3-b) and (4-b) in contrast there is no coreference relation between the subjects.

In the following, I will show that German exhibits the tendency to mark switch-reference by the order of linearization of the matrix clause and the subordinate clause. If there is a coreference relation between the subjects of two adjacent clauses, the subordinate clause prefers to follow its matrix clause, whereas in the case of different subjects, the subordinate clause prefers to precede its matrix clause. Hence, I claim that the precedence of the subordinate clause corresponds to a (non-obligatory) DS-marker, whereas a following subordinate clause equals a SS-marker.

This claim is based on a corpus study which is presented in section 2 and discussed in section 3. Section 4 provides previous implementations of similar statistical preferences within the framework of stochastic Optimality Theory. Concluding, I will show how the tendency in German to mark switch-reference by the linearization of the matrix and the subordinate clause can be modeled in stochastic Optimality Theory.

## 2. Corpus study

### 2.1. Method

Using the corpus search system COSMAS II, I examined the subject coreference in 300 sentences, taken from the public corpora of the IDS Mannheim. I only considered single embedded sentences, in detail that means that all investigated sentences consist of a matrix CP and a subordinate CP.<sup>3</sup> The abstract structure of all items is given in (5).

- (5) a.  $[[CP_{sub} \text{ SUBJUNCTION PRONOUN ....,}] [CP_{mtx} \dots \text{ (non-)antecedent DP...}]]$   
b.  $[[CP_{mtx} \dots \text{(non-)antecedent DP,}] [CP_{sub} \text{ SUBJUNCTION PRONOUN ....}]]$

Subjunctions and pronouns were varied the following way:

- (6) a. WÄHREND + ER 'while + he'  
b. WÄHREND + SIE 'while + she'  
c. ALS + ER 'when + he'  
d. ALS + SIE 'when + she'

---

<sup>3</sup>To provide a clear data set, multiple embedded sentences which introduce a further subject, as well as sentences including direct speech were not included in the study.

75 sentences per combination were chosen at random from the corpora. (7) provides four examples from the study.



## 2.2. Results

Two of the 300 taken sentences were excluded from the analysis because of unclear reference relations. The remaining 298 valid sentences were the base for a statistical analysis (chi-square-test) for the factors reference (DS/SS) and the position of the subordinate clause (preceding matrix clause/following matrix clause). Table 1 shows that in German there are more SS-sentences (181 in total) than DS-sentences (117 in total).

Furthermore, the linearization  $CP_{mtx}$ - $CP_{sub}$  (163 in total) is more common than  $CP_{sub}$ - $CP_{mtx}$  (135 in total). That means there is a general preference for subordinate clauses to follow their matrix clauses instead of preceding them. In spite of these general preferences, a highly significant interaction between sentence linearization and referential identity was found.

The referential identity differed for the two possibilities of linearization:  $\chi^2(1, N = 298) = 27.47$ ,  $p < 0.001$ . According to this result, a random distribution of sentence linearization and referential identity can be excluded. Instead, it leaves the following picture: SS-sentences prefer the order  $CP_{mtx}$ - $CP_{sub}$ , which means that in the case of coreferent subjects, the subordinate clause prefers to follow the matrix clause highly significantly. In contrast, DS-sentences prefer the linearization  $CP_{sub}$ - $CP_{mtx}$ . This means that if there is no coreference relation between the subjects, the subordinate clause shows the highly significant tendency to precede its matrix clause. These results are summarized in Table 1 and illustrated in Figure 1.

	Position of CP <sub>sub</sub>		total
	preceding CP <sub>mtx</sub>	following CP <sub>mtx</sub>	
<b>Reference</b>	<b>DS</b>	75	42
	<b>SS</b>	60	121
<b>total</b>	<b>135</b>	<b>163</b>	<b>298</b>

Table 1: Total distribution of referential identity and clause linearization  
 $(\chi^2(1, N = 298) = 27.47, p < 0.001)$

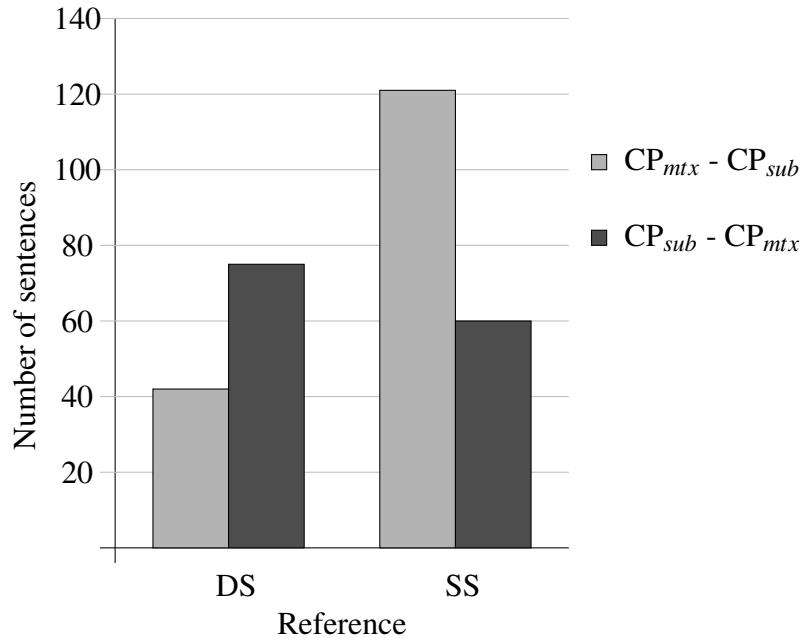


Figure 1: Total distribution ( $\chi^2(1, N = 298) = 27.47, p < 0.001$ )

Moreover, it was found that the two subjunctions *während* ‘while’ and *als* ‘when’ behave differently with respect to their general preference of linearizing the subordinate clause ( $\chi^2(1, N = 298) = 13.78, p < 0.001$ ). *Während* prefers the linearization CP<sub>sub</sub> - CP<sub>mtx</sub>, whereas *als* prefers CP<sub>mtx</sub> - CP<sub>sub</sub>. This is shown in table 2.

		Position of CP <sub>sub</sub>		total
		preceding CP <sub>mtx</sub>	following CP <sub>mtx</sub>	
<b>Subjunction</b>	<i>als</i>	52	98	<b>150</b>
	<i>während</i>	83	65	<b>148</b>
<b>total</b>		<b>135</b>	<b>163</b>	<b>298</b>

Table 2: Distribution of *während* and *als* (position) ( $\chi^2(1, N = 298) = 13.78, p < 0.001$ )

Additionally, both subjunctions differ concerning the factor referential identity (SS vs. DS): ( $X^2(1, N = 298) = 7.96, p < 0.01$ ). *Als* co-occurs more often in SS-sentences than in DS-sentences (Table 3).

		Reference		total
		DS	SS	
<b>Subjunction</b>	<i>als</i>	47	103	<b>150</b>
	<i>während</i>	70	78	<b>148</b>
<b>total</b>		<b>117</b>	<b>181</b>	<b>298</b>

Table 3: : Distribution of *während* and *als* (reference) ( $(\chi^2(1, N = 298) = 7.96, p < 0.01)$ )

Despite these general preferences, for both subjunctions there is an interaction between the position of the subordinate clause and the referential identity of the subjects. For the *während*-sentences (Table 4), as well as for *als*-sentences (Table 5), in the context of two different subjects (DS), the subordinate clause prefers to precede its matrix clause. In SS-sentences it is exactly the other way around: independently of the subjunction, subordinate clauses prefer to follow their matrix clauses.

“während”		Position of CP <sub>sub</sub>		total
		preceding CP <sub>mtx</sub>	following CP <sub>mtx</sub>	
<b>Reference</b>	<b>DS</b>	48	22	<b>70</b>
	<b>SS</b>	35	43	<b>78</b>
<b>total</b>		<b>83</b>	<b>65</b>	<b>148</b>

Table 4: Distribution of *während* (reference/position) ( $\chi^2(1, N = 148) = 8.41, p < 0.01$ )

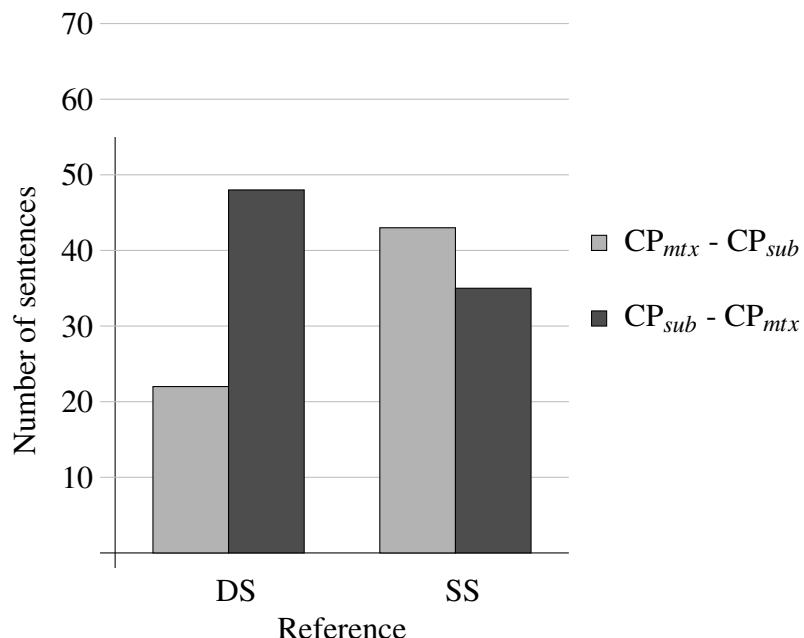


Figure 2: Distribution of *während* ( $\chi^2(1, N = 148) = 8.41, p < 0.01$ )

		<b>Position of <math>\text{CP}_{\text{sub}}</math></b>		<b>total</b>
		preceding $\text{CP}_{\text{mtx}}$	following $\text{CP}_{\text{mtx}}$	
<b>Reference</b>	<b>DS</b>	27	20	<b>47</b>
	<b>SS</b>	25	78	<b>103</b>
<b>total</b>		<b>52</b>	<b>98</b>	<b>150</b>

Table 5: : Distribution of *als* (position/reference): ( $\chi^2(1, N = 150) = 15.68, p < 0.001$ )

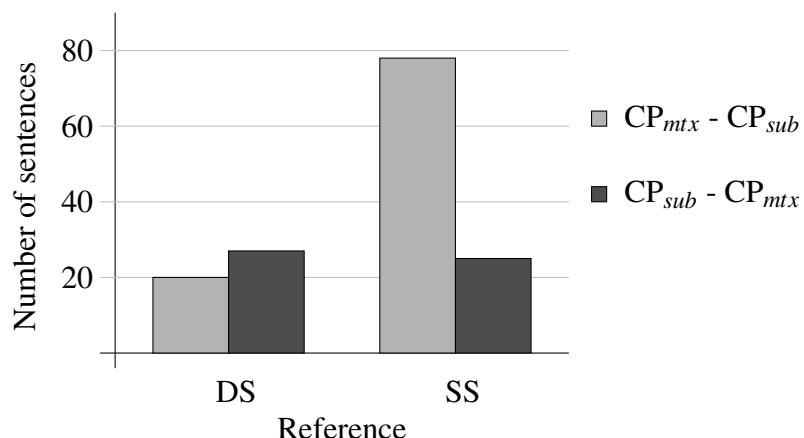


Figure 3: Distribution of *als* ( $\chi^2(1, N = 150) = 15.68, p < 0.001$ )

No significant interaction was found for the two examined pronouns *er* ‘he’ and *sie* ‘she’. Neither *er* nor *sie* prefers one of the orders CP<sub>mtx</sub> - CP<sub>sub</sub>/CP<sub>sub</sub> - CP<sub>mtx</sub> ( $X^2(1, N = 298) = 0.34, p = 0.56$ ) or one of the referential identity contexts SS/DS ( $X^2(1, N = 298) = 0.35, p = 0.55$ ).

### 3. Discussion

#### 3.1. Behaviour of *während* and *als*

The results of the present corpus study show that in case of identical reference of the subject in a matrix clause and its subordinate clause (SS), the subordinate clause prefers to follow its matrix clause, whereas in the case of non-identical subjects (DS) the subordinate clause prefers to precede its matrix clause. This observation is valid for subordinate clauses introduced by *während* as well as for those introduced by *als*, although in general the two subjunctions prefer different linearizations. Subordinated clauses introduced by *während* generally prefer to precede their matrix clauses. This could be due to the fact that *während* besides its temporal meaning (8) also has an adversative interpretation (9).

- (8) [CP<sub>sub</sub> W hrend sie kocht,] [CP<sub>mtx</sub> l uft das Radio in der K che.]  
While she cooks is.on the radio in the kitchen  
'While she is cooking, the radio is on in the kitchen.' (temporal)
- (9) [CP<sub>sub</sub> W hrend sie fr her joggte,] [CP<sub>mtx</sub> gilt ihre Leidenschaft heute dem  
while she in.the.past jogged holds her passion nowadays the  
Radfahren.]  
cycling  
'While in the past she used to do jogging, nowadays her passion is cycling.' (adversative)

Adversative contexts, like in (9), mostly involve the presence of two different subjects, which are contrasted. Under the assumption that preceding subordinate clauses mark a subject change, it is not surprising that in the context of *w hrend*, which is predestined for expressing contrasts, subordinate clauses prefer to precede their matrix clauses. Despite the general preceding preference of subordinate clauses with *w hrend*, they prefer to follow their matrix clauses if referential identity of the two subjects (SS) is given.

Remarkably, the same pattern holds for subordinate clauses with *als*, just the other way around: only referring to the position, *als*-sentences generally prefer to follow their matrix clauses. In the case of two different subjects (DS), however they give up their preferred pattern and show up the tendency to precede the matrix clause.

The fact that the two different pronouns *er* ‘he’ and *sie* ‘she’ do not show any statistical preference for a certain linearization pattern confirms that the interaction of clause linearization and referential identity is not due to the presence of a certain pronoun (as expected).

### 3.2. Dispreferred SR-marking

As has been shown so far, in German there is the tendency to linearize the subordinate clause and the matrix clause according to the referential relation of the subjects: SS-sentences prefer the linearization  $CP_{mtx} - CP_{sub}$ , DS-sentences prefer the reversed order  $CP_{sub} - CP_{mtx}$ . These findings are summarized in (10) and (11).

(10) *Preferred linearization*

- a.  $[CP_{mtx} \mathbf{Der Mann}_i \text{ sah die Frau}_j,] [CP_{sub} \text{ als er}_i \text{ sich umdrehte}].$   
the man saw the woman when he himself turned  
'The man<sub>i</sub> sah the woman, when he<sub>i</sub> turned around.' (SS:  $CP_{mtx} - CP_{sub}$ )
- b.  $[CP_{sub} \text{ Als sie}_j \text{ sich umdrehte},] [CP_{mtx} \text{ sah der Mann}_i \text{ die Frau}_j].$   
when she herself turned saw the man the woman  
'When she<sub>j</sub> turned around, the man<sub>i</sub> saw the woman<sub>j</sub>.' (DS:  $CP_{sub} - CP_{mtx}$ )

(11) *Dispreferred linearization*

- a.  $[CP_{sub} \text{ Als er}_i \text{ sich umdrehte},] [CP_{mtx} \text{ sah der Mann}_i \text{ die Frau}_j].$   
when he himself turned saw the man the woman  
'When he<sub>i</sub> turned around, the man<sub>i</sub> saw the woman<sub>j</sub>.' (SS:  $CP_{sub} - CP_{mtx}$ )
- b.  $[CP_{mtx} \mathbf{Der Mann}_i \text{ sah die Frau}_j,] [CP_{sub} \text{ als sie}_j \text{ sich umdrehte}].$   
the man saw the woman when she herself turned  
'The man<sub>i</sub> saw the woman<sub>j</sub>, when she<sub>j</sub> turned around.' (DS:  $CP_{mtx} - CP_{sub}$ )

The general dispreference for cataphoric sentences (11-a) in comparison to anaphoric ones (10-a) has already been described in the literature. De Beaugrande & Dressler (1981) for example mention that cataphora is used less often than anaphora because they are more difficult to process. The higher processing effort, however leads to a more attentive or 'deeper' processing (de Beaugrande & Dressler 1981:65).

Hence, processing difficulties could be due to the fact that normally in SS-sentences the anaphoric linearization is the preferred one (10-a). The precedence of the subordinate clause normally indicates a reference change (10-b), which does not occur in cataphoric sentences (11-a). Therefore it could be the case that speakers make use of cataphoric sentences to increase the attention level of their hearers/readers by choosing the preferred linearization for DS-sentences without intending a reference change.

Conversely, in DS-sentences the processing of the dispreferred linearization (subordinate clause following matrix clause, see (11-b)) should be more difficult to process because it is not the expected linearization when the subject reference changes. It is an outstanding issue to test these predictions in experiments.

Interestingly, unexpected SR-marking (DS-marker in SS contexts or SS-marker in DS contexts) is a quite common phenomenon in typical SR-marking languages (which mark SR morphologically) as well. Roberts (1988a) provides examples from Amele which are DS-marked despite of the fact that the subjects are coreferent.

(12) *Amele*

- a. Eu 1977 jagel November na odo-**co**-b cul-ig-ø-en.  
 that 1977 month November in do-**DS**-3SG leave-1PL-3SG-REMP  
 ‘That was in Novemeber 1977 that he<sub>i</sub> did that and he<sub>i</sub> left it for us.’  
 (Roberts 1988a:61)
- b. Age ceta gul-do-**co**-bil li bahim=na tac-ein.  
 3PL yam pull.up-3SG.DO-**DS**-3PL go(SS) floor=on fill.3PL.REMP  
 ‘They<sub>i</sub> pulled up the yams and then they<sub>i</sub> went and filled up the yam store.’  
 (Roberts 1997:187)

The examples in (12) show that SR-markers obviously are not only used to indicate a reference change, but also to mark contrasts concerning other aspects of a discourse. These aspects could be “foregrounded versus backgrounded events, same-place-setting versus different-place setting, same-time-setting versus different-time-setting and same-world-setting versus different-world-setting” (Roberts 1997:190).

According to this, the presence of the DS-marker *co* in spite of coreferent subjects in (12-a) is licensed because in the sentence two different time-settings are contrasted. In (12-b) the *co*-marking indicates a change of places. Taken more generally the DS-marker in Amele appears in SS-sentences if “a surprise change” (Roberts 1988b) or “some unexpected turn in the narrated events” (Stirling 1993) takes place. Such discourse related SR-markings, which indicate contrast in the widest sense, are not a special property of Amele, but have been observed in other SR-marking languages as well, for example in Yakunytjatjara (see Goddard 1985) and Pitjantjatjara (see Bowe 1990), in Dani (see Bromely 1981) as well as in Nankina (see Spaulding 1988).<sup>4</sup>

#### 4. Modeling of German SR-marking tendencies in Stochastic Optimality Theory

Switch-reference is not the only phenomenon which in some languages is grammaticalized and in others is reflected in statistical tendencies. Bresnan et al. (2001) discuss the interaction between the person hierarchy (1st, 2nd > 3rd) and voice which is a grammaticalized interaction in Lummi. In Lummi the person of the subject argument cannot be lower than the person of a non-subject argument, a so-called Silverstein effect (see Hale 1973; Silverstein 1976; Aissen 1999). If this would happen in the active, passivization is obligatory. Hence, in Lummi the sentence *The man sees me* is ungrammatical and must be realised as *I am seen by the man* even though the ordinary information structural trigger for passive is not present. In contrast, if in the active the person hierarchy is fulfilled like in *I see the man*, passivization is not possible.

What Bresnan et al. (2001) found in a corpus study was that in English there is the tendency to mark the person/voice-interaction as well. This means that, in English, passive sentences which fulfill the person hierarchy (*I was attacked by a man*) are more common than passive sentences which violate it (*Mary was attacked by me*).

Bresnan & Aissen (2002) remark that classical generative theories of formal grammar cannot account for the fact that a grammaticalized phenomenon in one language shows up as a clear

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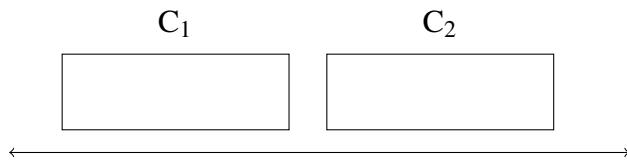
<sup>4</sup>For a detailed discussion of SR-markings related to weather verbs and impersonal constructions see Roberts (1987) and Roberts (2001).

statistical preference in another language: “On these theories, frequentistic processes (such as the conventionalization of usage preferences) must belong either to grammar-external ‘performance’ along with speech errors and memory limitations, or to external choices among competing dialect grammars. Yet neither of these alternatives is an adequate model of variation and change, as first pointed out by Weinreich et al. (1968)” (Bresnan & Aissen 2002:2).

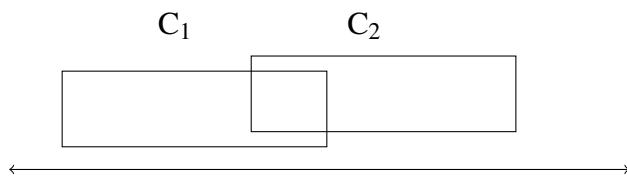
A framework where statistical preferences can be modeled is stochastic Optimality Theory (Anttila 1997; Boersma & Hayes 2001; Hayes 2001). According to stochastic OT, grammaticalized patterns and their usage by trend are not two different things, but merely different points on a continuous scale: “Stochastic OT grammars allow us to place the person/voice interactions in English and Lummi at points on a continuum of conventionalization that connects frequentistic preferences in usage to categorical grammatical constraints” (Bresnan et al. 2001).<sup>5</sup>

In contrast to a classical OT approach (Prince & Smolensky 1993), the basic idea of stochastic OT is that constraints are not necessarily categorically ordered with respect to each other. Rather, their application domains may overlap. An overlap of application domains gives rise to optionality. Categorical vs. overlapping application domains of constraints are illustrated in (13) and (14): the boxes signal the possible application domains of two constraints on an abstract continuum from “more strict” to “less strict” (interpreted from left to right).

(13) *Categorical order of application domains (grammaticalization)*



(14) *Overlapping order of application domains (optionality)*

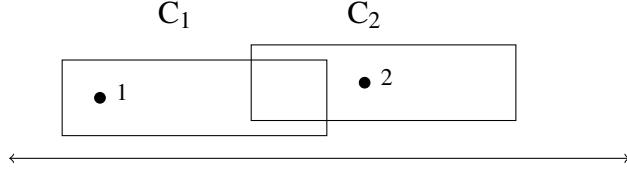


A candidate is evaluated at an evaluation time. It is well formed if it is optimal at that point. For an evaluation, an arbitrary point (indicated with 1 and 2) is chosen in the application domain of a constraint. If we have an overlapping configuration these points can be outside of the overlapping domain (15) or within the overlapping domain (16).

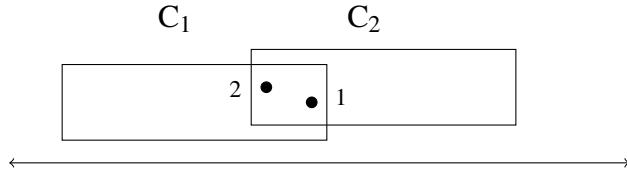
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<sup>5</sup>For a detailed discussion and analysis of the person hierarchy/voice-interaction see Bresnan et al. (2001).

(15) *Typical result: C<sub>1</sub> » C<sub>2</sub>*



(16) *Rare result: C<sub>2</sub> » C<sub>1</sub>*



A constraint C<sub>1</sub> is ranked higher than another constraint C<sub>2</sub> at a given evaluation time if the point chosen for C<sub>1</sub> is above the point chosen for C<sub>2</sub>. If the domains of C<sub>1</sub> and C<sub>2</sub> are categorically ordered, like in (13), then the point for C<sub>1</sub> is always going to be above the point for C<sub>2</sub>. In this case we deal with a grammaticalized phenomenon without any optionality. However, if the domains of C<sub>1</sub> and C<sub>2</sub> overlap, optionality arises. The winning candidate is determined by whether the point chosen for C<sub>1</sub> is above the point chosen for C<sub>2</sub> or vice versa. The choice of an evaluation point at a given evaluation time is free as such. However, the smaller the common domain of C<sub>1</sub> and C<sub>2</sub> is, the more likely it is that the point chosen for the higher ranked constraint C<sub>1</sub> is above the point chosen for the lower-ranked constraint C<sub>2</sub> (like in (15)).

This way the system captures statistical preferences. The winning candidate depends on the setting of the evaluation point at a given evaluation time. The scenario like in (15), where both points are outside the overlapping domain, leads to the statistically preferred typical result C<sub>1</sub> » C<sub>2</sub>. The same pattern results from the configuration where only one of the points is outside the overlapping domain. However, if we have the picture in (16), which is the statistically rare but indeed possible case, the point of C<sub>2</sub> is above the point of C<sub>1</sub>. This leads to the result C<sub>2</sub> » C<sub>1</sub>, which means that the candidate favoured by C<sub>2</sub> is going to be preferred over the candidate favoured by C<sub>1</sub>.

In the following I will model the preference of German to mark switch-reference by the linearization of subordinate and matrix clause within the stochastic OT framework. I assume the following constraints:

(17) a. SS<sub>CP<sub>mtx</sub>-CP<sub>sub</sub></sub>

If the subject of a clause is coreferent with the subject of an adjacent clause within the same syntactic structure, the subordinate clause follows the matrix clause.

b. DS<sub>CP<sub>sub</sub>-CP<sub>mtx</sub></sub>

If the subject of a clause is different from the subject of an adjacent clause within the same syntactic structure, the subordinate clause precedes the matrix clause.

But, as we have seen, these linearizations are not fully grammaticalized, so there must be further factors that influence the linearization of clauses. One obvious factor is information structure, hence I assume competing pragmatic constraints which prefer the contrary linearizations. In (18) I give some examples of possible competing constraints related to information structure.

(18) a. TOPIC/FOCUS FIRST

The clause which contains the topic or the focus of the whole sentence has to be linearized first.

Example 1:

A: What did the man see?

B: The man saw the woman, when she turned around.

Example 2:

There was a man on a party who was looking for a woman with green glasses. The man saw the woman, when she turned around.

b. PRONOUN FIRST

Cataphoric sentences are harder to process than anaphoric ones (Kennison et al. 2009). To increase the attention of the listener/reader, linearize the clause with the pronoun first.

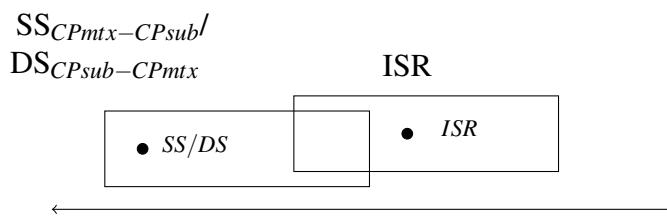
Example:

You won't believe it - when he turned around, the man saw the woman.

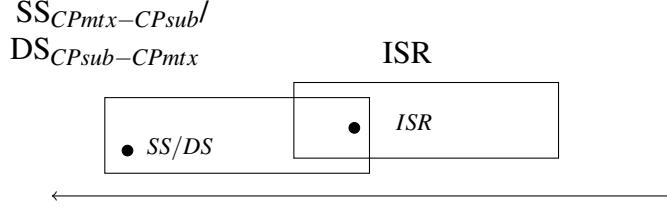
There might be even more such constraints. I summarize them all under *information structural reasons* (ISR).

The fact that switch-reference marking by clause linearization is not fully grammaticalized suggests that in German the switch-reference constraints and the information structural constraints are not ordered categorically to each other. Assuming instead that the application domains of the constraints which favour switch-reference and those which favour information structure overlap, we get four possible cases. (19) illustrates the case, where both evaluation points are outside the overlapping domain, whereas in (20) one point is inside the overlapping domain.

(19) Case 1:  $SS_{CPmtx-CPsub}/DS_{CPsub-CPmtx} \gg ISR$

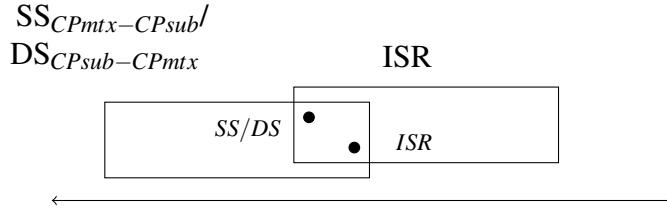


(20) Case 2:  $\text{SS}_{CPmtx-CPsub}/\text{DS}_{CPsub-CPmtx} \gg \text{ISR}$



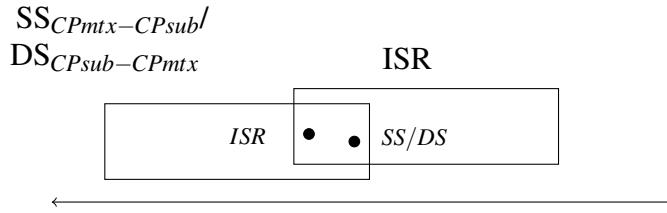
(21) illustrates the case where both points are within the overlapping domain. However, the evaluation point for SS/DS is still above the one for ISR.

(21) Case 3:  $\text{SS}_{CPmtx-CPsub}/\text{DS}_{CPsub-CPmtx} \gg \text{ISR}$



The last case is the one where both points are within the overlapping domain, but now the point for ISR is above the point for SS/DS.

(22) Case 4:  $\text{ISR} \gg \text{SS}_{CPmtx-CPsub}/\text{DS}_{CPsub-CPmtx}$



The setting of the evaluation points in (19), (20) and (21) leads to the higher ranking of the switch-reference constraints  $\text{SS}_{CPmtx-CPsub}/\text{DS}_{CPsub-CPmtx}$ . This means that the candidate favoured by these SR-constraints is going to be the winning candidate. The following tableaux illustrate these cases with a SS-sentence (23-a) and a DS-sentence (23-b).<sup>6</sup>

(23) Cases 1-3:  $\text{SS}_{CPmtx-CPsub}/\text{DS}_{CPsub-CPmtx}$  is higher ranked than ISR

a.  $\text{SS}_{CPmtx-CPsub} \gg \text{ISR}$

Candidates	$\text{SS}_{CPmtx-CPsub}$	ISR
C <sub>1</sub> : [When he <sub>i</sub> turned around, [the man <sub>i</sub> saw the woman.]	*!	
☞ C <sub>2</sub> : [The man <sub>i</sub> saw the woman, [when he <sub>i</sub> turned around.]		*

<sup>6</sup>For the sake of convenience the following tableaux only contain the English translations of the German examples (for the fully glossed German sentences see examples (3) and (4)).

- b.  $DS_{CPsub-CPmtx} \gg ISR$

Candidates	$DS_{CPsub-CPmtx}$	ISR
☞ C <sub>1</sub> : [When she <sub>i</sub> turned around, [the man <sub>j</sub> saw the woman.]		*
C <sub>2</sub> : [The man <sub>i</sub> saw the woman, [when she <sub>j</sub> turned around.]	*!	

Given the rare but possible configuration in (16), where both points are within the overlapping domain and the point for ISR is above the point for SS/DS, the ISR-constraint now is higher ranked than the SS/DS-constraints. The dispreferred candidate of the SS/DS-constraint is the winner, as shown in (24).

- (24) ISR is ranked higher than  $SS_{CPmtx-CPsub}/DS_{CPsub-CPmtx}$

- a.  $ISR \gg SS_{CPmtx-CPsub}$

Candidates	ISR	$SS_{CPmtx-CPsub}$
☞ C <sub>1</sub> : [When he <sub>i</sub> turned around, [the man <sub>i</sub> saw the woman.]		*
C <sub>2</sub> : [The man <sub>i</sub> saw the woman, [when he <sub>i</sub> turned around.]	*!	

- b.  $ISR \gg DS_{CPsub-CPmtx}$

Candidates	ISR	$DS_{CPsub-CPmtx}$
C <sub>1</sub> : [When she <sub>i</sub> turned around, [the man <sub>j</sub> saw the woman.]	*!	
☞ C <sub>2</sub> : [The man <sub>i</sub> saw the woman, [when she <sub>j</sub> turned around.]		*

Summarizing this section, I have shown that in German the constraint which favours SR-marking is not categorically ordered with respect to constraints concerning information structure. Rather their application domains overlap. This overlapping configuration gives rise to optionality. Given that the SR constraint is still the higher ranked one in the overlapping configuration, it is statistically more likely that candidates favoured by the SS/DS-constraint are the winning ones. In contrast, it is statistically less likely that the candidate favoured by information structural reasons wins the competition (but possible). This explains the result of my study that SR-marking in German is not a fully grammaticalized phenomenon but that its marking is reflected as a strong tendency in corpora.

5. *Concluding remark: Grammaticalization vs. Statistical tendencies*

As Bresnan & Aissen (2002) have shown, the same categorical phenomena which are attributed to hard grammatical constraints in some languages continue to show up as statistical preferences in other languages. This raises the question if there are languages where the interaction of linear clause order and switch-reference is grammaticalized. The answer is: yes. Kazenin & Testelets (2004) describe an interesting interaction between the order of a converb clause and its matrix clause in Tsakhur, a Nakh-Dagestanian (or East Caucasian) language spoken by 30,000 people in Daghestan (north Eastern Caucasus, Russia) and in northern Azerbaijan.

In Tsakhur, the converb clause standardly precedes or follows its matrix clause (25). In SS-sentences the converb clause can also be center-embedded within the matrix clause (26).

- (25) Standard order (SS)

[CP<sub>mtx</sub> Rasul ark'İN-na], [CP<sub>con</sub> ma-n ūwab iwho]  
 Rasul(1CL) leave.PFC.1CL-ATR.1CL this-ATR.4CL word(4CL) say.PFC  
 'Having said this word, Rasul left.'

- (26) Center-embedding possible (SS)

[CP<sub>mtx</sub> Rasul, [CP<sub>con</sub> ma-n ūwab iwho], ark'İN-na.]  
 Rasul(1CL) this-ATR.4CL word(4CL) say.PFC leave.PFC.1CL-ATR.1CL  
 'Having said this word, Rasul left.'

However, center-embedding is not possible in DS-sentences (28).

- (27) Standard order (DS)

[CP<sub>con</sub> ūe-na solulqa ark'İN,] [CP<sub>mtx</sub> z̄i ūiga-j-l]  
 he-ATR.1CL to.the.left leave.PFC.1CL I(1CL) place-OBL-SUP  
 ax-u.]  
 stay.1CL-PFC  
 'He having gone to the left, I stayed.'

- (28) Center-embedding not possible (DS)

\*[CP<sub>mtx</sub> z̄i, [CP<sub>con</sub> ūe-na solulqa ark'İN], ūiga-j-l]  
 I(1CL) he-ATR.1CL to.the.left leave.PFC.1CL place-OBL-SUP  
 ax-u.]  
 stay.1CL-PFC  
 'He having gone to the left, I stayed.'

So, in Tsakhur the influence of switch-reference on sentence linearization seems to be grammaticalized. This is exactly what one would expect.

## 6. Summary

First, I have shown that languages have the strategy to mark switch-reference (SR) syntactically. This finding is in contrast to the traditional assumption that switch-reference marking is a exclusively morphological phenomenon. I provide evidence from a corpus-based study that in German SR is marked by the linearization of the matrix clause and the subordinate clause: if a matrix and a subordinate clause within the same syntactic structure have coreferent subjects, the subordinate clause prefers to follow its matrix clause. If the subjects are different, the subordinate clause prefers to precede the matrix clause.

Secondly, I made the observation that SR marking in German does not seem to be a fully grammaticalized phenomenon, but that nevertheless it is reflected in clear statistical tendencies. I have shown that fully grammaticalized SR-marking, like in Amele, Mojave or Kiowa, and optional (but statistically preferred) SR-marking like in German both can be modeled in the framework of stochastic Optimality Theory without having to treat optionality as a grammar-external performance phenomenon.

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# **On forked chains in ATB-movement**

## Defending and newly implementing a traditional notion

Andreas Blümel

In this paper, I argue for the existence of ‘forked chains’ in Across-the-board movement. Phenomena from German like across the board WH-copying, case matching and remnant movement provide evidence for their existence, which runs contrary to a recent trend in the literature to deny the existence of forked chains. As for the analytical implementation, I suggest recasting ATB in terms of minimal search for the displaced element, applying to a strictly symmetrical, exocentric syntactic object. In conjunction with an independently suggested parallelism constraint on coordination, ATB emerges as the ambiguous identification of a copy in phase edges.

### *1. Introduction*

As is well known, Across-the-board (ATB) movement is the name of a construction which appears to feature a single antecedent simultaneously binding multiple gaps in conjunct, a so-called ‘forked movement chain.’ In the WH-question in (1) the antecedent is boldfaced and the gaps are signified by underscore:

- (1) **What** did John admire \_\_ and Mary despise \_\_?

The observation of this phenomenon goes back to at least Ross (1967), and the term ATB was coined by Williams (1978). The reality of forked chains/ATB was presupposed by Williams, and many others since (cf. Pesetsky 1982; Gazdar 1981; Gazdar et al. 1985 and Goodall 1987).<sup>1</sup> However, it is a recent tendency within, broadly speaking, minimalist approaches to ATB<sup>2</sup> to question this conventional wisdom and to seek alternative accounts, thereby avoiding the conclusion of a one-to-many relation between antecedents and gaps which (1) suggests (Munn

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<sup>1</sup> Occasionally, authors make reference to forked chains/ATB to establish an independent analytical or theoretical point, seemingly taking their existence for granted; in this paper I will discuss only analyses which aim at accounting for ATB as such.

<sup>2</sup> Note that work within other frameworks such as HPSG has not abandoned the notion of FCs, cf. Chaves (2007, 2012).

1993; Hornstein & Nunes 2002; Ha 2008; Zhang 2010). I refer the reader to Blümel (2013) for an elaborate criticism of these approaches. Most phenomena described in section 3.4 of this paper represent severe challenges to the works just mentioned.

In this paper I will show that there are empirical arguments from German which speak in favor of retaining the traditional idea as conceived by Williams and others. In section 2 I review what I consider to be a few core properties of ATB. Section 3 is devoted to a novel implementation of forked chains, resting on a recent theoretical idea by Martin & Uriagereka (2011), namely that the computational system makes the distinction between copies and repetitions by minimal search: only when minimal search for a syntactic object accompanies remerger of a phrase, a copy obtains. In ATB movement, minimal search for a copy ambiguously identifies multiple copies (=gaps), yielding forked chains. I show how the analysis captures ATB facts all of which are problematic for forked-chain-free analyses. The section finishes with open questions and potential problems my analysis faces. Finally, in section 4, I summarize the proposal.

## 2. Properties

In this section I will list a number of properties of ATB, the explanation of which I take to be crucial. I will argue for the existence of forked chains (henceforth FC) in ATB movement (2), a claim that is disputed:

- (2) What did John admire t and Mary despise t?

FCs are characterized by the fact that a single antecedent heads a chain with multiple tails, i.e. extraction proceeds simultaneously from more than one base position in coordinate structures.

### 2.1. Single-identity reading

Let me begin by pointing out certain properties of ATB which many analyses capture and which are straightforwardly accounted for if the idea of forked chains is assumed. It has been observed that the WH-operator in (3) strongly prefers a single identity reading.<sup>3</sup> In other words B is a

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<sup>3</sup> There are cases of multiple identity readings, especially in WH-adverbials (Munn 1999):

- (i) A: Where did Mary vacation and Bill decide to live?  
B: Mary vacationed in Paris and Bill decided to live in Toronto.

Below I will discuss WH-copying Across-the-board to show that a syntactic representation of the extracted element needs to be present in both conjuncts. Examples that make a similar point are easy to construct in German:

- (ii) a. Was hat Peter [<sub>DP</sub> <sub>t<sub>was</sub></sub> für ein Buch] gelesen und Maria [<sub>DP</sub> <sub>t<sub>was</sub></sub> für ein Buch] gekauft?  
what has Peter for a book read and Mary for a book bought  
'What kind of book has Peter read and what kind of book has Mary bought?'  
b. ?Wo hat Maria die Dose [<sub>PP</sub> <sub>t<sub>wo</sub></sub> mit] geöffnet und Jens [<sub>PP</sub> <sub>t<sub>wo</sub></sub> mit] gerechnet?  
where has Mary the can with opened and Jens with reckoned  
'What did Mary open the can with and what did Jens expect?'

(iia) is an instance of so called *was-für*-split Across-the-board, and (iib) is an instance of postposition stranding (*wo* and the respective instances of *mit* appear discontinuously). Crucially, however, a multiple identity reading is highly preferred as the English translations indicate.

felicitous response to question A, but C is dispreferred.

- (3)    A: Who did John meet and Mary like?  
 B: It is Bill (that John met and Mary likes).  
 C: # It is Bill (that John met) and Frank (that Mary likes).

So what (3) denotes can be presented in the sketch of a logical form below:

- (4)    For which  $x$ ,  $x$  a person, John met  $x$  and Mary liked  $x$

And crucially, what (3) does not mean is (5):

- (5)    For which  $x$ ,  $x$  a person, John met  $x$  and for which  $y$ ,  $y$  a person, Mary liked  $y$ .

In this paper, I will confine myself to single identity readings.

## 2.2. *The coordinate structure constraint*

A second important property of ATB is that it voids the Coordinate Structure Constraint by Ross (1967), formulated in (6) and violated in (7):

- (6)    *The Coordinate Structure Constraint*  
 In a coordinate structure, no conjunct may be moved, nor may any element contained in a conjunct be moved out of that conjunct.
- (7)    \* Which madrigals does Henry play the lute and sing?

Of course, if movement applies in an ATB fashion (8), extraction from a coordinate structure becomes possible:

- (8)    Which madrigals does Henry play and sing?

The CSC is standardly taken to be non-unitary, comprising two subparts, the Conjunct Constraint and the Element Constraint (Grosu 1973). The former bars movement of whole coordinands (9a)/(10a), while the latter bars asymmetric movement *out of* coordinands (9b)/(10b):

- (9)    a. \*  $\alpha \dots [t_\alpha \ \& \ \beta]$   
 b. \*  $\alpha \dots [[_Y P \dots t_\alpha \dots] \ \& \ [_X P \dots \beta \dots]]$
- (10)    a. \* Who did John meet [ $t_{who}$  and Mary]  
 b. \* Who did [[ $_T P$  John meet  $t_{who}$ ] and [ $_T P$  Mary see the boy]]

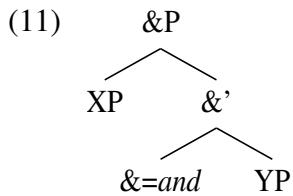
I take it that any analysis of ATB has to address both the fact that single identity readings arise and secondly, how ATB can void the CSC. While I will say something about the conditions which need to be in place for ATB to happen, I will not try to derive or explain the CSC as such.

### 3. The analysis

My analysis of ATB has two derivational parts, which can work independently to some extent. The first part is the process that creates forked chains, which hinges on (a) a symmetrical structural organization of the coordinands in the base configuration (cf. Chomsky 2013) which I will dub Coordinative Core (CC) and (b) an assumption concerning what distinguishes copies from repetition, inspired by Martin & Uriagereka (2011). The second part of the analysis is the process of asymmetrization of the coordinands. I discuss a particular way of introducing the conjunct into the derivation and splitting up the coordinative core along the lines of Chomsky (2013), i.e. by raising one of the coordinands to the sister-of-CoordP position to render (CC) labelable.

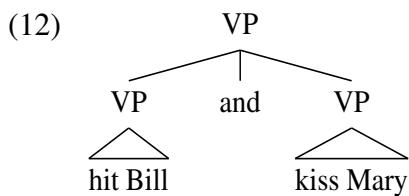
#### 3.1. Coordinative core

Before delving into my own analysis, I wish to point out what is arguably the predominant view of coordination within generative grammar up to this day. Putting aside analytical details, there is a long tradition of analyzing coordination in asymmetric terms, i.e. along the lines of (11) (cf. Kayne 1994 among many others):



In this tree, the first conjunct asymmetrically c-commands the second conjunct. One of the principles of  $\bar{X}$ -theory (Chomsky 1970; Jackendoff 1977) is endocentricity, i.e. the idea that phrases are headed, and the conjunct itself functions as the head in (11). Another well-established principle is binary branching (Kayne 1984) now recast as Merger of exactly two syntactic objects. With these ideas in place, an asymmetry between the Merge mates is introduced, and thus (11) is a natural way to capture coordination. Moreover, this structure receives empirical support from a number of phenomena. I will revisit these phenomena in the second half of section 3.

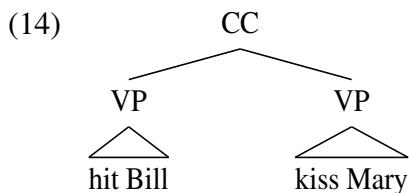
Despite the merits of an asymmetric organization of coordination, the very term coordination seems to contradict such a treatment, suggesting instead a structural symmetry between the coordinates and accordingly, many traditional grammarians have treated coordination by using flat,  $n$ -ary branching structures, in which the coordinate members are hierarchically on a par. In (12) I am using VP-coordination for illustration:



The intuition behind this arrangement is that coordination differs from subordination precisely in that the coordinated members are hierarchically symmetric. The intuition is supported by a simple test which illustrates that conjuncts can be freely swapped without loss of grammaticality:

- (13) a. John and Mary went to the cinema.  
       b. Mary and John went to the cinema.

The properties we have been considering up to this point are not mutually exclusive. One way to take the spirit of coordination seriously, namely that the coordinands are symmetrical at some level is to say that they are Merge mates. I will adopt a recent idea by Chomsky (2013) that says that symmetric Merge applies directly to the coordinative members yielding a structure which I will call Coordinative Core “CC”. Again, I take VP-coordination as in *John hits Bill and kisses Mary* as an example:



In this tree CC is just an expository label, not a grammatical label.

Let me now briefly address a property of coordination, namely the ‘law’ of coordination of like categories (Chomsky 1957). From the present perspective this principle requires a seemingly trivial reformulation:

- (15) CC comprises like categories.

While (15) is needed to capture the fact that generally, coordination involves categories of the same kind, it stipulates a restriction on the application of Merge, which has been argued to apply freely (Chomsky 2004; Boeckx in press; Ott 2011a). The idea is that grammatical deviance may result from a number of conceivable sources: either it results from violations of principles of efficient computation (Third Factors, Chomsky 2005), or deviant outcomes are taken to result from the fact that structures formed by free Merge cannot receive a coherent interpretation, or they reflect violation of general cognitive, i.e. language-independent principles.<sup>4</sup> Arguably, the effects we get when (15) is violated are such effects.

### 3.2. Parallelism Condition on ATB

I will now turn to a recent principle requiring parallelism between the two conjuncts, which I will adopt. Kasai (2004) suggests that the following principle, the Parallelism Condition for ATB, is computed on a phase-by-phase basis, i.e. within every cycle (16) is checked:

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<sup>4</sup> Cf. below for a speculation with regard to the parallelism condition on coordination and ATB.

- (16) *Parallelism Condition on ATB movement* (Kasai 2004:181)  
ATB movement must take place from syntactically parallel positions.

Take a look at the ungrammatical sentence (17a) to see (16) at work. (17a) involves simultaneous extraction of a direct object from the first sentential conjunct and a subject from the second sentential conjunct. The analysis is given in (17b) with the second sentential conjunct aligned below the first for clarity:

- (17) a. \* I know a man who Bill saw and likes Mary.  
b. C [TP Bill<sub>2</sub> [VP who<sub>1</sub> [VP t<sub>2</sub> saw t<sub>1</sub>]]] and  
[TP who<sub>1</sub> [VP t<sub>1</sub> likes Mary]]]

As can be seen, the ATB step applies simultaneously to a WH-expression in the vP-edge and to a WH-expression in SPEC-TP in violation of (16). Let us now turn to (18a), in which a direct object is extracted locally from the first sentential conjunct and a subject is extracted long-distance from the second sentential conjunct:

- (18) a. I know the man who John likes and we hope will win.  
b. C [TP John<sub>2</sub> [VP who<sub>1</sub> [VP t<sub>2</sub> likes t<sub>1</sub>]]] and  
[TP we<sub>3</sub> [VP who<sub>1</sub> [VP t<sub>3</sub> hope [CP t<sub>1</sub> [TP t<sub>1</sub> [VP t<sub>1</sub> will win]]]]]]]

As the analysis (18b) indicates, no problem for (16) obtains because the ATB step applies to parallel structures as far as the relative-clause-CP-cycle is concerned. The well-formedness of (18a), of course, underscores that we cannot blame differential grammatical functions of the extractees for the deviance in (17a): with respect to grammatical functions, the examples are exactly parallel.

As the reader can verify, (16) does more than capturing contrasts like the one described. It subsumes effects of Ross's CSC and in this sense is a modern recasting of the parallelism principle suggested by Williams (1977, 1978). Let me finally note that the condition (16) is a likely candidate to be a general cognitive principle rather than specific to language. I refer the reader to Boeckx (2009:6-9) for illustrations of visual disambiguation under juxtaposition, seemingly the effect of a cognitive parallelism requirement outside of language.

### 3.3. *The proposal: how forked chains come about*

In this subsection I will finally flesh out the details of forked chain formation. Let us start with a simple example like ‘Who did John see and ignore?’, which I take to be coordination of two vPs. The CC of this structure is given in (19):

- (19) [CC [v<sub>\*P</sub> who<sub>1</sub> see <who<sub>1</sub>>] [v<sub>\*P</sub> who<sub>2</sub> ignore <who<sub>2</sub>>]]

Let *who*<sub>1</sub>=*who*<sub>2</sub>, i.e. both elements are featurally non-distinct. Moreover, (16) forces their presence in both vP-edges before the actual ATB step. Now I will assume that movement at the C-phase level can apply freely to either *who*<sub>1</sub> or *who*<sub>2</sub>. Let *who*<sub>1</sub> move while *who*<sub>2</sub> remains in the verb phrasal edge (20):

- (20) [ who<sub>1</sub> [C ... [CC [v\*P<sub>1</sub> who<sub>1</sub> see ⟨who<sub>1</sub>⟩] [v\*P<sub>2</sub> who<sub>2</sub> ignore ⟨who<sub>2</sub>⟩]]]].

At this point I follow Martin & Uriagereka (2011) in assuming that movement involves minimal search.<sup>5</sup> Their prime concern is: how does the computational system make a distinction between copies and repetitions? I take the core of their proposal to be the following:

- (21) An element  $\alpha$  constitutes a copy of  $\alpha'$  iff
- a. there is no phase boundary between  $\alpha$  and  $\alpha'$  and
  - b. Merge is accompanied by *Minimal Search*.

Conversely,

- (22)  $\alpha$  and  $\alpha'$  are interpreted as repetitions whenever
- a. a phase node separates  $\alpha$  from  $\alpha'$  and
  - b. no search for  $\alpha'$  takes place upon Merger of  $\alpha$  to a phase edge.

Chain formation thus consists of Merge of an element into a phase edge and of the identification as such, which is minimal search-abiding identification of the element raised. The interesting result for our CC-structure is that in (20) the search results in the identification of **two** elements; the WH-phrases are non-distinct and equidistant from C. The overall process of merging an instance of *who* in SPEC-CP and applying *Minimal Search* to identify the raised instance as a copy – instead of a repetition – is schematized in (23) and (24) respectively:

- (23) [ who<sub>1</sub> [C ... [CC [v\*P<sub>1</sub> who<sub>1</sub> see ⟨who<sub>1</sub>⟩] [v\*P<sub>2</sub> who<sub>2</sub> ignore ⟨who<sub>2</sub>⟩]]]].

- (24) [ who<sub>1</sub> [C ... [CC [v\*P<sub>1</sub> who<sub>1</sub> see ⟨who<sub>1</sub>⟩] [v\*P<sub>2</sub> who<sub>2</sub> ignore ⟨who<sub>2</sub>⟩]]]].

As a result, both elements are integrated into the movement chain headed by the upper occurrence of *who<sub>1</sub>*. Due to their equidistance from C, both instances of *who* in the edges of  $v^*P_1$  and  $v^*P_2$  are identified as belonging to the movement chain.

Having shown how forked chains can be conceived within certain guidelines and assumptions, I shall now address evidence and arguments that speak in their favor.

### 3.4. Evidence for FCs and Specifics of the Analysis

The first piece of evidence for forked chains comes from WH-copying Across-the-board. As is well known, languages like German allow multiple pronouciations of simplex WH-expressions in intermediate SPEC-CP positions under long-distance Ā-movement (cf. Felser 2003), often taken as evidence of successive-cyclicity:

- (25) Wen hat Maria gemeint wen Peter gesehen hat?  
 who has Mary meant who Peter seen has  
 'Who did Mary say that Peter saw?'

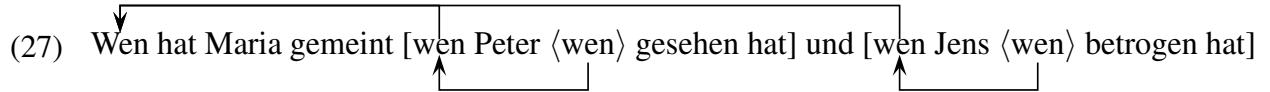
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<sup>5</sup> In their work Martin & Uriagereka (2011) make use of this conception of movement to analyze parasitic gaps and control structures.

What is less known, however, is that so-called WH-copying can also apply Across-the-board (Felser 2003):

- (26) Wen hat Maria gemeint [CP<sub>1</sub> **wen** Peter gesehen hat] und [CP<sub>2</sub> **wen** Jens betrogen hat]  
 who has Mary meant who Peter seen has and who Jens cheated on  
 hat]  
 has  
 ‘Who did Mary say that Peter saw and that Jens cheated on?’

I assume that syntactically, the copy theory of movement (Chomsky 1995) lies at the heart of this phenomenon, i.e. it is successive-cyclic movement and occurrences of copies in intermediate SPEC-CP positions that give rise to the possibility of their spell out.<sup>6</sup> If that is correct, we can take this as an indication that a syntactic representation of the WH-expression in the second conjunct must be there to provide the precondition of WH-copying. However, this is nothing but a forked chain. A sketch of the actual derivation is given in (27):

- (27)  Wen hat Maria gemeint [wen Peter <wen> gesehen hat] und [wen Jens <wen> betrogen hat]

The mechanism for establishing the forked chains applies at the matrix-vP-phase level, i.e. that is the point where the previously independent Ā-chains become unified by ambiguous minimal search. I have omitted this substep in the illustration in (27), as nothing hinges on this.

The second argument that can be made in favor of forked chains comes from remnant movement (den Besten & Webelhuth 1990), which can also apply Across-the-board. It is, admittedly, not a straightforward piece of evidence for forked chains, but I have previously tried to show that it represents quite a severe challenge to analyses which do not take forked chains as their starting point. Within this paper my goal is more modest in that I will show how the phenomenon can be captured with the conception of forked chains I have proposed. However, additional maneuvering turns out to be inevitable.

Consider (28):

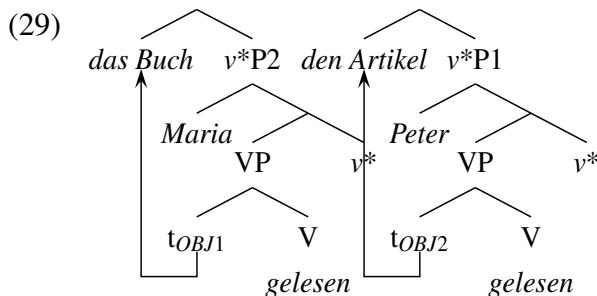
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<sup>6</sup> Here I refrain from going into the actual reasons for their pronunciation, cf. Nunes (2004); Boef (2012); Pankau (2013) for proposals. It is interesting to note that whatever mechanism yields the spell-out in SPEC-CP<sub>1</sub> also has to apply in SPEC-CP<sub>2</sub>. Failure to apply the spell-out mechanism in either clause is ungrammatical:

- (i)     a. \*Wen hat Maria gemeint, wen Peter gesehen hat und dass Jens betrogen hat?  
           who has Mary meant who Peter seen has and that Jens cheated on has
- b. \*Wen hat Maria gemeint, dass Peter gesehen hat und wen Jens betrogen hat?  
           who has Mary meant that Peter seen has and who Jens cheated on has

- (28) a. [<sub>VP</sub> X Gelesen] hat [ Maria [<sub>X</sub> das Buch] t<sub>VP</sub>] und [ Peter [<sub>X</sub> den Artikel] t<sub>VP</sub>].  
           read      has Mary    the book      and Peter    the article  
       ‘As for reading, Mary tried to read to read the book, and Peter tried to read the article.’
- b. [<sub>VP</sub> Gründlich zu X lesen] hat [ Maria [<sub>X</sub> das Buch] t<sub>VP</sub>] und [ Peter [<sub>X</sub> den Artikel] t<sub>VP</sub> versucht].  
           thoroughly to read    has Mary    the book      and Peter    the  
           article      tried  
       ‘As for thoroughly reading, Mary tried to read the book and Peter tried to read the article.’

I take these phenomena to be instances of remnant movement. The fact that additional material may accompany the fronted verbs (like the adverbial phrase *gründlich* ‘thoroughly’ or the PP *for children*) strongly suggests that we are dealing with a phrasal unit, not a head.<sup>7</sup> I have indicated the gap position inside the remnant category with X. It is interesting to note that seemingly, a single remnant category undergoes fronting while – assuming that ATB does in fact involve forked chains – *distinct* instances of X create the remnant. So, for example, in (28a) it is the two DPs *das Buch* ‘the book’ and the *den Artikel* ‘the article’ which have to evacuate their respective verb phrases, before the latter can be unified in the ATB process. If this way of describing things is correct, what we need is an instance of ‘parallel evacuation’ within each conjunct before remnant ATB takes place:

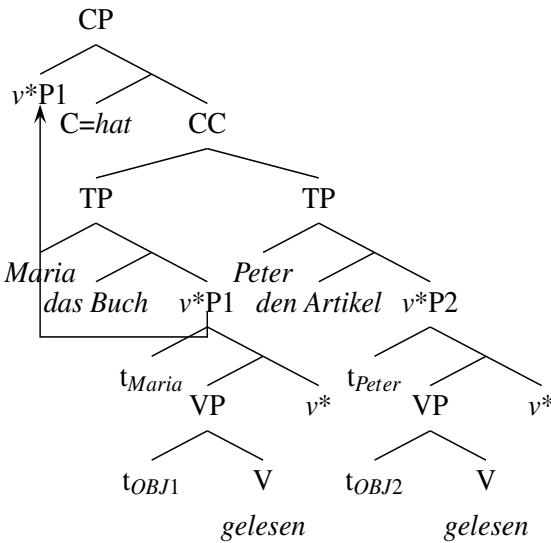


I take the above description of (28) to be correct. Next, let us take a look at what happens in the CP-cycle. Consistent with the analysis of ATB I have developed above, let us assume that either of the evacuated vPs may undergo fronting to SPEC-CP. So let vP1 do the fronting:

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<sup>7</sup> I thus reject the option of analyzing such examples in terms of syntactic head movement (*pace* Trinh 2009, Ott 2010). From the perspective of head movement the relevant examples (28) would have to be analyzed as adjunction of an adverbial phrase or a PP to a head. As far as I am aware, this is not standard; instead, adjunction is usually taken to be phrasal adjunction to a phrase, and head adjunction to a head, never phrasal adjunction to a head (or, for that matter, head adjunction to a phrase).

(30)



Again, following the derivational steps of the analysis of ATB above we now have to license a movement chain, i.e. identify a copy or copies which are non-distinct from the raised element. A question arises: how can we guarantee that both vPs are recognized as being identical to the one raised? Finally, Ā-moved vP1 contains the unpronounced copy of the DP *das Buch*, while vP2 contains the unpronounced copy of the DP *den Artikel*; hence the respective vPs are plainly different syntactic objects, lacking the featural identity needed to interpret them as elements in a movement chain.

Let us step back for a second and think about what actually happens at this point. Adopting a conception of chains proposed by Martin & Uriagereka (2011) I have suggested earlier that the process that identifies syntactic objects as copies in a movement chain is subject to the principle of minimal search. At this point we can ask what properties this principle has. To anticipate the solution, I will say that copies left by movement are invisible to minimal search (Chomsky's 2000 'trace invisibility'), and if that is true, the reason why vPs with distinct featural make-up can be identified as part of a single movement chain is just that: the invisibility of traces to processes involving minimal search.

Chomsky (2000) suggested that minimal search is involved in the syntactic operation AGREE. In particular an unvalued φ-feature functions as a probe which peruses its c-command domain for the structurally closest active DP, i.e. one that bears an unvalued Case feature. One particular set of phenomena he considered was quirky Case subjects in Icelandic. The following data are from Holmberg & Hróarsdóttir (2005).<sup>8</sup> In particular, Chomsky suggested that in raising constructions, the trace of a moved experiencer like *mér* in (31a) is invisible for or ignored by φ-feature probing: agreement with a lower DP *hestarnir* becomes possible. If, however, the experiencer remains in situ, minimal search by the φ-set identifies it as the closest goal and undergoes AGREE with it (31b). So in (31b) agreement with the DP *hestarnir* is blocked by the presence of *einhverjum manni*, which in turn controls the agreement:<sup>9</sup>

<sup>8</sup> I use the following abbreviations for the glosses and graphs: nominative NOM, accusative ACC, dative DAT, oblique OBL; singular SG plural PL; neuter N; expletive EXPL.

<sup>9</sup> For recent arguments from *tough*-constructions in favor of this line of reasoning, cf. Hartman (2011).

- (31) a. Mér<sub>i</sub> virðast t<sub>i</sub> [hestarnir vera seinir]  
           me.DAT seem.PL the horses.NOM be slow  
           ‘It seems to me that the horses are slow.’
- b. það virðist/\*virðast einhverjum manni [hestarnir vera seinir]  
           EXPL seem.SG/seem.PL some man.DAT [the horses.NOM be slow]  
           ‘It seems to some man that the horses are slow.’

If this reasoning can be sustained it suggests that in other phenomena too minimal search ignores ‘traces’ – a case in point would be labels (cf. Chomsky 2013), but I won’t enter that discussion here. While the exact reasons for trace invisibility remain to be elucidated, I take it to be a fact.

Returning to our remnant-ATB case and the derivation given in (30), I would like to suggest that the very reason minimal search identifies both instances of vP in the search domain as identical to the raised vP1 is that minimal search is ‘blind’ to previously evacuated material, and hence integrates both vP1 and vP2 into a forked movement chain. This is, effectively, how ATB remnant movement comes about. As previously noted, additional assumptions were necessary, but I hope to have shown a feasible way of analyzing this phenomenon.

Let me finally address case matching effects in ATB movement in German (cf. Citko 2005 for examples from Polish exhibiting basically the same pattern). To illustrate the basic pattern, consider (32) and (33a). Take (32a) first. *Gehorchen* ‘obey’ and *helfen* ‘help’ both assign dative case. The ATB moved category bears dative case and the sentence is fine. In (33a) the verb *sehen* ‘see’ in the first conjunct assigns accusative case, while we still have *helfen* in the second conjunct. The result is ungrammatical regardless of whether the antecedent bears accusative (33a) or dative (33b):

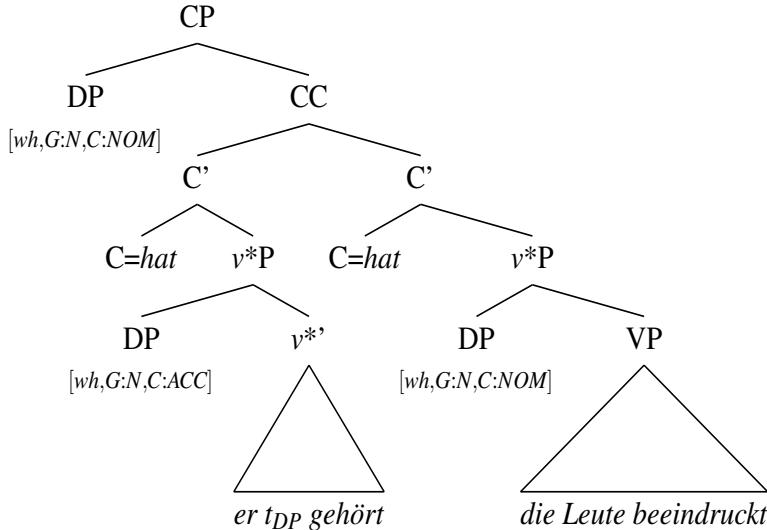
- (32) a. [Welchem Jungen] hat Maria gehorcht und dann geholfen?  
           which.DAT boy has Mary obeyed and then helped  
           ‘Which boy did Mary obey and then help?’
- b. [Welchen Jungen] hat Maria gesehen und geliebt?  
           which.ACC boy has Mary seen and loved  
           ‘Which boy did Mary see and love?’
- (33) a. \* [Welchen Jungen] hat Maria gesehen und geholfen?  
           which.ACC boy has Mary sehn and helped
- b. \* [Welchem Jungen] hat Maria gesehen und geholfen?  
           which.DAT boy has Mary seen and helped

We could conclude now that the antecedent simply needs to satisfy the case requirements of both verbs, i.e. there is just a single value the Case feature on the DP can assume. However, the morphological case realization plays a role in the well-formedness of the sentences. Consider e.g. (34b):

- (34) a. ? Bären              hat er geliebt und geholfen.  
           bears.ACC/DAT has he loved and helped  
           'It is bears which he loved and helped.'  
       b. Was              hat er gehört und hat die Leute beeindruckt?  
           what.NOM/ACC has he heard and has the people impressed  
           'What did he hear and impressed the people?'

What (34b) shows is that the antecedent can bear both accusative (assigned by *hören* 'hear' in the first conjunct) and nominative (assigned by T in the second conjunct) at once. Thus, what is crucial is the identity and the matching of the morphological case form, not the identity and the matching of the underlying syntactic features. I will therefore assume that the syntax and the morphology divide up their labor and will make an amendment concerning the way movement chains are formed. Let me first suggest that the syntactic structure of an example like (34b) looks as in (35):

(35)



The interpretation of Case mismatches which is implied in this analysis is that in the syntax, minimal search identifies the DPs in the vP-edges as non-distinct from the one raised to SPEC-CP. As long as the featural make-up is identical, a chain can be formed; the values on the features need not match. However, how do we account for the ill-formedness of the examples in (33a)? What I would like to claim is that syntactically, there is nothing wrong with these examples. Instead, they violate a morphological requirement regarding chain formation. Let me suggest the following stipulation:

- (36) A movement chain must
- a. comprise non-distinct members (i.e. they must be featurally identical)
  - b. be headed by a syntactic object which receives an exponent compatible with all lower chain members.

Of course, the new part is (36b), which intuitively says that the members of a movement chain should in principle be realizable by the same form. Turning to our examples, (33a) satisfies

condition (36a) but violates condition (36b), hence it is ungrammatical.

As for the case syncretism in (34b), I adopt a realizational approach to morphology along the lines of Distributed Morphology (DM, Halle & Marantz 1993 *et seq*). Three main features characterize this morphological framework: *late insertion* is the hypothesis that terminal nodes in the syntax consist of abstract morphosyntactic features only, without phonological content.<sup>10</sup> The morphophonological forms are introduced when the syntactic structure is delivered to the phonological interface. Vocabulary Items are relations between morphosyntactic features and phonological forms. *Underspecification* refers to the idea that Vocabulary Items must comprise a subset of the feature set in the terminal node to qualify for insertion, i.e. they need not be fully specified vis-à-vis the featural content of the terminal node. If numerous Vocabulary Items can be considered for insertion, the most specified candidate gets inserted. Finally, DM endorses the idea that both discrete morphological and syntactic elements enter into the same kind of constituent structure, often summarized as *Syntactic Hierarchical Structure all the way down*.

Returning to the syncretism observed in (34), I suggest for concreteness that the inanimate WH-pronoun *was* ‘what’ in German is negatively specified for oblique case. A conceivable Vocabulary Item for this pronoun is given in (37):

$$(37) \quad [D, WH, +N, -OBL] \leftrightarrow was$$

This vocabulary item meets condition (36b): it can in principle be inserted into all the abstract DP-positions in (35), determined by the subset principle,<sup>11</sup> and hence the corresponding sentence (34b) is grammatical. The instances of case mismatch (33) are weeded out not by the syntax alone, but by violating the condition on morphological realization of chain members (36b). My take on morphological case matching effects resembles the one by Citko (2005) in some respects. Differences include that in my analysis, there is no multiple case assignment to a single Case feature, as I employ multiple instances of the moved item, not just a single one (which undergoes movement to different case positions).

In this section I have shown how phenomena of increasing complexity can be analyzed by means of the forked chain conception I have proposed. Let us now turn to the way CC is split up.

### 3.5. *Splitting up CC - asymmetrizing the coordinants*

A fuller theory of ATB from coordinate structures involves the above derivation, i.e. the minimal-search based account of forked chains. In addition, the coordinating element must obviously be part of the structure. Moreover, there is ample evidence for the idea that in languages like English and German, the first conjunct asymmetrically c-commands the second conjunct. These observations represent a problem for my conception of CC, in which both conjuncts stand in a mutual c-command relation. In the following, ideas from Chomsky (2013) will

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<sup>10</sup> Whether this includes lexical categories/roots is disputed, meanwhile practitioners of DM agree on the idea that this holds for functional categories.

<sup>11</sup> Of course, the Case feature in the syntax in (35) needs to be modified to be a superset of the featural content of the Vocabulary Item; nominative and accusative Case are [-OBL] Cases.

be taken up, who suggests that one coordinand within CC must raise to spec of Coord after the latter merges with CC. I will discuss two scenarios regarding how that can come about. In both scenarios ATB formation and the asymmetrization of CC happen in parallel. However, in the first scenario the ATB moved element aims at its target directly. In the second scenario, the ATB moved element targets the edge of the derived Coordinate Phrase first, and then undergoes further movement. Before doing so, however, I shall briefly revisit the evidence in favor of an asymmetric coordinate structure.

There is considerable distributional evidence that the syntax of coordination involves an asymmetric structural association of the conjunction with one coordinand to the exclusion of the other coordinand. This appears to hold cross-linguistically. For example, in English and German the conjunction forms a unit with the last conjunct to the exclusion of all other conjuncts preceding the last conjunct. This asymmetry can be demonstrated by tests like parentheticals, independent sentences and movement. Thus, parentheticals and independent sentences can be preceded but not followed by the conjunct, suggesting that an underlying structural unit [Coord XP] exists but none of the type [XP Coord] (or, for that matter, a ternary branching [XP Coord XP]):

- (38) Insertion of a parenthetical
  - a. Even Bill, and he is no fool, didn't pass the test.
  - b. \* Even Bill, he is no fool and, didn't pass the test.
- (39) a. Und ob ich schon wanderte im finsternen Tal, so fürchte ich kein  
and if I though wandered in the dark valley thus fear I no  
Unglück.  
misery  
'Yea, though I walk through the valley of the shadow of death, I fear no evil.'
- b. \* Ob ich schon wanderte im finsternen Tal und, so fürchte ich kein  
if I though wandered in the dark valley and thus fear I no  
Unglück.  
misery

Along the same lines, displacement shows that a unit [Coord NP] can move as a unit (40). However, the conjunct cannot be stranded with the first coordinate member (41a) or moved along with the first coordinate member (41b):

- (40) Gestern sind [der Hans] angekommen und [der Bernd].  
yesterday are the Hans arrived and the Bernd.  
'Yesterday, Hans arrived, and Bernd.'
- (41) a. \* John gave [an article and] to Mary, [a squib].  
b. \* John gave [a squib] to Mary, [an article and].

It is interesting to note that, even though (41a)-(41b) indicate that the constituency of coordination in English is [XP [Coord YP]], with the last conjunct forming a constituent with the coordination, it is impossible to displace XP rightward, stranding the unit [ $t_{XP}$  [Coord YP]]:

- (42) \* John gave [and a squib] to Mary, [an article]

Leftward movement with conjunction, like passivization, WH-movement or topicalization is impossible as (43a), (43b) and (43c) show:<sup>12</sup>

- (43) a. \* [and who] did John like what?  
 b. \* [and Bill] was seen John.  
 c. \* [and this book], Mary read this article.

Various binding phenomena point to the conclusion that the first conjunct asymmetrically c-commands the last, but not vice versa. Thus it is possible that an R-expression is the first conjunct and a coreferential possessive pronoun is part of the second conjunct (44a), while the reverse is not possible (44b):

- (44) Binding of possessive pronouns  
 a. John<sub>i</sub> and his<sub>i</sub> brother went to the cinema.  
 b. \* His<sub>i</sub> brother and John<sub>i</sub> went to the cinema.

This is parallel to the possessive binding behavior between subjects and objects, which clearly involves c-command of the latter by the former:

- (45) a. John<sub>i</sub> met his<sub>i</sub> brother on the way to the cinema.  
 b. \* His<sub>i</sub> brother met John<sub>i</sub> on the way to the cinema.

Likewise, a universally quantified expression as the first conjunct can bind a pronoun in the second, but the reverse is not possible:

- (46) Variable Binding  
 a. Every<sub>i</sub> boy and his<sub>i</sub> sister go for a swim.  
 b. \* His<sub>i</sub> sister and every<sub>i</sub> boy go for a swim.

Again, we find parallel patterns with subjects and objects:<sup>13</sup>

- (47) a. Every<sub>i</sub> boy met his<sub>i</sub> sister on the way to the cinema.  
 b. \* His<sub>i</sub> sister met every<sub>i</sub> boy on the way to the cinema.

All of these facts support the idea that conjunction involves an asymmetric structure [XP [& YP]]. After these empirical considerations let us now address the problem of how we can link the symmetric CC-category to the asymmetric structure commonly and rightfully assumed for coordination. In my analysis the two are derivationally related. As noted in the beginning of this subsection, I will sketch two derivational scenarios, each of which comprises the formation of

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<sup>12</sup> In (40) I have chosen a ‘discontinuous coordination’ example from German, which Prinzhorn & Schmitt (2010) convincingly argue involves genuine rightward movement of an NP and must be distinguished from English examples like (i) (which also exist in German):

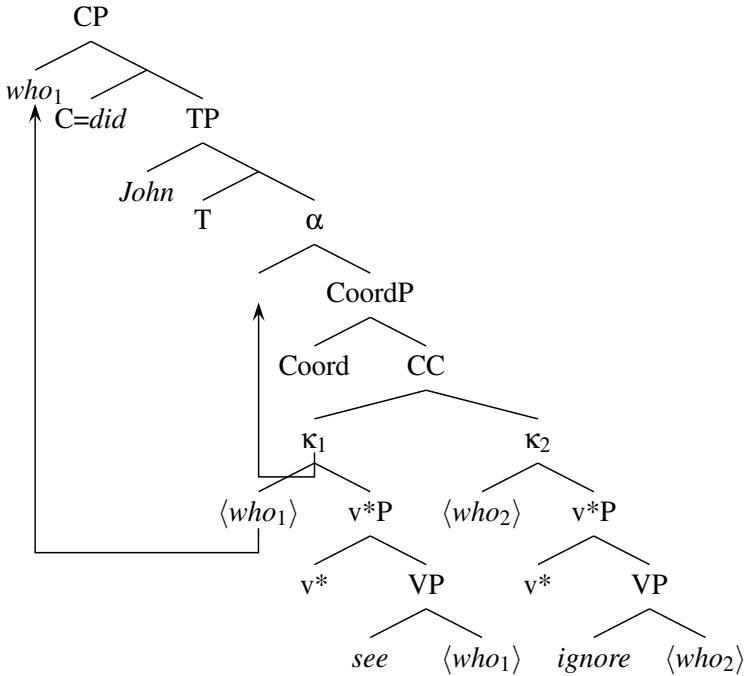
(i) John gave an article to Mary, and a squib.

<sup>13</sup> A confounding factor for (47b) is that it might involve a weak crossover violation if quantifier raising is assumed.

forked chains as its part.

Let us turn to the direct scenario first, in which extraction targets a goal outside of the Coordinate Phrase. To make things specific, suppose it is the member out of which WH-extraction takes place which raises.

(48)



First, a number of operations take place simultaneously or in parallel. WH-extraction and the formation of chains need to apply to the symmetric CC-representation, because after raising of one of the coordinate members, the coordinate structure is asymmetrical, such that one WH-phrase is closer to the probe and chain formation will detect the higher WH-phrase only. So to ensure ambiguous *Minimal Search*, CC is the relevant unit for chain formation. Secondly, it must be the case that the familiar asymmetry effects of coordination are “surface” effects, i.e. they result not from CC but the derived CoordP. Thirdly, raising of both the coordinate member and WH-extraction need to take place in parallel at the C-phase level, where all operations are take place (cf. Chomsky 2008).

I shall finally address the issue of labeling.  $\kappa_1$  (or  $\kappa_2$ ) needs to raise to make labeling of CC possible. In this particular case, CC effectively obtains the label  $v^*$ . After raising  $\kappa_1$  to the sister-of-CoordP position,  $\alpha$  needs to receive a label. Again, we have a symmetric structure, in which no element is more prominent than the other. I will tentatively assume that raised  $\kappa_1$  labels the structure, i.e. T selects a  $vP$ .

Let us now turn to the indirect scenario, in which ATB targets the edge of the derived Coordinate Phrase before moving on. We know that the distribution of coordinates is the same as the one of its members (cf., among many, Munn 1993). Chomsky (2013:46) remarks on this issue:

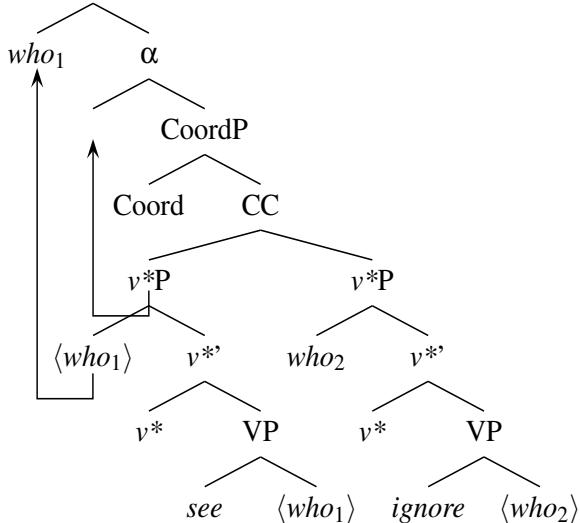
We know what the right answer is: the label is not *Conj* but rather the label of [the raised coordinate], typically shared with [the in-situ coordinate]; if the coordinated expressions are APs, then [ $\alpha$ ] is an AP, etc. It follows that *Conj* and the construction

[ConjP] that it heads are not available as a label, so that  $[\alpha]$  receives the label of [the raised coordinate].

The remarks make sense but it is unclear how to get to the result. To complicate matters, in Chomsky (2013:fn. 40) it reads: “The assumption under consideration is that although [Coord] is not a possible label, it must still be visible for determining the structure. Otherwise, as a reviewer points out, [both coordinates] would be equally prominent.” To rephrase the problem: CC, say  $\{vP, vP\}$ , is problematically symmetric hence requires raising of one member to yield  $\{vP, CoordP\}$ , where  $CoordP = \{Coord, \{\langle vP \rangle, vP\}\}$ . The output of this raising needs to be labeled by the raised  $vP$ , as we know that such units have the distribution of  $vPs$ . This requires  $Coord$  to be ‘unavailable’ for labeling. However, if  $Coord$  is unavailable for labeling, we must still guarantee that the  $\{vP, CoordP\}$  is not equivalent to CC as far as labeling is concerned (which would effectively reiterate the original symmetry problem). How can we effectuate the unavailable-but-visible property? Which feature is it that  $Coord$  bears?

I will here consider an analysis that uses an idea recently suggested by Ott (2011b). Based on the syntax of free relatives, he argues that if a phase head carries no features necessary for subsequent computation, such as free relative C after feature inheritance, it must be removed from the workspace by transfer along with TP, in order to comply with Full Interpretation. Coordination represents a comparable state of affairs:  $Coord$ , while being lexically interpretable, bears no features which are needed for subsequent derivational steps (cf. Zhang 2010:65) – it is not selected and has no grammatical function for the ongoing derivation. Thus in  $\alpha$  it is  $CoordP$  as a whole which gets removed by transfer (not just  $Coord$ ’s complement), leaving only  $v^*P$  available for subsequent selection (say, by T). Thus the current conception of coordination does not resort to either adjunction of a Boolean phrase to the first conjunct (Munn 1993) which faces independent problems, nor does it employ stipulated feature percolation by the first conjunct to account for the distribution of conjoined phrases (*pace* Zhang 2010). Under the current view, the set-forming operations Merge and transfer suffice to yield the correct outcome.

(49)



$CoordP$  undergoes transfer as a whole – analogous to CP in free relatives – leaving only the

raised constituent available for subsequent selection, the right result. Although conceptually appealing, the idea might not be compatible with current considerations because of the additional cycle which gets introduced, rendering the symmetric CC unrecoverable at the C-phase level.

### 3.6. A Remark on Asymmetric Reconstruction

As noted in the exposition of the asymmetric analyses, there are reconstruction asymmetries with respect to the first and the last conjunct. Thus (50a) exhibits a Condition C effect induced by the coreferential pronoun in the first conjunct, while no such Condition C effect shows up in (50b), where the coreferential pronoun is the subject of the last conjunct:<sup>14</sup>

- (50) a. \* Which picture of John<sub>i</sub> did he<sub>i</sub> like and Mary dislike?  
       b.   Which picture of John<sub>i</sub> did Mary like and he<sub>i</sub> dislike?

Likewise, (51a) is accounted for once the complex WH-expression including the anaphor is reconstructed in the first conjunct, while, apparently, reconstruction is obviated in the second conjunct as (51b) suggests:

- (51) a. Which pictures of himself<sub>i</sub> did John<sub>i</sub> buy and Mary paint?  
       b. \*Which pictures of herself<sub>i</sub> did John buy and Mary<sub>i</sub> paint? (Munn 1993:52)

Citko (2005) suggests that such examples might indicate that linear proximity is at work: reconstruction targets the linearly closest conjunct. However, we do not have a clear account of how this works, let alone a plausible answer of why linear order should play a role in reconstruction. One possible solution could be to say that it is always the first element in the edges of members of CC to move and serve as antecedent.<sup>15</sup> However, this begs the question of why this should be so. At this point I have no account for the reconstruction asymmetries mentioned and have to leave the issue open.

#### 4. Conclusion

In this paper I have defended the traditional notion of forked chains in ATB movement and given partly new empirical arguments in favor of them: WH-copying Across-the-board in German indicates that syntactically, forked chains exist prior to the unification process (ATB). Case matching effects as well as remnant movement Across-the-board also suggest that the dependency between the antecedent and the gaps is one-to-many. Finally, I have suggested a new implementation of ATB, according to which the actual ATB step applies to a strictly symmetrical core in which the coordinands form a headless, exocentric structure {XP, YP}. Movement applies from the edge of one member of this structure and chain integration – copy identifica-

<sup>14</sup> At this point I am not sure what to make of an observation in Citko (2011:220, fn. 17), (ia)/(ib):

- (i) a. Which picture of John, do you think he, liked and Mary disliked?  
b. Which picture of John, do you think Mary liked and he, disliked?

<sup>15</sup> I am grateful to Philipp Weisser for this suggestion.

tion – is ambiguous between two (or  $n$ ) members in equidistant edges. I have shown how certain recalcitrant phenomena like WH-copying, case matching and remnant movement ATB can be accounted for.

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# **Polish experiencer and affectedness datives as adjuncts**

Natalia Cichosz

In this paper I will propose an analysis of optional dative nominals that occur in the sentence-initial position in a number of structures in Polish. Contrary to proposals inspired by Pylkkänen's (2002, 2008) applicative model, I claim that high datives in Polish should be analysed as adjuncts that select the structure they combine with on the basis of that structure's eventive semantics. I will argue for a specific internal structure of all dative-inflected nominals that will be able to account for various differences between optional and argument datives on the one hand and dative and accusative nominals on the other.

## *1. Introduction*

The distinction between arguments and adjuncts has commonly been considered one of the key issues of most current formal linguistic theories. Even though it is difficult to provide a definition of these notions, there are certain semantic and syntactic criteria that help to determine whether a given category should be classified as an argument or an adjunct. For instance, arguments, but not adjuncts, are expected to receive an interpretation that belongs to a limited list of semantic functions such as agents, experiencers and goals. Syntactic criteria draw a distinction between arguments and adjuncts on the basis of, for example, their obligatory or optional presence in structure, movement and extraction. As arguments are also subcategorised for by a verb and directly related to its meaning, their omission often renders a sentence ungrammatical. Adjuncts, on the other hand, are never obligatory, since they are not implied by the semantics of the predicate. As they are always optional elements of the sentence, when removed they do not create any sense of semantic incompleteness or ungrammaticality.

In the present paper I will focus on a number of Polish structures particularly significant from the point of view of the above argument – adjunct distinction. I will demonstrate that the common assumption that a case-marked DP referring to an individual associated with an event should be assigned argument status can be challenged when confronted with data from less closely investigated languages.

### *1.1. Preliminary data*

The structures that provide crucial evidence in support of the above claim are illustrated below. The

sentences in (1) – (3) contain an optional dative DP that can be omitted without affecting the grammaticality of the structure. In (4) the dative is required by the predicate and in many theories it is thus treated as an argument of the verb *dedykować* 'dedicate'. Accusative DPs occurring with transitive verbs or in double object constructions are uncontroversially considered arguments of the verb.

- (1) a. (Jankowi) dobrze się tańczyło.  
 (John.DAT) well REFL danced.3SG.N  
 '(John) / One danced and he experienced that as good.'
- b. (Jankowi) zakaszłało się.  
 (John.DAT) coughed.3SG.N REFL  
 '(John) / One (accidentally) coughed.'
- (2) (Jankowi) zepsuł się samochód Pawła.  
 (John.DAT) broke down REFL car.NOM Paul.GEN  
 'Paul's car broke down (and John was affected by that).'
- (3) (Jankowi) te teksty łatwo się tłumaczą.  
 (John.DAT) these texts.NOM easily REFL translate.3PL  
 '(To John), these texts translate easily.'
- (4) Anna dedykuje ten wiersz \*(Jankowi).  
 Anna.NOM dedicates this poem.ACC John.DAT  
 'Anna dedicates this poem to John.'

Structures containing dative-inflected NPs that are not selected by the main predicate have been identified in numerous unrelated languages. Two central issues discussed in the literature addressing them concern the above mentioned argument or the adjunct status of those datives and whether their semantic interpretation is licensed internally or externally to the dative constituent. Two obvious analyses of its structure will propose that the dative DP is either an argument of an external functional head introduced in the verbal projection which assigns the relevant semantics to it or that it is an adjunct that is assigned its interpretation internally to its constituent. The literature on dative nominals by and large adopts the former view and many such proposals have been inspired by Pylkkänen's (2002, 2008) applicative analysis. They include, among others, an analysis by Bosse et al. (2012) of dative structures from Albanian, German, Hebrew and Japanese, proposals by Rivero & Arregui (2012) on dative structures in Slavic languages and by Rivero et al. (2010) on Polish and St'át'imcets and an analysis of Polish dative sentences by Malicka-Kleparska (2012a,c). In this paper, contrary to the above-mentioned proposals, I will claim that dative DPs in (1) – (3) should be analysed as adjuncts that receive their semantic interpretation from a functional head within the dative constituent. The two remaining possibilities in relation to the status of the dative NP and the source of its interpretation would assume that the dative is an adjunct introduced either by an external head or an argument introduced by an internal head. I will not follow Cinque's analysis of adjuncts which assumes that they are specifiers of a particular class of functional heads. The analysis according to which the dative is an argument introduced by an internal head from which it receives its interpretation is incoherent and therefore cannot account for the structure of dative-nominal sentences.

In this article, I will propose an analysis that will be able to account for a number of differences between structures containing optional datives such as (1) – (3) and those with datives selected by the main predicate. The main feature of my proposal will be that the dative constituent occurring in (1) – (3) has an internal structure that comes partly from dative case itself and partly from a functional head internal to the constituent. This head will be absent in sentences such as (4) where the dative is

introduced into the structure by the verb. The proposal put forward in this paper will be able to explain differences between the two above-mentioned types of datives and, in addition, between the class of dative-inflected nominals on the one hand and nominative or accusative DPs on the other. I will demonstrate that when confronted with the full range of those structures<sup>1</sup>, my analysis will offer a better account of the data than proposals based on the applicative model. More precisely, in section 2 I will introduce a specific syntactic structure both for argument and adjunct dative nominals and provide arguments in its favour on the basis of various dependency relations that exist between those datives and elements contained in the remaining part of the structure. In addition, I will provide a semantic representation for adjunct dative DPs and discuss the interpretations that they can receive in various contexts as well as the mechanisms by which those interpretations can be assigned. Section 3 will discuss some other aspects of dative-nominal structures related to the position in which adjunct dative DPs can appear in the clause. I will also refer to the competing proposals and demonstrate why they cannot account for the full set of the data introduced in this paper. Section 4 will conclude the paper and summarise the main ideas of the proposed analysis.

## 1.2. *The meaning of dative nominal structures*

In the structures in (1) – (3), the optional dative requires the sentence it combines with to express an event that the dative is associated with but not in control of. In some of these structures, the dative is identified with the performer of the action and in cases in which it is not associated with the subject argument, it is interpreted as an individual affected by a given event. There are no particular requirements with regards to the morphology of structures that can combine with the dative. However, as will be demonstrated further in the paper, the availability of the actor argument interpretation of the dative depends on the presence of the reflexive morpheme *się*<sup>2</sup> in sentences that the dative precedes.

In (1a) and (1b) the dative DP co-occurs with an impersonal sentence that is obligatorily composed of the neuter third person singular form of the verb and the morpheme *się*. I will refer to the dative sentences exemplified in (1) as the dative impersonal *się* construction. The sentence in (1a) also contains an obligatory adverb that refers to the way in which the agent perceives the action that he is performing and not to the quality of the action itself. In the absence of the dative, the remaining impersonal structure expresses an action that is performed by an arbitrary [+human<sup>3</sup>] subject.<sup>4</sup> The

<sup>1</sup> Each of the above mentioned analyses that rely on the applicative proposal focuses on a limited set of dative structures that exist in the languages under discussion and in some cases would require some readjustments to be applicable to a wider range of structures.

<sup>2</sup> ‘Reflexive’ is the term traditionally used to refer to the morpheme *się*. I will use this term throughout the paper even though *się* has many usages some of which are not related to the notion of reflexivity.

<sup>3</sup> As indicated by Krzek (2010:76), after Kibort (2008), the default [+human] interpretation of the impersonal *się* construction can be overridden by providing a different referent for the unspecified agent somewhere in the context, as in (i).

i. Gdy się jest bocianem, gniazdo buduje się wysoko.  
When REFL is.3SG stork nests.ACC builds.3SG REFL high-up  
'When one is a stork, one builds the nest high up.'  
(Kibort 2008:272, quoted after Krzek 2010:76)

adverb occurring in such a structure, similarly to its interpretation in sentences containing a dative DP, normally refers to the way in which the arbitrary subject perceives the action that he is performing. This interpretation of the adverb is not possible in nominative-subject sentences. In these cases, the adverb can only refer to the quality of the action (5).

- (5) Janek dobrze tańczył.  
 John.NOM well danced.3SG.M  
 ‘John danced well.’  
 Not: ‘John danced and he experienced dancing as good.’

As indicated earlier, the difference between the two dative impersonal *się* sentences in (1) lies in the obligatory presence of an experiencer adverb in one of them. Both examples, however, contain an event that the dative is not in control of. Namely, in (1b) the dative does not control the action of coughing. The sentence in (1a), on the other hand, can be thought of as containing two events, one being the event of dancing and the other the event in which dancing is experienced in a certain way. In this case, the dative is in control of dancing but not of the experience.

The nominative-subject version of (1b), illustrated by (6) below, is underspecified as to whether or not the subject is in control of the action – it is compatible with a scenario in which John performs the action on purpose and with one where he does it accidentally.

- (6) Janek kichnął.  
 John.NOM sneezed.3SG.M  
 ‘John sneezed.’

For this reason, it seems that the use of the dative case in sentences such as (1b) is justified only if the event expressed by the predicate can in theory be controlled by the actor argument. This initial observation is confirmed by the ungrammaticality of sentences in which the dative precedes a subject experiencer verb that describes a state that cannot be controlled<sup>5</sup> as in (7).

<sup>4</sup> Depending on the referent(s) available in the context in which the sentence is uttered, the covert arbitrary subject of the impersonal *się* construction may be specified for any person, number or gender (the following example has been adopted from Kibort 2004:288).

- i. Pracowało się jako nauczyciel / nauczycielka / nauczyciele / nauczycielki.  
 worked.3SG.N REFL as teacher.M / teacher.F / teachers.VIR / teachers.NON-VIR  
 ‘One worked as a teacher.’/ ‘People worked as teachers.’

As will be illustrated later in the paper, the presence of such an arbitrary subject in the structure will be necessary for the dative in sentences such as (1a) and (1b) to receive an (involuntary) agent/experiencer interpretation.

<sup>5</sup> There is no similar restriction on the formation of impersonal *się* sentences that contain subject experiencer verbs:

- i. Lubi się Annę.  
 likes.3SG.N REFL Anna. ACC  
 ‘One likes Anna.’

- (7) \*Jankowi lubi się Annę.  
 John.DAT likes.3SG.N REFL Anna. ACC  
 Intended reading: 'John likes Anna.'

If the dative cannot be identified with the subject argument of the event described by the sentence it combines with, it has to be interpreted as affected by that event. In the example in (2) above the affectedness dative precedes the anticausative structure but it can co-occur with sentences that belong to various syntactic types.<sup>6</sup> The obligatory affectedness interpretation of the dative occurring in such sentences is due to the fact that they all contain independent grammatical subjects with which the dative cannot be co-referential. The availability of the affectedness interpretation for the dative will be discussed in the relevant sections of this paper.

In the middle sentence in (3), similarly to the examples in (1), the dative NP is normally interpreted as the performer of the action expressed by the verb. However, it turns out that for a number of reasons middle structures in Polish behave differently from impersonal *się* sentences. For example, they do not contain a syntactically active agent<sup>7</sup> and can only be formed with transitive verbs.

As stated earlier, the sentences in (1) – (3) differ from the one in (4) due to the optional presence of the dative in their structure. Example (4) illustrates a case where it is normally assumed that the dative, nominative and accusative DPs are all arguments of the main predicate. The structures so far introduced in this paper should also be distinguished from other kinds of datives that are also widely used in Polish. In particular, even though optional datives in (1) – (3) may at first sight seem similar to those that occur in sentences such as (8) below, there are a number of reasons to think that they should not be treated in a uniform way.<sup>8</sup>

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<sup>6</sup> An affectedness dative can combine with any type of structure that has an independent grammatical subject. In the sentence below it precedes the impersonal *-no/-to* construction that contains a covert subject which has to have a human referent. However, there are reasons to believe that there are certain restrictions on possible subjects of impersonal *-no/-to* sentences that do not apply in the impersonal *się* construction (but see Kibort, 2004 for discussion). As a result, in the sentence below the dative cannot receive the involuntary agent/experiencer interpretation that was available for it in sentences in which it preceded the impersonal *się* construction.

- i. (Jankowi) zepsuto samochód Pawła.  
 (John.DAT) broke.-no/-to IMPERSONAL car.ACC Paul.GEN  
 'People broke Paul's car (and John was affected by that).'

<sup>7</sup> Unlike impersonal *się* sentences, middle structures cannot be followed by a purpose clause (i) and modified by the adverb *celowo* 'deliberately' in (ii).

- i. \*Te teksty szybko się tłumaczą żeby zadowolić wydawcę.  
 these texts.NOM fast REFL translate.3PL in order to please. INF publisher.ACC  
 '\*These texts translate fast in order to please the publisher.'  
 ii. \*Te teksty szybko się tłumaczą celowo.  
 these texts.NOM fast REFL translate.3PL deliberately  
 '\*\*These texts translate fast on purpose.'

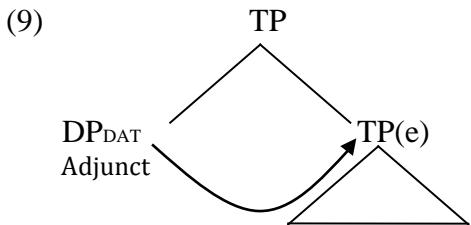
<sup>8</sup> For reasons of space I cannot provide any relevant argumentation here but refer to Szymanek & Bondaruk (2007) for a discussion of some of the properties of the structure in (8).

- (8) (Jankowi) smutno było wyjeżdżać.  
 (John.DAT) sadly was.3SG.N leave.INF  
 'It was sad (for John) to leave.'

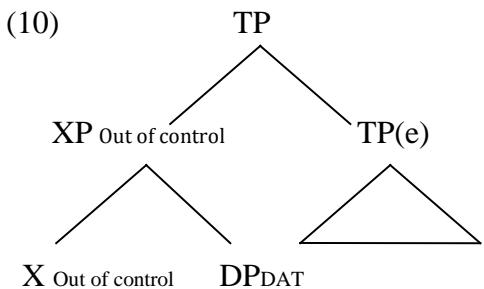
In the next section I will develop an account of structural differences between the two types of dative nominals and provide more details on the interpretations that are assigned to the optional dative in (1) – (3).

## 2. Basic proposal

Optional dative DPs can combine with a number of constructions that otherwise occur in the language as independent, well-formed structures. I propose that these datives should be analysed as adjuncts that select their sister constituent on the basis of that constituent's eventive semantics (9).



According to my proposal, internally to the dative adjunct's constituent, a dative-marked DP is selected by a functional head that assigns the out-of-control interpretation to it. I will therefore propose that the dative adjunct constituent has the internal structure illustrated by (10) and its meaning is represented as (11).

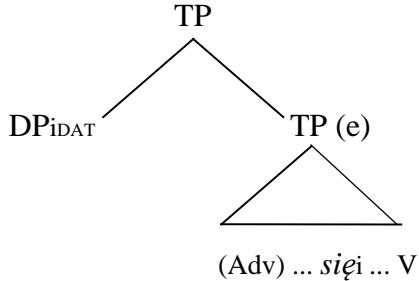


- (11) [[Dat]] =  $\lambda x \lambda e [\text{PARTICIPANT}(x,e) \& \text{OUT OF CONTROL}(x,e)]$

I will assume that depending on the structure in which it occurs, the dative's lack of control over the event can be expressed either when the dative is identified with the subject argument of that event or when it is affected by that event. In order to be interpreted as the performer of the action, the dative has to be co-indexed with the referent of the arbitrary [+human] subject argument available in the structure that it precedes. I will propose that the reference of the dative DP is assigned to the subject of the

impersonal sentence following these steps of the *arb* interpretation rule in (12).<sup>9</sup>

- (12) a. If there is a suitable<sup>10</sup> dative antecedent, assign its index to the subject.



- b. If there is no suitable antecedent available, interpret the subject as arbitrary.

As demonstrated above, the dative is interpreted as the performer of the action when it is identified with the referent of the arbitrary subject present in the structure to which it attaches. As participants in a given event must be specified, the requirement in (11) that the dative has to be interpreted as a participant in the event it is associated with is satisfied when, as a result of co-indexation with the arbitrary subject argument, the dative is linked to the subject's thematic role. On the other hand, if no such specification is provided, I will propose that through the application of the default rule in (13)<sup>11</sup>, participants are interpreted as affectees and then the requirement that they should be specified is satisfied.

- (13) PARTICIPANT(x) → AFFECTED (x)

In line with Bosse, Bruening & Yamada's (2012) analysis, I will propose that affectedness dative structures in Polish contribute non-truth conditional meaning. I will assume that affectedness should be interpreted as a presupposition.

### 2.1. Affectedness as presupposition

According to the rule in (11), when the dative receives the actor interpretation, it is not in control of the event in which it participates. In the affectedness scenario, the action is not performed by the dative but there is a presupposition that the dative is psychologically affected by that event. I will demonstrate that this claim is true on the basis of the *Hey wait a minute* test, illustrated by von Fintel (2001), among others, that will be applied to one of the affectedness dative structures. According to the test, in

<sup>9</sup> Similar proposals have been put forward in the literature to explain the interpretation of PRO subjects of infinitives, e.g. Williams (1980).

<sup>10</sup> For a dative DP to co-index with the subject, the locality condition must be fulfilled and the dative also has to occur in its base-generated position.

<sup>11</sup> There are other rules of this nature that assign default interpretations to categories which remain unspecified. See, for example, Harley and Ritter's (2002) discussion of person features.

response to the speaker's utterance of Y, the hearer can reply *Hey wait a minute I didn't know X* if and only if Y presupposes X. Therefore, in the context of (14a), when the hearer is informed about Paul's actions, they can object along the lines of (14b).

- (14) a. Jankowi Paweł hałaśuje!  
          John.DAT Paul.NOM makes-noise.3SG.M  
          'Paul is making a noise (and John is affected by that).'  
       b. *Hej, zaraz, nie wiedziałem, że to Jankowi przeszkadza!*  
          *Hey, wait a minute, I didn't know that this.NOM John.DAT disturbs.3SG*  
          'Hey, wait a minute, I didn't know that John was affected by that!'

On the other hand, the results of the *Hey wait a minute* test applied to datives which are identified with actor arguments of their events confirm that there is no need to assume that those datives are also affected (15).

- (15) a. Jankowi się zakaszlało!  
          John.DAT REFL coughed.3SG.N  
          'John (accidentally) coughed!'  
       b. *Hej, zaraz, nie wiedziałem, że #to Jankowi przeszkadza!*  
          *Hey, wait a minute, I didn't know that this.NOM John.DAT disturbs.3SG*  
          'Hey, wait a minute, I didn't know that #John was affected by that!'

In this respect, (15a) resembles sentences with nominative subjects which are not presupposed to be affected by the action that they perform.

- (16) a. Janek zakaszlał.  
          John.NOM coughed.3SG.M  
          'John coughed.'  
       b. *Hej, zaraz, nie wiedziałem, że #to Jankowi przeszkadza!*  
          *Hey, wait a minute, I didn't know that this.NOM John.DAT disturbs.3SG*  
          'Hey, wait a minute, I didn't know that #John was affected by that!'

The above data confirm that datives which are interpreted as involuntary performers of the action are not necessarily interpreted as affectees. Therefore, in this aspect they pattern with nominative agents that are not expected to encode affectedness as part of their semantics. The proposal described above assumes that the affectedness interpretation for the dative is only available when the dative is a participant in an event but the structure it combines with has no argument to which it could be linked to be interpreted as the performer of the action. This does not mean that an experiencer/involuntary agent dative cannot at the same time be affected by the event that he performs. In fact, one would be expected to be affected by a state that one experiences or an action that one knowingly performs. In this case, this additional affectedness interpretation does not need to be assigned to the dative as it is specified as a participant in the event via its agent theta role. However, if the dative is not the performer of the action, as in the examples above, it can only be linked to that action via the notion of affectedness.

## 2.2. Non-truth-conditionality of affectedness

Evidence that the sense of affectedness should be considered a non-truth-conditional part of the meaning of sentences such as (14a) comes from the fact that their affected meaning survives under negation (17) and yes/no questions (18). For example, even if the answer to the question in (18) below is negative, it cannot refer to lack of affectedness on the part of the dative DP.

- (17) Nie jest tak, że Jankowi Paweł zbił wazon Tomka.  
 NEG is so that John.DAT Paul.NOM broke.3SG.M vase.ACC Tom.GEN  
 ‘It is not the case that Paul broke Tom’s vase (and John was affected by that).’  
 Unavailable interpretation: ‘Paul broke Tom’s vase but that did not affect John (or anyone else).’
- (18) Jankowi zepsuł się samochód Pawła?  
 John.DAT broke down.3SG.M REFL car.NOM Paul.GEN  
 ‘Did Paul’s car break down (and did that affect John)?’  
 No. a. Tom’s car broke down (and John was affected by that).  
 b. Paul’s car broke down (and Mary was affected by that).  
 c. Paul’s bike broke down (and John was affected by that).  
 d. Paul’s car stalled (and John was affected by that).  
 Unavailable reading: ‘No - Paul’s car broke down (and John (or anyone else) was not affected by that’)

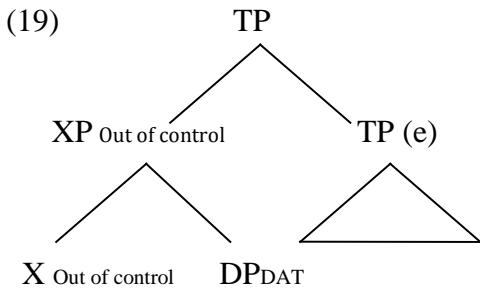
The fact that the sense of affectedness contributes to non-truth-conditional meaning is consistent with its proposed presupposition status.

### 2.3. *The internal structure of adjunct datives*

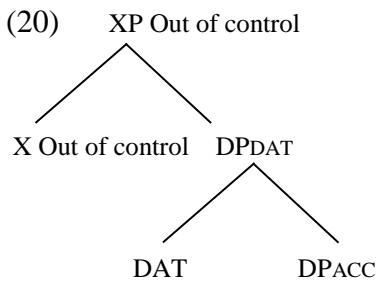
The representation in (10) makes certain predictions with regards to the properties of the dative DP. The initial evidence in favour of its adjunct status is based on their three important characteristics. Namely, in all the examples in (1) – (3), the dative nominal is an optional element of the structure. It makes a consistent semantic contribution to the meaning of the constituent that it modifies and it seems to attach to its sister constituent on the basis of that constituent’s semantic specification. In addition, it will be shown that the representation in (10) correctly predicts the dative’s properties in relation to binding and control of secondary predicates and is also able to account for a number of differences between dative DPs in (1) – (3) and those that appear in double object constructions or as sole objects of a verb. These contrasts cannot be captured by the competing analyses that ascribe the argument status to all of those dative nominals.<sup>12</sup> The structure in (10) is repeated as (19).

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<sup>12</sup> Please see references at the beginning of the paper.



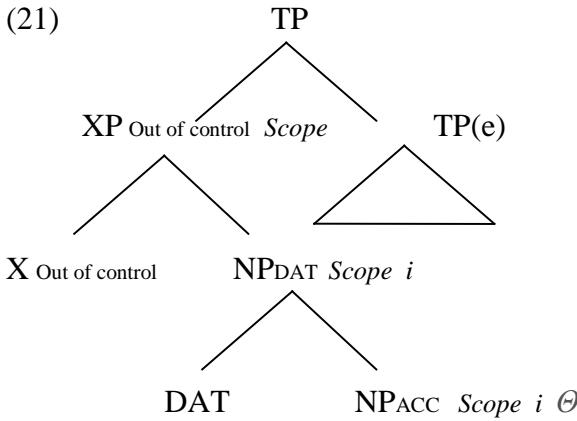
As proposed in the above representation, internally to the dative adjunct, the dative NP is an argument of a functional head that assigns the out-of-control interpretation to it. In addition, I will follow analyses along the lines of Caha (2008), which rely on the idea of case hierarchy and propose that the dative case involves more complex structure than the accusative or any other case that is lower in the hierarchy. The internal structure of the dative constituent will thus be represented as in (20).



In the remaining sections of this paper, I will demonstrate that the representation in (19) makes the right predictions in relation to the dative's (in)ability to participate in anaphoric and variable binding and control secondary predicates. I will assume that these relations are regulated by percolation of three different types of information contained in a noun phrase to higher nodes in the structure. According to (20), there are three levels within the dative constituent at which thematic information, (relevant to secondary predication), and case and scope information (that regulate anaphoric<sup>13</sup> and pronominal binding, respectively), can be represented. More specifically, on the basis of the assumption that surface c-command is crucial in order to establish anaphoric binding and secondary predication relations but not required for variable binding, I will assume that (21) correctly illustrates percolation of the three types of information.

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<sup>13</sup> I will assume that anaphoric binding information is linked to case which would explain why this type of binding is restricted to A-positions.



According to the above diagram, thematic information remains low and case information, represented by an index, can only percolate to the dative node. Scope extension does not seem to be restricted in a similar way, which is consistent with the fact that the pronominal binding appears to be the most loose relation in terms of the c-command requirement. Even though it is not possible to specify at this stage why certain types of information can percolate higher than others, (21) predicts that a hierarchical order exists that specifies the availability of the three types of relations with respect to each other. Namely, it is expected that the inability of an element to perform pronominal binding excludes it both from becoming a reflexive binder and a controller of secondary predicates. This is represented in (22).

- (22) pronominal binding << reflexive binding << predication

The diagram in (21) therefore makes certain predictions in relation to binding and control of secondary predicates by both adjunct and argument datives. In what follows, I will demonstrate how these predictions are confirmed by the data.

### 2.3.1 Pronominal binding

According to the diagram in (21), pronominal binding should be less restricted than anaphoric binding and secondary predication due to the fact that scope information percolates to a higher node than information relevant for the other two relations. However, it is still necessary to justify binding from an A-bar position in the first place as it is often assumed that only arguments can act as binders. The sentence in (23) confirms that pronominal binding by an adjunct is also possible.

- (23) Every dayi John thinks iti is the best day of his life. (Ausín, 2003)

According to (21), scope information can percolate to the highest node within the dative constituent and as a result of this the dative DP c-commands the structure with which it combines. Subject to locality conditions on binding, dative adjuncts should therefore be able to bind pronouns occurring lower in the structure. This is confirmed by (24) and (25). The first example is ungrammatical as it

violates principle B<sup>14</sup> but long distance binding is allowed in the second.

- (24) \*Każdemu chłopcu Paweł goi uderzył.  
 [every boy]i.DAT Paul.NOM hei.ACC hit.3SG.M  
 Intended meaning: ‘Paul hit every boy (and every boy was affected by that).’
- (25) Każdej nauczycielcei Paweł oblał egzamin bo jeji  
 [every teacher]i.DAT Paul.NOM failed.3SG.M exam.ACC because shei.GEN  
 ‘Paul failed an exam (and every teacher was affected by that) because he didn’t  
 nie słuchał.  
 NEG listened.3SG.M  
 listen to her.’

Similarly, pronominal binding by dative and accusative complements of a verb should be possible. As expected, (26) and (28) violate principle B but (27) and (29) are grammatical.

- (26) \*Przedstawiam każdemu chłopci jego.  
 introduce.1SG [every boy]i.DAT himi.ACC  
 Intended meaning: ‘I am introducing every boy to himself.’
- (27) Daję każdemu chłopci książkę bo goi lubię.  
 give.1SG [every boy]i.DAT book.ACC because hei.ACC like.1SG  
 ‘I give every boy a book because I like him.’
- (28) \*Skłócam kaźdego chłopca z nim.  
 conflict.1SG [every boy]i.ACC with himi  
 Intended meaning: ‘I am causing every boy to argue with himself.’
- (29) Zjadam wszystkie dania bo jei lubię.  
 eat.1SG [all courses]i.ACC because theyi.ACC like.1SG  
 ‘I’m eating all courses because I like them.’

The above examples confirm that both accusative objects and the two types of datives provided in (1) – (3) and (4) can perform pronominal binding. However, it cannot be concluded that there are no restrictions on this type of binding. For example, in (30) the quantifier cannot scope out of the relative clause.

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<sup>14</sup> Sentences in which the dative is co-indexed with a pronominal possessor or with a pronoun contained within a prepositional phrase receive better judgements than (24).

- i.    Każdej nianii Paweł ciągle oblewa herbatą **jeji** ulubioną bluzką.  
 [Every nanny]i.DAT Paul constantly pours tea.INSTR [**heri** favourite blouse].ACC  
 ‘Paul constantly pours tea on every nanny’s favourite blouse (and every nanny is affected by that).’
- ii.    Każdej nianii Paweł ciągle wylewa **na nią** herbatę  
 [Every nanny]i.DAT Paul constantly pours **on heri** tea.ACC  
 ‘Paul constantly pours tea on every nanny (and every nanny is affected by that).’

Cross-linguistically, these two cases are known exceptions to the Principle B condition.

- (30) \*Student, który czyta każdą książkę, rozumie ją.  
 Student.NOM who reads.3SG [every book]i.ACC understands.3SG iti.ACC  
 \*‘The student that reads every booki understands iti.’

### 2.3.2. Anaphoric binding

On the other hand, case information related to anaphoric binding in (21) cannot be represented beyond the dative case node and therefore the out-of-control head blocks c-command from this node to the constituent with which the dative NP combines. For this reason, it is expected that there will be a contrast in the anaphoric binding properties of dative adjuncts in (1) – (3) on the one hand and dative complements of a verb which are not introduced into the structure by an additional functional head on the other. Accusative objects are expected to pattern with dative arguments and allow anaphoric binding as well. This is confirmed by the data. The sentence in (31) shows both that anaphoric binding by the affectedness dative is not possible and that the accusative object (and nominative subject) of *przedstawić* ‘introduce’ can act as a binder.

- (31) [Obydwu chłopcom]i proj przedstawiamy obie dziewczynyk sobie\*i,j,k nawzajem.  
 [Both boys]i.DAT (we) introduce.1PL [both girls]k.ACC self\*i,j,k.DAT reciprocally  
 ‘We introduce both girls to each other (and both boys are affected by that).’

As expected, the dative argument of *powiedzieć* ‘tell’ and *pokazać* ‘show’ can bind the reflexive/reciprocal expression within the PP (32a) and the reciprocal direct object (32b).

- (32) a. Piotr powiedział dziewczynomj o sobie.i,j.DAT (nawzajem).  
 Peteri.NOM told.3SG girlsj.DAT about selfi,j(reciprocally)  
 ‘Peter told the girls about himself/ each other.’  
 b. Piotr i Tomek pokazali dziewczynomj siebiei,j (nawzajem).  
 [Peter and Tom]i.NOM showed.3PL girlsj.DAT self.i,j.NOM (reciprocally)  
 ‘Peter and Tom showed the girls to each other.’  
 (Witkoś: year unknown)

The above structures confirm that dative adjuncts can bind pronominal but not anaphoric elements occurring in the clause with which they combine. This contrast is expected under (21) but should disappear in sentences such as (33) below where the dative is identified with the performer of the action. This is because in such sentences the dative is co-indexed with the impersonal subject argument that is normally allowed to bind reflexive/reciprocal expressions. As predicted, (33) is acceptable.

- (33) [Ani i Janowi]i miło się przedstawia obydwu uczniomj siebiei,j nawzajem.  
 [Ann and John]i.DAT nicely REFL introduce.3SG.N [both pupils]j.DAT self.i,j.ACC reciprocally  
 ‘Ann and John are introducing both pupils to each other and they experience that as nice.’

Differences in the ability to perform anaphoric binding between adjunct and complement datives illustrated by (31) – (32) are not expected under the applicative analysis as this proposal ascribes argument status to both types of datives. Moreover, it presupposes that the dative should be able to bind

anaphors regardless of whether or not it is associated with the impersonal subject. For this reason it cannot explain the contrast between sentences such as (31) in which binding by the dative is not possible and examples such as (33) where the dative can act as a binder.

### 2.3.3. Secondary predication

As secondary predicate licensing conditions include the requirements that a secondary predicate has to be c-commanded by its subject and that the subject has to occupy an A-position, secondary predication data can provide a further argument to support the configuration in (21). The role of the c-command restriction on predication is demonstrated in (34).

- (34) a. John ate *the dish* warm.  
       b. \*John ate from *the dish* warm.

In both cases the subject of the secondary predicate occupies an argument position. However, in the ungrammatical (34b) *the dish* does not c-command the adjective that it is supposed to be modified by because it is contained inside a PP which does not contain *warm*; in (34a), however, there is c-command from the DP to the modifying adjective. Similarly, the c-command requirement is not satisfied in the case of adjunct dative DPs and therefore they cannot be modified by non-agreeing<sup>15</sup> secondary predicates (35).

- (35) \*Jankowi Paweł hałaśował nago.  
       John.DAT Paul.NOM made-noise.3SG.M naked.NON-AGR  
       ‘Paul was making a noise naked (and John was affected by that).’  
       Unavailable reading: ‘Paul was making a noise (when John was naked and John was affected by that event).’

The above sentence is acceptable if the secondary predicate *nago* ‘naked’ modifies the nominative subject. Therefore, just as in the case of the anaphoric binding data (cf. (33)), the dative becomes a possible controller of the secondary predicate when it is identified with the impersonal subject (36).

- (36) Jankowii przyjemnie tańczyło się nago.  
       John.DAT pleasurable.d.3SG.N danced.3SG.N REFL naked.NON-AGR  
       ‘John danced naked and he considered dancing pleasurable.’

Again, the contrast between (35) and (36) is not expected under the applicative analysis but can be

<sup>15</sup> Dative DPs can be modified by agreeing secondary predicates:

i. Jankowi Paweł hałaśował nagiemu.  
       John.DAT Paul.NOM made-noise.3SG.M naked.DAT.M  
       ‘Paul was making a noise (when John was naked and John was affected by that event).’

The contrast between (i) here and (35) above can be accounted for on the assumption proposed for various languages that agreement is an alternative to c-command.

accounted for by the proposal in (21). In addition, (21) offers an explanation for the unavailability of control of secondary predicates in the case of dative nominals, regardless of their adjunct or argument status. Namely, as illustrated in (37) and (38), dative but not accusative objects also fail to control secondary predicates.

- (37) \*Anna pomaga *Jankowi nago*.  
           Anna.NOM helps.3SG John.DAT naked.NON-AGR  
           ‘Anna helps John naked.’
- (38) Anna spotkała *Janka nago*.  
           Anna.NOM met.3SG John.ACC naked.NON-AGR  
           ‘Anna met John naked.’

The difference between these two sentences and the ungrammaticality of (37) follow from the internal structure of the dative proposed in (21). Namely, the additional structure of the dative case compared with accusative or nominative blocks c-command from the DP to the modifier regardless of whether the dative DP is a complement of a verb or whether it is introduced by the out-of-control head. Again, it is not clear how the applicative analysis could account for the above grammaticality judgements for (35), (37) and (38). One solution that it could adopt to explain the contrast between (37) and (38) is to admit that dative case has more structure than accusative case. However, once this is accepted, it seems that there is not much motivation to claim that the dative’s semantics should be located outside the dative constituent in the extended verbal projection.

#### 2.3.4. Optionality and semantic selection by the dative

As far as the optionality of the adjunct is concerned, the semantic or syntactic well-formedness of the above sentences does not depend on the dative DP. Therefore, in the absence of a dative nominal, sentences such as (1) will be interpreted as impersonal structures referring to the action performed by an arbitrary subject who will perceive that action as pleasurable. Another difference between adjuncts and arguments concerns the fact that adjuncts are systematically optional whilst arguments can be left out from the structure only under certain conditions. As was indicated earlier, the dative is never an obligatory constituent of the structures illustrated by (1) – (3). This is a property characteristic of adjuncts. Arguments, on the other hand, can only be left out in some specific cases. For example, objects of some transitive verbs can only be omitted if the interpretation of the verb-object unit is specified in the lexicon and, as a result, its reading remains the same even when the object has been omitted. This happens in the case of verbs such as *smoke* or *drink* that typically refer to smoking tobacco and drinking alcohol also when their objects are not explicitly present. Expression of a direct object is sometimes also optional in the case of other transitive verbs such as *read*, *win*, *bake*. However, alongside such verbs there are those that never allow their objects to be omitted. In that respect, the distribution of the dative is much more regular than that of direct objects. Namely, the dative in sentences (1) – (3) is never an obligatory element of the structure and as such it can be freely omitted without having to satisfy any semantic or syntactic requirements.

Also, impersonal *sie* sentences cannot be treated as instances of, for example, (1a) or (1b) in which the dative would have been left out according to the same principles that allow the omission of pragmatically inferable argument pronouns in a number of pro-drop languages. As demonstrated by the two examples below, only (39b) is an acceptable continuation of (39a). The unacceptability of (39c) in

this context confirms that this sentence is an impersonal structure referring to an action carried out by an arbitrary subject and as such it does not contain a phonologically null dative pronoun.

- (39) a. Czego chciałeś się dowiedzieć o Janku?  
           What wanted.2SG find out.INF about John  
           ‘What did you want to find out about Janek?’
- b. Że właśnie wyszedł?  
           That just left.2SG.M  
           ‘That he has just left?’
- c. #Że przyjemnie się wczoraj tańczyło?  
           that pleasurable REFL yesterday danced.3SG.N  
           Intended meaning: ‘That he danced yesterday and considered dancing pleasurable?’

The above data confirm that datives in (1) – (3) pattern with adjuncts rather than with arguments. Just like adjuncts, they are always optional. Even though in some circumstances arguments can also be considered optional, there exist certain conditions specifying when they can be left out from the structure. There are no similar restrictions in the case of the dative.

Arguments and adjuncts also differ in terms of the way in which they contribute semantically to the meaning of the sentence in which they occur. Whilst arguments demonstrate a great deal of variation in terms of their semantic interpretation, it has typically been assumed that adjuncts make a constant semantic contribution to the meaning of the constituent that they modify.<sup>16</sup> Therefore, even though adjuncts belong to different groups distinguished on the basis of their meanings, a particular adjunct will always contribute to the meaning of a sentence in the same way. For example, adverbs of time will always specify the temporal frame of the modified event regardless of the other properties of the structure in which they occur. Arguments, on the other hand, will receive a different interpretation depending on the kind of syntactic head they are selected by.<sup>17</sup> As a result, even the interpretation assigned to arguments that constantly occur in the subject or the object position in a clause will vary among agents, experiencers, themes, etc. For instance, the DPs in *run a mile*, *knit a sweater* or *worry John* will be interpreted in different ways even though they occupy the same position within their verbal phrases. The fact that unselected datives always receive the same interpretation regardless of the structure that they are followed by demonstrates that in this respect they also pattern with adjuncts.

<sup>16</sup> A proposal trying to undermine this claim could potentially rely on the observation that the adverb ‘cleverly’ in the following examples can either describe the way in which the car was repaired (i) or it can refer to the fact that the car was repaired at all (ii), which would suggest that the meaning of the adverb changes depending on the position in which it attaches:

- i.       John has repaired the car cleverly.
- ii.      John cleverly has repaired the car.

However, the above data can also be explained in the following way. One possibility is that there are two types of ‘cleverly’ and each of these has unique semantic contribution. According to the other solution, there is only one ‘cleverly’ that has the same semantic contribution but its interpretation depends on what element it combines with. Crucially, regardless of which of the two options is chosen, the adverb still makes a single semantic contribution to the meaning of the constituent that it modifies and the claim that its interpretation depends on its attachment site can no longer be maintained.

<sup>17</sup> Proposals that would like to relate those different interpretations to different syntactic structures could rely on cross-linguistic data showing that certain types of objects could occupy a different position from other objects with respect to the head that they are selected by. However, no evidence is available as yet to confirm that such data actually exist.

#### *2.4. Summary*

The analysis introduced in this section is based on the representation in (21) that aims to account for different behaviour of the two types of dative NPs. It proposes that optional datives in (1) – (3) are best analysed as adjuncts that select a constituent they combine with on the basis of that constituent's eventive semantics. The internal structure of dative DPs is confirmed by a number of types of data including binding and secondary predication examples.<sup>18</sup>

### 3. High and low datives

The sentences in (1) - (3) all contain dative DPs which occur in the initial position in the clause. However, on the basis of a number of scope data, I will show that there is more than one position where those datives can originate.

Dative DPs that receive the agent interpretation occur sentence-initially in the neutral word order. Due to this and because of the fact that they lack any kind of interpretation that they could be assigned lower in the structure, I will claim that they surface in their base-generated position.

Conversely, the high attachment site is not available for affectedness datives and they occur sentence-initially only as a result of movement. This claim is supported by sentences such as (40) where the dative modified by scope-bearing *dokładnie trzej* ‘exactly three’ co-occurs with *ponownie* ‘again’.<sup>19</sup>



<sup>18</sup> Further arguments in favour of (21) can possibly be provided by weak island extraction patterns but more research needs to be carried out to collect the relevant data.

<sup>19</sup> The results of this test are contradictory to judgements of some speakers, including myself, who allow dative DPs to take scope over ‘again’ in sentences such as (i).

- i. Marysi ponownie Janek oblał egzamin.  
 Mary.DAT again John.NOM failed.3SG.M exam.ACC  
 Reading 1: ‘Again, John failed his exam and Mary was affected by that.’ again > DAT  
 Reading 2: ‘Mary was affected (for the first time) by John failing his exam again.  
 DAT > again

Whilst reading 1 is available to everyone, reading 2 is only allowed by some. However, interpretation 2 is no longer available to anyone when in sentences such as (i) the dative is modified by the reflexive possessor *swój* ‘one’s’ that has to be bound by the subject. In such cases, the dative must originate in the scope of ‘again’ and it obligatorily reconstructs for binding. The speakers who allow affectedness datives to take scope over ‘again’ in examples such as (i) do not accept the wide scope of dative NPs interpreted as benefactives which shows that benefactive datives can occur sentence-initially only as a result of movement.

Namely, in (40) ‘exactly three’ can only be interpreted in the scope of ‘again’, which shows that the dative originates low in the clause. The sentence in (40) can thus describe a scenario in which again exactly three teachers are affected by the subject failing the exam for the second time. The wide scope reading of ‘exactly three’ is not available. Similarly to sentences containing dative affectees, evidence that there was an associated low position for dative agents could come from scope patterns in sentences such as (41) that contain the same scope bearing elements as (40).

- (41) Dokładnie trzem kobietom przyjemnie ponownie się tańczyło.  
 [exactly three women].DAT pleasurable again REFL danced. 3SG.N  
 a. ‘Exactly three women again danced and considered dancing as pleasurable.’  
 exactly > again  
 b. Unavailable reading: ‘Again, exactly three women danced and considered dancing  
 as pleasurable.’ \*again > exactly

In the above case, in order to get the reading illustrated by (41b), *ponownie* would have to occur sentence-initially. This is not required for it to take scope over *dokładnie trzem* in (40).

The above scope interaction data show that adjunct datives in (1) – (3) can originate in more than one position in the structure. The restriction demonstrated by (40) that affectedness datives have to be generated in the low position does not have any bearing on their predicted properties discussed in this paper.

#### 4. Conclusions

I have proposed that optional dative DPs in (1) – (3) should be analysed as adjuncts with the inherent ‘out-of-control’ semantics defined by (11) and the internal syntactic structure represented by (20). This analysis correctly predicts the meaning of sentences in which optional datives occur and it accounts for the two interpretations that can be assigned to them in the relevant contexts. In addition, the internal structure proposed for optional and argument dative NPs explains different patterns of behaviour of these two classes of datives and also captures the differences between dative and accusative noun phrases. This cannot be achieved by proposals based on the applicative model that have been argued to be able to account for the properties of at least some structures containing optional datives in other languages.

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## **The super-strong Person-Case Constraint**

Scarcity of resources by scale-driven Impoverishment

Aaron Doliana

Kambera, a Malayo-Polynesian language, shows a new version of the Person-Case Constraint (PCC), disallowing any combination of phonologically weak objects except the one where the indirect object is 1st/2nd person and the direct object is 3rd person. Recent minimalist accounts fail to capture this new pattern, which, I claim, indicates the existence of a scalar continuum within the constraint's typology. In this paper, I account for this new version as a syntactic rule-interaction effect between Agree and scale-driven impoverishment. I claim that with this mechanism, set along the lines of an Optimality Theoretic version of the Minimalist Program, the whole typology of the PCC can be accounted for.

### *1. Introduction*

This paper aims to show by means of the *super-strong* version of the Person-Case Constraint that there is a continuum in the typology of the PCC, and thus to account for the full typology as a syntactic rule-interaction effect between Agree and scale-driven Impoverishment. The PCC is a constraint on combinations of phonologically weak objects in ditransitive constructions, depending on their person-feature specifications. The super-strong version allows only combinations of 1st/2nd person indirect object and 3rd person direct object. Unlike other versions of the constraint, the *super-strong* PCC cannot be derived in existing minimalist approaches such as Anagnostopoulou (2005), Adger & Harbour (2007), Richards (2008) or Nevins (2007). These build on the notion that the PCC arises in ‘two-arguments-against-one-head situations’ where the functional head entering Agree with the two arguments lacks the resources to check the features of both arguments. I will from now on call this notion *scarcity of resources*. In this paper I will attempt to rescue this idea by relativising it to syntactic Impoverishment following from the harmonic alignment of markedness scales (cf. Keine & Müller 2008, 2011; Keine 2010). With the additional assumption that the operation Agree is split up into two sub-operations, *Copy* and *Check*, the PCC follows in three derivational steps: (i) the person features of the goals are copied and transferred onto the probe by *Copy*; (ii) Impoverishment applies to the probe,

due to the harmonic alignment of markedness scales interacting with a faithfulness constraint protecting the copied person features on the probe; (iii) the scarcity of resources caused by Impoverishment bleeds Check, which deletes uninterpretable features under feature identity of the probe and the goal, and the derivation crashes.<sup>1</sup> Consequently, the notion of the scarcity of resources on the probe is saved (although relativised to Impoverishment), PCC effects can be linked to Hale/Silverstein hierarchy effects and the full typology of the PCC can be derived without having to assume asymmetries between the representations of 1st/2nd and 3rd person (of the kind in Anagnostopoulou 2005 and Adger & Harbour 2007).

This paper is divided into three sections. In section 2 I will summarise the background on the Person-Case Constraint, describe the super-strong version of it and discuss the pros and cons of Anagnostopoulou's (2005), Adger & Harbour's (2007) and Haspelmath's (2004) approaches to the PCC. In section 3 I will introduce the theoretical background and in section 4 I will present my assumptions, propose my approach to the PCC and show some of its consequences. In conclusion I will discuss the consequences more generally and present open questions that need further research.

## 2. The Person-Case Constraint

### 2.1. Background

The Person-Case Constraint, also known as the *\*me-lui* Constraint, is a restriction on possible combinations of phonologically weak elements. This restriction was first reported for French by Perlmutter (1971). A ditransitive construction is grammatical if the indirect object (IO) is *local* person (i.e. 1st and 2nd person) and the direct object (DO) is 3rd person as shown in (1a).<sup>2</sup> However, the same sentence is ungrammatical if the indirect object is 3rd person and the direct object is local person, cf. (1b).

- (1) a. On me le montrera.  
one 1.DAT 3.ACC show.FUT  
'They will show it to me.'<sup>3</sup>
- b. \*On me lui montrera.  
one 1.ACC 3.DAT show.FUT  
'They will show me to him.'

The PCC was first thoroughly analysed by Bonet (1991, 1994) who noticed the following properties: (i) it applies in a large range of unrelated languages; (ii) it applies only to phonologically

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<sup>1</sup> Feeding, bleeding, counter-feeding and counter-bleeding are all understood in the sense of Kiparsky (1973).

<sup>2</sup> Throughout this paper, the terms IO and DO will be used with no particular theoretical meaning. They shall stand for the higher and the lower internal arguments of a ditransitive verb, respectively. Furthermore, only their person- and (decomposed) case-features will be relevant, with no mention of (macro-)θ-roles.

<sup>3</sup> Abbreviations are as follows: ACC (accusative), DAT (dative), 1 (1st person), 2 (2nd person), 3 (3rd person), SG (singular), PL (plural), THM (theme), REC (recipient), FUT (future), AG (agent), PFV (perfective), M (masculine), F (feminine), N (neuter). I will furthermore adopt the notation  $\langle x,y \rangle$ , where  $x$  = person feature of IO and  $y$  = person feature of DO and where *loc* = local person and 3 = 3rd person. So,  $\langle \text{loc}, 3 \rangle$  is a combination of phonologically weak objects with a local person IO and a 3rd person DO.

*weak* elements, i.e. clitics, agreement affixes and weak pronouns; (iii) it applies only to combinations of phonologically weak elements; (iv) it also applies to combinations where the DO is a reflexive element; (v) it only affects constructions with an external argument.

Apart from the super-strong version of the PCC introduced above, two further versions have been mainly discussed in the minimalist literature so far: the *strong* version and the *weak* version of the PCC.<sup>4</sup> The former disallows local person direct objects in double-object constructions in general, whereas the latter disallows local person direct objects only when the indirect object is 3rd person. Examples covering the four possible configurations <loc,3>, <3,3>, <loc,loc> and <3,loc> are given for French (strong version) and Italian (weak version) in (2) and (3), respectively. In French both (2c) and (2d), i.e. the combinations where the DO is local person, are ungrammatical; in Italian only (3d), where the DO is local person and the IO is 3rd person, is ungrammatical.<sup>5</sup>

(2) *Strong PCC in French:*

- a. Il me l' a montré  
3.NOM 1.DAT 3.ACC has shown  
'He showed it to me.'
- b. Il le lui a montré  
3.NOM 3.ACC 3.DAT has shown  
'He showed it to him/her.'
- c. \*Il me t' a montré  
3.NOM 1.ACC 2.DAT has shown  
'He showed me to you.'
- d. \*Il me lui a montré  
3.NOM 1.ACC 3.DAT has shown  
'He showed me to him/her.'

(3) *Weak PCC in Italian:*

- a. Me l' ha presentato  
1.DAT 3.ACC has introduced  
'He introduced him to me.'

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<sup>4</sup> See Nevins (2007) for versions of the PCC, where 1st and 2nd person do not pattern together as local person. Such versions (as the *me-first* PCC and the *strictly-descending* PCC) will not be discussed in this paper. But see also Sturgeon et al. (2011) for an approach deriving the strictly-descending PCC as a linearisation effect.

<sup>5</sup> As an anonymous reviewer notes, French and Italian differ slightly in the word order of the <3,3> combination, cf. (2b) vs. (3b), respectively. There are also differences in word order within the languages. In Italian, for instance, (3a-b) have a DAT > ACC order, while (3c-d) have an ACC > DAT order. The reader is referred to Anagnostopoulou (2008) for an overview of Germanic languages where the word order of weak pronouns does have an effect on the PCC. Namely, in the DO>IO word order the PCC ceases to hold in these languages (Swiss German, Dutch, Swedish and possibly German). The differences in word order in French and Italian, however, can be safely claimed to be of morphological nature: person and other features of the clitics drive their relative linearisation to an order of 1st > 2nd > 3rd (cf. Anagnostopoulou 2008:39–40). In fact, while in Italian the sentence in (3c) is ungrammatical with the clitic order 2nd > 1st (\**Ti mi ha presentato*), both meanings are preserved from the 1st > 2nd linearisation (viz. 'He introduced me to you' and 'He introduced you to me'). This suggests that there is morphological readjustment, always neutralising *ti mi* '2nd > 1st' to *me ti* '1st > 2nd' at PF.

- b. Gliel' ha presentato  
3.DAT:3.ACC has introduced  
'He introduced him to him/her.'
- c. Mi ti ha presentato  
1.ACC 2.DAT has introduced  
'He introduced me to you.'
- d. \*Mi gli ha presentato  
1.ACC 3.DAT has introduced  
'He introduced me to him.'

Furthermore, the PCC is argued to pattern together with other phenomena constraining certain combinations of person-features or combinations of certain person-features with certain  $\phi$ -features. On the one hand, the PCC is argued to have the same syntactic origin as DAT-NOM constructions in Icelandic (Anagnostopoulou 2005), case syncretism in Kiowa and French (Adger & Harbour 2007), defective Agree in Russian (Richards 2008) or limited plural agreement in Pazar Laz (Blix 2012). On the other hand, it is argued by Haspelmath (2004, 2011) to be a reflex of Hale/Silverstein hierarchies (Hale 1972; Silverstein 1976), whose effects can best be seen in inverse systems and limited plural marking.

## 2.2. *The super-strong PCC*

Haspelmath (2004) introduces the super-strong version of the PCC, found in the Malayo-Polynesian language Kambera. The following data from Klamer (1997:903-904) show that in Kambera ditransitive constructions only the configuration  $\langle \text{loc}, 3 \rangle$  is allowed.<sup>6</sup> Thus, in addition to the combinations prohibited in the strong PCC, the super-strong version also prohibits  $\langle 3, 3 \rangle$  combinations as can be seen in (4c).

### (4) *Super-strong PCC in Kambera:*

- a. Na-wua-ngga-nya  
3SG.AG-give-1SG.REC-3SG.THM  
'He gives it to me.'
- b. \*Na-wua-nja-nya  
3SG.AG-give-3PL.REC-3SG.THM  
'He gives it to them.'
- c. \*Na-wua-ngga-nggau  
3SG.AG-give-1SG.REC-2SG.THM  
'He gives you to me.'

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<sup>6</sup> So far, the super-strong PCC has only been found in Kambera. The example for the ungrammatical  $\langle 3, \text{loc} \rangle$  combination to complete the paradigm is not available, but Haspelmath quotes Klamer (1997:903) in that "two object clitics can occur in sequence if the inner clitic [i.e. the Recipient] is first or second person and the outer clitic is third person". Finally, it may be worth noting that in ditransitive constructions in Kambera both the objects bear the dative case (cf. Georgi 2006 for a detailed analysis of argument encoding in Kambera). This will be ignored as only syntactic case is taken to be relevant here.

Taking into account the super-strong version and language types such as German, which allow any person-case combination, we see that there is a continuum within the typology of the PCC.<sup>7</sup> This can be seen in the overview in (5) and stated as a two-way universal implicational hierarchy as in (6).

(5) *Typology of the Person-Case Constraint:*

IO	DO	super-strong	strong	weak	German
1/2	3	✓	✓	✓	✓
3	3	*	✓	✓	✓
1/2	1/2	*	*	✓	✓
3	1/2	*	*	*	✓

(6) *PCC implications:*

- a. If a language disallows only one object combination, then that combination is  $\langle 3, \text{loc} \rangle$ .
- b. If a language allows only one object combination, then that combination is  $\langle \text{loc}, 3 \rangle$ .

This insight from Haspelmath (2004) is crucial for the understanding of the PCC. It complicates the phenomenon, as it can no longer be analysed as a constraint against a certain person feature in a given context (viz. against the Person/Participant feature, inherent to local person to the exclusion of 3rd person, in the context of the first mover to little *v*, to be discussed in the following sections). Hence, unless one treats these other languages as epiphenomena of further constraints, one must analyse the PCC as a continuum. This is why the minimalist accounts I have mentioned cannot derive the super-strong version of the PCC. Nonetheless, I would like to contend that their ideas afford fundamental insight that should be maintained. Therefore, these approaches will be the basis for a new account which comprises the idea of scarcity of resources, Optimality Theoretical modelling of scales and a rule-interaction effect with Agree.

### 2.3. Existing approaches

#### 2.3.1. Scarcity of resources

Anagnostopoulou (2005) proposes scarcity of syntactic resources as the trigger for the PCC. In general this means that there is a ‘two arguments against one head’ situation. More precisely, in this approach it consists in one functional head (viz. little *v*) entering Agree with both objects. However, the probe on little *v* is assumed to have only one set of  $\phi$ -features when it enters Agree with two goals. More precisely, split feature checking is assumed to occur. This means that the indirect object, being closer (in terms of c-command) to the functional head, undergoes Agree first and checks person, after which the direct object checks the remaining number feature.<sup>8</sup> Crucially, in order to derive PCC effects, Anagnostopoulou follows Adger (2003)’s representation

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<sup>7</sup> But see also Anagnostopoulou (2008), who argues that there are PCC effects in German in non-default word orders.

<sup>8</sup> Here, indirect objects are taken to bear lexical case, but are nonetheless able to enter Agree with a functional head, as Anagnostopoulou follows Taraldsen (1995) in that datives in Icelandic have a default person feature.

of person. As can be seen in (7), the system bears an asymmetry.<sup>9</sup> 1st and 2nd person are always specified for their person features, whereas 3rd person is underspecified by default, but specified for the absence of person in ‘salient’ contexts such as datives/genitives/IOs. The concept of salience can be linked to Hale/Silverstein scales, but does not find a theoretical implementation in this approach.

- (7)     1/2: [+Person/Participant]  
       3:    [–Person/Participant] / DAT,GEN; [ ] / elsewhere

The strong version of the PCC follows because whenever the probe enters Agree with its goals, it first checks the person feature on the indirect object as it is closer in terms of c-command, leaving only number for the direct object. Local person direct objects are therefore ruled out because they necessarily have a person feature that needs to be checked to receive structural case. Since it cannot be checked, double object combinations with a local direct object lead to a crash in the derivation. Languages with the weak version of the PCC, on the other hand, are argued to be parametrically different in that they can employ Multiple Agree (rather than only Cyclic Agree). Multiple Agree allows the probe to check two goals simultaneously as long as they do not have any conflicting features (e.g. [+F] and [–F]). Derivations with two local person objects therefore converge as both objects have the feature [+Person/Participant] and can be checked simultaneously against the one person feature on the probe.  $\langle 3, \text{loc} \rangle$  derivations, on the other hand, still crash because neither cyclic nor Multiple Agree can check the person feature on the DO. So the weak and strong versions of the PCC are accounted for in this system. The super-strong version of the PCC, however, cannot be accounted for: in order to derive the ungrammaticality of  $\langle 3, 3 \rangle$  in this system, either both objects would need to be specified for [–Person/Participant] with the option of Multiple Agree unavailable in this language, or both objects need to be left underspecified for [Person/Participant]. In the former case,  $\langle 3, 3 \rangle$  is ruled out because the person feature on the DO cannot be checked. By the same logic, also  $\langle \text{loc}, 3 \rangle$  should be ungrammatical in this language, but this is not the case. In the latter case,  $\langle 3, 3 \rangle$  derivations crash because the uninterpretable person feature on the probe is not discharged. This solution, too, makes the wrong predictions because  $\langle 3, \text{loc} \rangle$  combinations in the same language would be grammatical as the IO would not prevent the DO from getting its person feature checked. The problem clearly lies in the asymmetry of the representation of person, which cannot be reconciled with the super-strong PCC facts in Kambera. I conclude that this approach must be abandoned.

### 2.3.2. Domain-specific restrictions

In Adger & Harbour (2007) the PCC also arises from a ‘two arguments against one head’ situation, but the system proposed is slightly different. The two phonologically weak objects merge with an Appl(icative)-head (in the sense of Pylkkänen 2002): the direct object as its complement and the indirect object as its specifier. In addition, the Appl-head has the ability to ban a feature in its complement domain and to require the same feature in its specifier, the value of the feature being irrelevant. As for the representation of person, Adger and Harbour assume basically the

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<sup>9</sup> The [Author] feature, which distinguishes between 1st and 2nd person, is omitted here as it plays no role for the languages considered here.

same kind of system as Anagnostopoulou in (7) with compulsory person-feature specification for local person (viz. [+Participant] here) and two possible ways of representing 3rd person: by default, i.e. without any specification ([ ]) or by negative specification of the person feature (viz. [-Participant] here).<sup>10</sup> The two different representations of 3rd person are linked to the special semantics of datives/IOS, which are construed as *animates/humans/receiver of empathy* and show more consistent syncretisms with inherently animate accusatives. The strong version of the PCC follows if the feature banned and required by the Appl-head is [ $\pm$ Participant]. The 3rd person can be both direct or indirect object as it can be underspecified for [Participant] and escape the ban when being the complement, and be specified for [Participant] and fulfil the requirement when it is the specifier. Local person, though, can only be the indirect object as it has to be specified for [Participant] and can never escape the ban on its feature in the complement domain. The weak version of the PCC is not considered in Adger and Harbour's approach because there seems to be too much variation between regions and speakers as to which combinations of <loc,loc> are allowed.<sup>11</sup>

### 2.3.3. *Markedness scales*

Haspelmath (2004) proposes a diachronic, frequency-based approach to the PCC. The focus lies not on combinations of person and case, but on combinations of person and semantic roles, although this difference is irrelevant for what follows. Haspelmath argues for a grammaticalisation effect, where over time only the more frequent structures are grammaticalised. In this case only the more frequent pronoun combinations are grammaticalised into clitic combinations, whereas their less frequent counterparts are not and are hence ungrammatical as clitics. The frequency of the pronoun combinations is related to Silverstein/Hale scales: indirect objects (or recipients) tend to be 1st or 2nd person and direct objects (or themes) tend to be 3rd person. The unmarked combination in double object constructions is therefore <loc,3>, which is allowed in almost all languages exhibiting the PCC. The most marked combination, on the other hand, is <3,loc>, which is forbidden in almost all languages obeying the PCC.<sup>12</sup> Although it does not aim to explain how the PCC works in synchronic grammars and can therefore give no answer to that question, this approach succeeds in motivating the existence of the super-strong, strong and weak versions of the PCC. It also predicts a fourth logical version of the PCC, disallowing <3,3> and <3,loc> while allowing <loc,3> and <loc,loc>, which I will call the *other-strong* version of the PCC. Although I will tentatively link Spanish to this version further in this article, to the best of my knowledge no language exhibiting this pattern has been attested so far.

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<sup>10</sup> Specifically, they break the feature [ $\pm$ Person] down into two binary features: [ $\pm$ Author], which stands for the speaker/writer of the speech act, and [ $\pm$ Participant], which stands for a direct participant in the speech act, i.e. the hearer or the speaker. 2nd person is thus specified as [-Author, +Participant] in this system. 3rd person is either negatively specified for [Participant] – which entails negative specification for [Author] – or not specified at all, functioning as a default marker.

<sup>11</sup> Interestingly, the super-strong version of the PCC, which is also not taken into consideration in their paper, could possibly be derived in their system. If the feature banned and required by the Appl-head were [Author], and 3rd person could not bear this feature at all, then the only grammatical combination would be <loc,3>.

<sup>12</sup> The exceptions are the *total* and the *zero* versions of the PCC, respectively, discussed in section 4.5.

### 3. Theoretical background

#### 3.1. Impoverishment

Impoverishment (Halle & Marantz 1993; Noyer 1998; Keine & Müller 2008, 2011; Keine 2010; Bank et al. 2012) is a post-syntactic feature-deletion operation. It was first introduced within the framework of Distributed Morphology (DM, Halle & Marantz 1993), where it has the form of transformational rules and deletes certain features in certain contexts. DM operates under the assumptions of the *Subset Principle* and *Specificity*.<sup>13</sup> The former states that a vocabulary item  $V_1$  is inserted in a functional head  $F$  when its features form a subset of the functional head's features and  $V_1$  is more specific than any other compatible vocabulary item  $V_i$ . The latter standardly states that a vocabulary item  $V_1$  is more specific than a vocabulary item  $V_2$  iff  $V_1$  has more features than  $V_2$ . Thus, whenever Impoverishment applies, deleting certain features, a vocabulary item, otherwise the most specific, may no longer fit, giving room for the insertion of a less specific exponent. A typical example of Impoverishment, shown in (8), is the deletion of the feature [+object] in the context of singular neuter nouns in several Indo-European languages such as German. This leads to a syncretism between the nominative and the accusative case on singular neuter nouns because the distinctive feature [+object] is deleted.

$$(8) \quad / [+obj] / \rightarrow \emptyset / [-masc, -fem, -pl]$$

In the approach to be developed here, however, I will follow Keine & Müller (2008, 2011) and Keine (2010), who, building on the work of Aissen (1999, 2003), developed a more restrictive theory of Impoverishment, ultimately driven by ranked and violable constraints in an Optimality Theoretic fashion. In this approach, faithfulness constraints penalising featural changes (viz. deletion) compete with markedness constraints penalising the presence of certain features (hence demanding deletion). Consequently, the ranking between these two types of constraints determines whether or not Impoverishment applies. This is achieved in Keine & Müller (2008, 2011), who posit harmonic alignment of markedness scales at its base. Finally, Keine (2010) takes Impoverishment to apply in syntax, allowing it to interact freely with other syntactic operations such as Agree. Since these two assumptions play a major role in the following approach to the PCC, I shall explain briefly the mechanisms involved and give their theoretical background.

#### 3.2. Optimality Theory and harmonic alignment of scales

Optimality Theory (OT, Prince & Smolensky 1993) is widely known as a phonological framework. However, even though it features less prominently in the domain of syntax, it has also been adopted in syntactic analyses (see e.g. Kiparsky 1999; Wunderlich 2000; Stiebels & Wunderlich 2000; Stiebels 2002; Woolford 2001; Lee 2002). The main idea of OT is that grammatical constraints are *ranked, violable* and *universal*. Consequently, not satisfying a constraint does not strictly lead to ungrammaticality. Rather, it is the competition between different poten-

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<sup>13</sup> It also operates under the assumptions of *Late Insertion*, i.e. the morphological exponents are inserted after all syntactic processes have terminated, and *Syntactic Hierarchical Structure all the Way Down*, i.e. syntactic hierarchical structure does not stop at the word level, but rather goes down all the way to morphemes.

tial outputs that gives linguistic expressions grammatical status: an output is well-formed if it is optimal with respect to a given constraint ranking, i.e. if it fares better than all its competitors. Whether an output *A* fares better than its competitor output *B* depends on their constraint profiles. Output *A* has a better constraint profile if it violates a given constraint less often than its competitor and there is no higher ranked constraint which *A* violates, but *B* does not. This is important because constraints in OT are ranked strictly, which means that an output becomes suboptimal (and therefore ungrammatical) as soon as it violates a higher ranked constraint more often than another output, regardless of their relative violations of lower ranked constraints.

Moreover, within the framework of OT, two mechanisms to model hierarchical scales were given by Prince and Smolensky (Prince & Smolensky 1993; Smolensky 1993, 1995, 2006): *harmonic alignment* and *local conjunction*.

Harmonic alignment was first introduced to model sonority hierarchies in Phonology, but soon used to model Hale/Silverstein scales, as well (cf. Aissen 1999, 2003). The mechanism is defined in (9) and (10). Basically, the first element of a binary scale is aligned with the elements of another scale, starting with the edge it is best associated with. Then the same is done for the second element of the binary scale, starting from the opposite edge. Two harmonically aligned scales result, with the most harmonic combination at its left edge and progressively less harmonic combinations towards the right edge. Furthermore, constraints can be obtained from these scales by prohibiting the inverse order of the harmonic alignment scales, cf. (10).

- (9) *Harmonic alignment:* (Prince & Smolensky 1993:161)

Suppose given a binary dimension  $D_1$  with the scale  $X > Y$  on its elements  $\{X, Y\}$ , and another dimension  $D_2$  with a scale  $a > b > \dots > z$  on its elements  $\{a, b, \dots, z\}$ . The *harmonic alignment* of  $D_1$  and  $D_2$  is the pair of Harmony scales  $H_X, H_Y$ :

- a.  $H_X: X/a \succ X/b \succ \dots \succ X/z$
- b.  $H_Y: Y/z \succ \dots \succ Y/b \succ Y/a$

The *constraint alignment* is the pair of the following constraint hierarchies  $C_X, C_Y$ :

- (10) a.  $*X/z \gg \dots \gg *X/b \gg *X/a$   
      b.  $*Y/a \gg *Y/b \gg \dots \gg *Y/z$

Local conjunction, on the other hand, is the creation of a new constraint, by means of combining two existing constraints. The new constraint is violated whenever both of the constraints which it comprises are violated within a given domain. Furthermore, it is inherently ranked higher than its combined parts. Universally, the local conjunction of two constraints  $C_1$  and  $C_2$  outranks the individual constraints  $C_1$  and  $C_2$ ; in other words:  $C_1 \& C_2 \gg C_1, C_2$ .

- (11) *Local conjunction:* (Smolensky 1995:4)

The local conjunction of  $C_1$  and  $C_2$  in domain  $D$ ,  $C_1 \& C_2$ , is violated when there is some domain of type  $D$  in which both  $C_1$  and  $C_2$  are violated.

### 3.3. Agree

The present approach is couched within the framework of an Optimality Theoretic version of the Minimalist Program (Chomsky 2000; Adger 2003; Heck & Müller 2007) with realisational morphology. Agree is – along with Merge – one of the two structure-building operations of the framework. The operation Agree checks features under c-command, allowing deletion of uninterpretable features which would otherwise cause a crash of the derivation at the semantic interface (LF). When certain features are involved – such as  $\phi$ , case or tense – checking happens by *valuation*. The interpretable  $\phi$ -features of the c-commanding element (goal) are copied and transferred to the functional head (probe) yielding the corresponding uninterpretable feature. The probe is valued by the transferred copy and its uninterpretable feature may delete once it has been checked.

In accordance with much recent work, where Agree (cf. Di Sciullo & Isac 2003; Arregi & Nevins 2013; Bhatt & Walkow 2013; Bobaljik 2008), Move (cf. Chomsky 1995, 2000), or syntactic operations in general (cf. Hornstein 2009) are decomposed into more fine-grained operations, I will split Agree into two sub-operations, Copy and Check, with the former copying and transferring the goal's features onto the probe (and thus valuing it), and the latter checking uninterpretable features under feature identity of the probe and the goal. This is necessary for Impoverishment to apply between the valuation (copying) and the checking of the probe, which is the key assumption of the new approach.

## 4. A new approach

### 4.1. Assumptions

In what follows, I will make the following assumptions:

- [A1] There is only one probe entering Agree with both phonologically weak elements in ditransitive constructions. The probe is made up of an ordered tuple of uninterpretable feature bundles (viz.  $<[u\phi], [u\phi]>$ ) that need valuation and checking by entering Agree with two elements providing interpretable features. The ordered tuple is valued in an order related to c-command closeness, thus, roughly speaking, resulting in the form  $<\text{IO}, \text{DO}>$ . This is more or less as in Anagnostopoulou (2005).
- [A2] 3rd person is always fully specified (Nevins 2007).
- [A3] Impoverishment applies in syntax and is thus able to interact with such operations as Agree (Keine 2010).
- [A4] Impoverishment is scale-driven: markedness constraints penalising less likely feature-combinations interact in an Optimality Theoretic fashion with a faithfulness constraint penalising the deletion of the features involved (Keine & Müller 2008, 2011; Keine 2010).
- [A5] Impoverishment may target probes just as it may target goals.
- [A6] Crucially, Agree is made up of two sub-operations, Copy and Check, cf. (12).

[A7] Optimisation happens in a strictly derivational fashion (the so-called ‘extremely local optimisation’, cf. Müller 2004, 2009; Heck & Müller 2007), only ever targeting one derivational step at a time. The step optimised in the present approach occurs between the application of the two sub-operations of Agree, Copy and Check.

(12) *Agree:*

Agree is a process containing the following operations.

- a. Copy: The operation copying and transferring the goal’s features onto the probe.
- b. Check: The operation deleting uninterpretable features under feature identity.

They apply in the only logical order Copy > Check.

#### *4.2. Impoverishment of the probe*

The feature combinations interacting in the PCC are at least Case and Person.<sup>14</sup> I will further assume that cases are decomposed into binary features (Bierwisch 1967), e.g.: nominative [–obl(ique), –obj(ect)]; accusative [–obl, +obj]; dative [+obl, +obj]; genitive [+obl, –obj]. The decomposition of person features is also possible. The difference between local and 3rd person can be taken to be something like [+Participant] > [–Participant]. The relevant scales are thus the case-feature scale in (13) and the person-feature scale in (14), which will be the basis of the constraints at work. The first scale shows that [+obl]-arguments are more prominent than [–obl]-arguments. The second scale shows that 1st and 2nd person – patterning together as local person – are more prominent than 3rd person.

(13) *Case-feature scale:*

$$[+oblique] > [-oblique]<sup>15</sup>$$

(14) *Person-feature scale:*

$$\underbrace{\text{local person}}_{\text{1st person} > \text{2nd person}} > \text{3rd person}$$

These two scales are combined by harmonic alignment to give rise to the harmony scales in (15a) and (15b). The more harmonic (viz. less marked) combinations are at the left edge of the scales, whereas the less harmonic (viz. more marked) combinations are at the right edge. The OT constraints following from the prohibition of the reversed order of the harmonic scales in (15) can be seen in (16). The prohibition of less harmonic combinations is ranked higher, which in OT means that it is more difficult to violate in a well-formed output.

(15) *Harmony scales:*

- a.  $[+oblique]/\text{local} \succ [+oblique]/3$
- b.  $[-oblique]/3 \succ [-oblique]/\text{local}$

<sup>14</sup> See Subsection 4.5 for PCC effects with further  $\phi$ -features.

<sup>15</sup> As noted in footnote 6, ditransitive constructions in Kambera actually have dative case on both objects. Therefore, [–obl] does not actually apply to a dative-case object, as it bears [+obl]. This could, however, simply be a morphological effect. The case relevant here is the syntactically assigned case, not its morpho-phonological realisation.

(16) *Constraint alignment:*

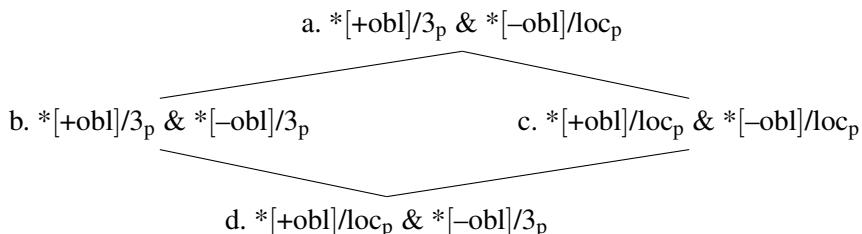
- a.  $*[+oblique]/3 \gg *[+oblique]/local$
- b.  $*[-oblique]/local \gg *[-oblique]/3$

As the PCC applies only to combinations, both the indirect and the direct object are relevant for triggering Impoverishment and the rankings in (16) have to be combined. This is achieved by local conjunction in (17). Recall that, as defined in (11), local conjunction of two constraints  $C_1$  and  $C_2$  is violated whenever both constraints are violated within a given domain (by assumption, the syntactic head, i.e. the probe on little  $v$ ).

(17) *Local conjunction:*

- a.  $*[+obl]/3_p \& *[-obl]/loc_p \gg *[+obl]/3_p \& *[-obl]/3_p$
- b.  $*[+obl]/loc_p \& *[-obl]/loc_p \gg *[+obl]/loc_p \& *[-obl]/3_p$
- c.  $*[-obl]/loc_p \& *[+obl]/3_p \gg *[-obl]/loc_p \& *[+obl]/loc_p$
- d.  $*[-obl]/3_p \& *[+obl]/3_p \gg *[-obl]/3_p \& *[+obl]/loc_p$

For example, the first constraint in (17a) is violated if both a 3rd person with [+obl] case and a local person with [-obl] are present in the relevant domain. This will be the case if the two objects trigger Agreement on the same verbal head, justifying the assumption that the relevant domain of the locally conjoined constraints in (17) is the probe, which is made explicit by using subscript  $p$ . Furthermore, the rankings in (17) correspond to markedness in terms of Hale/Silverstein hierarchies:  $*[+obl]/3_p \& *[-obl]/loc_p$  is ranked higher than  $*[+obl]/3_p \& *[-obl]/3_p$  as local person direct objects are less canonical than 3rd person direct objects. This is shown graphically in (18).

(18) *Inherent ranking of markedness constraints:*

As Impoverishment arises from the interaction of markedness and faithfulness constraints, I am going to introduce a faithfulness constraint – MAX – penalising deletion. More precisely, the faithfulness constraint will be relativised to the relevant feature and domain. The relevant feature is  $\pi$  and the relevant domain is the probe. The result is a constraint that penalises deletion of  $\pi$ -features on probes, cf. (19). The relative ranking of this faithfulness constraint to the markedness constraints is crucial, as it determines whether a certain feature combination is deleted or not. It also gives rise to the different versions of the PCC, as will be demonstrated in subsection 4.3.

(19) *MAX- $\pi_{probe}$ :*

Penalise deletion of person features on probes.

### 4.3. Derivation of the PCC

As outlined previously, the PCC is accounted for by scale-driven Impoverishment causing scarcity of resources on the probe and consequent bleeding of Check. I will illustrate this with one grammatical and one ungrammatical example for each version of the PCC. Generally, the derivation may unfold in two different directions, as I will demonstrate on two abstract examples in (20) and (21). The first example shows why certain phon. weak object combinations lead to a crash of the derivation; the second why, on the contrary, others lead to grammaticality.

*Crash:* In any case, the first step of the derivation is the copying of the goal's interpretable features onto the probe. This is triggered by the uninterpretable feature on the probe, which may only be deleted by Check if the feature identity between the probe and its goals was established. The result of the copying is a valued probe with an uninterpretable feature yet to be checked, (20a→b). The copying of certain features onto the probe may then feed Impoverishment. Impoverishment of the copied features on the probe applies whenever the markedness constraint that penalises a given feature combination on the probe is ranked higher than the faithfulness constraint protecting the probe from feature deletion. This can be seen abstractly in the tableau in (20). Whenever this is the case, the copied features are deleted and the derivation continues with an empty probe. As a consequence, Check is bled, because the feature identity between the probe and its goals cannot be established. Since Check is bled, it can no longer delete the uninterpretable feature on the probe, which leads to a crash of the derivation, cf. (20c→d).

- (20) a.  $[_v [u\text{Pers}: \langle \square, \square \rangle] [_{\text{IO}} [\text{Pers}: x]] [_{\text{DO}} [\text{Pers}: y]]]$  COPY →  
     b.  $[_v [u\text{Pers}: \langle x, y \rangle] [_{\text{IO}} [\text{Pers}: x]] [_{\text{DO}} [\text{Pers}: y]]]$  impov. fed →
- |   |  |                           |              |
|---|--|---------------------------|--------------|
|   | $[_v [u\text{Pers}: \langle x, y \rangle] ]$ | $*\langle x, y \rangle_p$ | MAX- $\pi_p$ |
|   | $[_v [u\text{Pers}: \langle x, y \rangle]]$  | *                         |              |
| ☛ | $[_v [u\text{Pers}: \langle , \rangle]]$     |                           | *            |
- c.  $[_v [u\text{Pers}: \langle , \rangle] [_{\text{IO}} [\text{Pers}: x]] [_{\text{DO}} [\text{Pers}: y]]]$  CHECK bled →  
     d. Ungrammaticality

*Convergence:* On the other hand, if the faithfulness constraint is ranked higher than the markedness constraint, Impoverishment is not triggered. As a result, the probe maintains its valued features, cf. the tableau in (21). This has the consequence that Check may apply, because the feature identity between the probe and its goals can be established, cf. (21c). Hence, Check deletes the uninterpretable feature on the probe and the derivation converges, cf. (21c→d).

- (21) a.  $[_v [u\text{Pers}: \langle \square, \square \rangle] [_{\text{IO}} [\text{Pers}: x]] [_{\text{DO}} [\text{Pers}: y]]]$  COPY →  
     b.  $[_v [u\text{Pers}: \langle x, y \rangle] [_{\text{IO}} [\text{Pers}: x]] [_{\text{DO}} [\text{Pers}: y]]]$  no impov. →
- |   |  |              |                           |
|---|--|--------------|---------------------------|
|   | $[_v [u\text{Pers}: \langle x, y \rangle] ]$ | MAX- $\pi_p$ | $*\langle x, y \rangle_p$ |
| ☛ | $[_v [u\text{Pers}: \langle x, y \rangle]]$  |              | *                         |
|   | $[_v [u\text{Pers}: \langle , \rangle]]$     | *            |                           |
- c.  $[_v [u\text{Pers}: \langle x, y \rangle] [_{\text{IO}} [\text{Pers}: x]] [_{\text{DO}} [\text{Pers}: y]]]$  CHECK fed →  
     d. Grammaticality

#### 4.3.1. The super-strong version of the PCC

The ranking specific to languages instantiating the super-strong version is the one in (22) (where  $*\langle x,y \rangle_p$  stands for  $*[+obl]/x_p \& *[-obl]/y_p$ ). The faithfulness constraint is ranked lower than the markedness constraints penalising the ungrammatical combinations, but higher than the markedness constraint penalising the grammatical combination  $\langle loc,3 \rangle$ .

(22) *Super-strong PCC Impoverishment ranking:*

$$*\langle 3,loc \rangle_p \gg *\langle loc,loc \rangle_p \gg *\langle 3,3 \rangle_p \gg \mathbf{MAX}\text{-}\pi_p \gg *\langle loc,3 \rangle_p$$

The derivation unfolds as previously described. In the first case, the markedness constraint prohibiting the combination involved is ranked higher than the faithfulness constraint. This triggers deletion because the empty probe is optimal – as shown by the pointing finger in front of the optimal candidate and the exclamation mark signalling that the competitor's violation was fatal. As a consequence, the feature identity of the goal and the probe cannot be established and Check is bled, leading to ungrammaticality.

(23) *Deriving  $\langle 3,3 \rangle$ :*

- a.  $[_v [u\text{Pers}: \langle \square, \square \rangle] [_{\text{IO}} [\text{Pers}: 3]] [_{\text{DO}} [\text{Pers}: 3]]]$  COPY →
  - b.  $[_v [u\text{Pers}: \langle 3,3 \rangle] [_{\text{IO}} [\text{Pers}: 3]] [_{\text{DO}} [\text{Pers}: 3]]]$  impov. fed →
- |  |  |                            |                              |                          |                             |                            |
|--|--|----------------------------|------------------------------|--------------------------|-----------------------------|----------------------------|
|  | $[_v [u\text{Pers}: \langle 3,3 \rangle]]$ | $*\langle 3,loc \rangle_p$ | $*\langle loc,loc \rangle_p$ | $*\langle 3,3 \rangle_p$ | $\mathbf{MAX}\text{-}\pi_p$ | $*\langle loc,3 \rangle_p$ |
|  | $[_v [u\text{Pers}: \langle 3,3 \rangle]]$ |                            |                              | *!                       |                             |                            |
|  | $[_v [u\text{Pers}: \langle , \rangle]]$   |                            |                              |                          | *                           |                            |
- c.  $[_v [u\text{Pers}: \langle , \rangle] [_{\text{IO}} [\text{Pers}: 3]] [_{\text{DO}} [\text{Pers}: 3]]]$  CHECK bled →
  - d. Ungrammaticality

In the second case, the copying of the features  $\langle loc,3 \rangle$  does not lead to their deletion, because the faithfulness constraint  $\mathbf{MAX}\text{-}\pi_p$  is ranked higher than the markedness constraint  $*\langle loc,3 \rangle_p$ . Therefore, the output with the full probe is optimal, which means that Check may apply and that the derivation converges.

(24) *Deriving ✓  $\langle loc,3 \rangle$ :*

- a.  $[_v [u\text{Pers}: \langle \square, \square \rangle] [_{\text{IO}} [\text{Pers}: \text{loc}]] [_{\text{DO}} [\text{Pers}: 3]]]$  COPY →
  - b.  $[_v [u\text{Pers}: \langle loc,3 \rangle] [_{\text{IO}} [\text{Pers}: \text{loc}]] [_{\text{DO}} [\text{Pers}: 3]]]$  no impov. →
- |  |  |                            |                              |                          |                             |                            |
|--|--|----------------------------|------------------------------|--------------------------|-----------------------------|----------------------------|
|  | $[_v [u\text{Pers}: \langle loc,3 \rangle]]$ | $*\langle 3,loc \rangle_p$ | $*\langle loc,loc \rangle_p$ | $*\langle 3,3 \rangle_p$ | $\mathbf{MAX}\text{-}\pi_p$ | $*\langle loc,3 \rangle_p$ |
|  | $[_v [u\text{Pers}: \langle loc,3 \rangle]]$ |                            |                              |                          | *                           |                            |
|  | $[_v [u\text{Pers}: \langle , \rangle]]$     |                            |                              |                          | *!                          |                            |
- c.  $[_v [u\text{Pers}: \langle loc,3 \rangle] [_{\text{IO}} [\text{Pers}: \text{loc}]] [_{\text{DO}} [\text{Pers}: 3]]]$  CHECK fed →
  - d. Grammaticality

#### 4.3.2. The strong version of the PCC

The ranking specific to languages obeying the strong version of the PCC is the one in (25): the faithfulness constraint is ranked lower than the markedness constraints penalising the ungrammatical combinations, but higher than those penalising the grammatical combinations.

(25) *Strong PCC Impoverishment ranking:*

$$^{*}<3,\text{loc}>_p \gg ^{*}<\text{loc},\text{loc}>_p \gg \mathbf{MAX}\text{-}\pi_p \gg ^{*}<3,3>_p \gg ^{*}<\text{loc},3>_p$$

The derivation of the strong version of the PCC proceeds just like the previous one. The first example shows how  $\langle \text{loc}, \text{loc} \rangle$  combinations are ruled out; the second how  $\langle 3, 3 \rangle$  combinations can emerge as grammatical.

(26) *Deriving  $^{*}<\text{loc},\text{loc}>$ :*

- a.  $[_v [\text{uPers: } < \square, \square >] ] [\text{IO} [\text{Pers: loc}]] [\text{DO} [\text{Pers: loc}]]$  COPY  $\rightarrow$
  - b.  $[_v [\text{uPers: } <\text{loc},\text{loc}>] ] [\text{IO} [\text{Pers: loc}]] [\text{DO} [\text{Pers: loc}]]$  impov. fed  $\rightarrow$
- |   |  |                        |                                 |                             |               |                        |
|---|--|------------------------|---------------------------------|-----------------------------|---------------|------------------------|
|   | $[_v [\text{uPers: } <\text{loc},\text{loc}>] ]$ | $^{*}<3,\text{loc}>_p$ | $^{*}<\text{loc},\text{loc}>_p$ | $\mathbf{MAX}\text{-}\pi_p$ | $^{*}<3,3>_p$ | $^{*}<\text{loc},3>_p$ |
|   | $[_v [\text{uPers: } <\text{loc},\text{loc}>] ]$ |                        | *!                              |                             |               |                        |
| ☛ | $[_v [\text{uPers: } <, >] ]$                    |                        |                                 | *                           |               |                        |
- c.  $[_v [\text{uPers: } <, >] ] [\text{IO} [\text{Pers: loc}]] [\text{DO} [\text{Pers: loc}]]$  CHECK bled  $\rightarrow$
  - d. Ungrammaticality

(27) *Deriving  $\checkmark <3,3>$ :*

- a.  $[_v [\text{uPers: } < \square, \square >] ] [\text{IO} [\text{Pers: 3}]] [\text{DO} [\text{Pers: 3}]]$  COPY  $\rightarrow$
  - b.  $[_v [\text{uPers: } <3,3>] ] [\text{IO} [\text{Pers: 3}]] [\text{DO} [\text{Pers: 3}]]$  no impov.  $\rightarrow$
- |   |                                |                        |                                 |                             |               |                        |
|---|--------------------------------|------------------------|---------------------------------|-----------------------------|---------------|------------------------|
|   | $[_v [\text{uPers: } <3,3>] ]$ | $^{*}<3,\text{loc}>_p$ | $^{*}<\text{loc},\text{loc}>_p$ | $\mathbf{MAX}\text{-}\pi_p$ | $^{*}<3,3>_p$ | $^{*}<\text{loc},3>_p$ |
|   | $[_v [\text{uPers: } <3,3>] ]$ |                        |                                 | *                           |               |                        |
| ☛ | $[_v [\text{uPers: } <, >] ]$  |                        |                                 | *!                          |               |                        |
- c.  $[_v [\text{uPers: } <3,3>] ] [\text{IO} [\text{Pers: 3}]] [\text{DO} [\text{Pers: 3}]]$  CHECK fed  $\rightarrow$
  - d. Grammaticality

#### 4.3.3. The weak version of the PCC

The ranking specific to languages exhibiting the weak version of the PCC is the ranking in (28). Once again, the faithfulness constraint is ranked higher than the constraints against the grammatical combinations  $\langle \text{loc}, 3 \rangle$ ,  $\langle 3, 3 \rangle$  and  $\langle \text{loc}, \text{loc} \rangle$ , and lower than the constraint against the only ungrammatical combination  $\langle 3, \text{loc} \rangle$ .

(28) *Weak PCC Impoverishment ranking:*

$$^{*}<3,\text{loc}>_p \gg \mathbf{MAX}\text{-}\pi_p \gg ^{*}<\text{loc},\text{loc}>_p \gg ^{*}<3,3>_p \gg ^{*}<\text{loc},3>_p$$

The derivation of the weak version of the PCC unfolds as in the other versions. In the first case, the copying of features onto the probe leads to their deletion, to a bleeding of Check and thus to ungrammaticality. In the second case, the markedness constraint prohibiting the combination

involved is ranked lower than the faithfulness constraint: thus deletion by Impoverishment is avoided and Check may apply, leading to grammaticality.

(29) *Deriving \*<3,loc>:*

- a.  $[_v [u\text{Pers}: <\square, \square>] ] [_{\text{IO}} [\text{Pers}: 3]] [_{\text{DO}} [\text{Pers}: \text{L}]]$  COPY →
- b.  $[_v [u\text{Pers}: <3, \text{loc}>] ] [_{\text{IO}} [\text{Pers}: 3]] [_{\text{DO}} [\text{Pers}: \text{loc}]]$  impov. fed →

	$[_v [u\text{Pers}: <3, \text{loc}>] ]$	$* <3, \text{loc}>_p$	MAX- $\pi_p$	$* <\text{loc}, \text{loc}>_p$	$* <3, 3>_p$	$* <\text{loc}, 3>_p$
	$[_v [u\text{Pers}: <3, \text{loc}>] ]$	*	!			
☛	$[_v [u\text{Pers}: <, >] ]$		*			

- c.  $[_v [u\text{Pers}: <, >] ] [_{\text{IO}} [\text{Pers}: 3]] [_{\text{DO}} [\text{Pers}: \text{loc}]]$  CHECK bled →
- d. Ungrammaticality

(30) *Deriving ✓ <loc,loc>:*

- a.  $[_v [u\text{Pers}: <\square, \square>] ] [_{\text{IO}} [\text{Pers}: \text{loc}]] [_{\text{DO}} [\text{Pers}: \text{loc}]]$  COPY →
- b.  $[_v [u\text{Pers}: <\text{loc}, \text{loc}>] ] [_{\text{IO}} [\text{Pers}: \text{loc}]] [_{\text{DO}} [\text{Pers}: \text{loc}]]$  no impov. →

	$[_v [u\text{Pers}: <\text{loc}, \text{loc}>] ]$	$* <3, \text{loc}>_p$	MAX- $\pi_p$	$* <\text{loc}, \text{loc}>_p$	$* <3, 3>_p$	$* <\text{loc}, 3>_p$
☛	$[_v [u\text{Pers}: <\text{loc}, \text{loc}>] ]$			*		
	$[_v [u\text{Pers}: <, >] ]$		*	!		

- c.  $[_v [u\text{Pers}: <\text{loc}, \text{loc}>] ] [_{\text{IO}} [\text{Pers}: \text{loc}]] [_{\text{DO}} [\text{Pers}: \text{loc}]]$  CHECK fed →
- d. Grammaticality

#### 4.4. Rule interaction

As shown in the previous section, there are two paths that the derivation can take:

1. The features copied onto the probe are penalised by a constraint ranked higher than the faithfulness constraint. The context for feeding Impoverishment is given because the output with the empty probe is optimal. As a consequence Check is bled, leading to ungrammaticality.
2. The features copied onto the probe are penalised by a constraint ranked lower than the faithfulness constraint. The context for feeding Impoverishment is not given and the output with the full probe is optimal. As a consequence Check is fed, leading to grammaticality.

Thus, the following two general patterns in (31) emerge.

(31) *Consequent ordering of processes and interaction:*

- a. Copy —feeds → deletion —bleeds → Check ⇒ ✗
- b. Copy —feeds → Check ⇒ ✓

Moreover, the ordering of the three operations adopted so far (Copy > Impoverishment > Check) is the only logical one if PCC effects are to be explained this way. In fact, if the rule

ordering were different – and Agree must be split for this ordering to be possible – no PCC effects would follow. Since there is only one logical ordering of Copy and Check, there are two further possible orderings: (32b) and (32c).

(32) *Logically possible rule orderings:*

- a. Copy > Impoverishment > Check
- b. Impoverishment > Copy > Check
- c. Copy > Check > Impoverishment

If (32b) holds, Impoverishment will never take place. In fact, the probe would still be empty as Copy has not applied yet, meaning that the context for Impoverishment to apply is not given. If (32c) holds, Impoverishment will behave just as in the rule ordering I assume for all well-formed cases in (32a): Check can never be bled by Impoverishment because the latter may only apply too late. Generally, in this case, the features on the probe may still be deleted in certain contexts, but the derivation would still converge as Check will already have deleted the probe's uninterpretable feature – with the consequences for the interfaces remaining unclear. Anyway, no PCC effects would follow.

In sum, I have tried to show here that only one of the three possible rule orderings of Copy, Check and Impoverishment leads to a successful application of Impoverishment: only in that ordering of rules can Impoverishment differentiate between the ungrammatical and the grammatical combinations of agreeing objects in the languages obeying the PCC. On the contrary, in the other two orderings, and especially the one in (32b), Impoverishment does not seem to serve any purpose. This is why I exclude those two rule orderings from playing a role in person-case effects; also they can arguably be excluded from being learnable in these languages as Impoverishment is vacuous in (32b) and creates strong syntax-interface mismatches in (32c). However, I do not exclude their existence completely, as Impoverishment might show further interactions with other operations, in which case these orderings of rules may make sense again, as they would bear consequences for different derivations. In conclusion of this section, in the case of languages exhibiting the PCC, Impoverishment must apply as soon as it can, i.e. just after Copy. In fact, this is necessary for Impoverishment to bleed Check in the right contexts and differentiate between grammatical and ungrammatical person-case combinations.

#### 4.5. *Consequences*

Positing scale-driven Impoverishment at the basis of the PCC has the consequence and, as I claim, the advantage that the constraint typology of Impoverishment automatically and restrictively determines the typology of the PCC. This way, clear predictions can be made about possible and impossible PCC language types. In fact, the total amount of variation that is predicted by this system is given in (35). All existing PCC language types are accounted for with a mechanism that finds independent support from an extensive work on Agreement and the interaction between  $\phi$ -features and (syntactic and morphological) case (cf. Keine 2010). Three versions of the PCC that have not been discussed in this paper so far are predicted: what might be called the *total* version in (35a), the *other-strong* version in (35d) and the *zero* version in (35f). A lan-

guage instantiating the total version would have an absolute prohibition against double-object constructions with two phonologically weak objects. Cairene Arabic (Shlonsky 1997:207), as pointed out to me by Thomas Graf (p.c.), and also Hausa, an Afro-Asiatic language spoken in West-Africa, are two languages of that type.<sup>16</sup> In (33) this is illustrated for Hausa. In (33a) and (33b), respectively, one can see that both weak DOs and IOs can be realised on their own. In (33c), however, one can see that a combination of both is not possible: one of the objects has to be realised as phonologically strong, as e.g. the DO in (33d).<sup>17</sup> This means that Agreement with two weak objects is not possible for any person combination.

(33) *Total version in Hausa* (data from lecture material by Ari Awagana, Universität Leipzig):

- a. Audù yaa      kaawoo tà  
Audu 3.M.PFV bring 3.F.ACC  
'Audu brought it (e.g. the water).'
- b. Audù yaa      dafàa makà  
Audu 3.M.PFV cook 2.M.DAT  
'Audu cooked for you.'
- c. \*Audù yaa      kaawoo makà    ta  
Audu 3.M.PFV bring 2.M.DAT 3.F.ACC  
'Audu brought you it.'
- d. Audù yaa      kaawoo makà    ita  
Audu 3.M.PFV bring 2.M.DAT 3.F.ACC.STRONG  
'Audu brought it to you.'

A language with the zero version is one allowing all four combinations, such as German, cf. (34).<sup>18</sup>

(34) *Zero version in German:*

- a. dass er      es      dir      gestern      gezeigt hat.  
that 3.M.NOM 3.N.ACC 2.DAT yesterday shown has  
'that he showed it to you yesterday.'
- b. dass er      es      ihr      gestern      gezeigt hat.  
that 3.M.NOM 3.N.ACC 3.F.DAT yesterday shown has  
'that he showed it to her yesterday.'
- c. dass er      mich      dir      gestern      gezeigt hat.  
that 3.M.NOM 1.ACC 2.DAT yesterday shown has  
'that he showed me to you yesterday.'

<sup>16</sup> See also Graf (2012) for an algebraic account of the PCC, also expecting a total version to exist.

<sup>17</sup> The weak form of the 3rd person feminine DO is *ta* with a polar tone; the strong form is just *ita*.

<sup>18</sup> Anagnostopoulou (2008) argues that German exhibits the (weak version of the) PCC, but only in contexts where the object cluster occurs before a full-DP subject. Regardless of German, Haspelmath (2004:10) cites Polish, Haya (Bantu-J, Tanzania), Noon (Northern Atlantic, Senegal), Lakhota and Kabardian as languages with phonologically weak object clusters that escape the PCC. However, it has to be checked for Noon, Lakhota and Kabardian, which are shown to allow <3,2> combinations, whether they also allow <3,1> combinations. If not, they could still be well-behaved languages that differentiate between 1st and 2nd person, instantiating what is called the *me-first* PCC (Nevins 2007).

- d. dass er dich ihr gestern gezeigt hat.  
 that 3.M.NOM 2.ACC 3.F.DAT yesterday shown has  
 ‘that he showed you to her yesterday.’

A language with the other-strong version, on the other hand, would prohibit only the phonologically weak combinations  $<3,3>$  and  $<3,loc>$ . Given the present assumptions, this version has to be treated as an accidental gap, as no language with that pattern has been attested so far, unless Spanish might be identified as an other-strong language with further research. In fact,  $<3,3>$  combinations in Spanish are only grammatical if the IO is expressed by the reflexive clitic *se* – also known as the *spurious se*. If reflexive elements pattern together with local person (as they seem to do in French, e.g., where combinations of  $*<\text{local},3.\text{reflexive}>$  are ungrammatical; see Anagnostopoulou 2005:204 and references therein) the  $<\text{se},3>$  combination could be analysed as a repair strategy to avoid the combination  $*<3,3>$  by replacing it with a  $<\text{loc},3>$  combination of the same meaning. If this were the case, Spanish would fit the other-strong version of the PCC for those speakers who allow  $<\text{loc},\text{loc}>$  combinations. All in all, the following typology is predicted:

(35) *Constraint typology:*

- a. Total version of the PCC: (Cairene Arabic, Hausa)  
 $*<3,\text{loc}>_p \gg *<\text{loc},\text{loc}>_p \gg *<3,3>_p \gg *<\text{loc},3>_p \gg \mathbf{MAX}\text{-}\pi_p$
- b. Super-strong version of the PCC: (Kambera)  
 $*<3,\text{loc}>_p \gg *<\text{loc},\text{loc}>_p \gg *<3,3>_p \gg \mathbf{MAX}\text{-}\pi_p \gg *<\text{loc},3>_p$
- c. Strong version of the PCC: (French, Greek, Kiowa)  
 $*<3,\text{loc}>_p \gg *<\text{loc},\text{loc}>_p \gg \mathbf{MAX}\text{-}\pi_p \gg *<3,3>_p \gg *<\text{L},3>_p$
- d. Other-strong version of the PCC: (Spanish?)  
 $*<3,\text{loc}>_p \gg *<3,3>_p \gg \mathbf{MAX}\text{-}\pi_p \gg *<\text{loc},\text{loc}>_p \gg *<\text{loc},3>_p$
- e. Weak version of the PCC: (Italian, Catalan, Old Occitan)  
 $*<3,\text{loc}>_p \gg \mathbf{MAX}\text{-}\pi_p \gg *<\text{L},\text{L}>_p \gg *<3,3>_p \gg *<\text{loc},3>_p$
- f. Zero version of the PCC: (German, Dutch, Haya)  
 $\mathbf{MAX}\text{-}\pi_p \gg *<3,\text{loc}>_p \gg *<3,3>_p \gg *<\text{loc},\text{loc}>_p \gg *<\text{loc},3>_p$

Finally, the analysis may be extended to capture PCC effects involving other  $\phi$ -features, such as gender, animacy and number. In Italian both a masculine and a feminine 3rd person dative clitic exist. However, only the masculine one is grammatical in a clitic cluster ( $\checkmark <3[-\text{fem}, +\text{obl}], 3[-\text{obl}]>; *<3[+\text{fem}, +\text{obl}], 3[-\text{obl}]>$ ). In the Leísta dialects in Spanish the combination  $<\text{loc},3>$  is generally grammatical, unless the DO is animate ( $*<\text{loc},3[+\text{anim}]>$ , where  $3[+\text{anim}, -\text{obl}]$  is syncretic with  $3[+\text{obl}]$ ). However, as pointed out to me by Elena Anagnostopoulou (p.c.), the present account cannot capture correlations between the strength of the PCC a given language is subject to and the kind of weak objects that language has (i.e. weak pronouns vs. clitics vs. agreement).<sup>19</sup> The observation behind this is that languages with agreement affixes always have (at least) the strong version of the PCC, while languages with weak pronouns have at most the weak version. This correlation, however, is at best a tendency. In fact, Polish and Haya (Bantu-J, Tanzania) have the zero version of the PCC in spite of having clitics and agree-

<sup>19</sup> For proposals and background on that matter, see the review by Rezac (2010).

ment affixes, respectively (Haspelmath 2004:10). This is shown with example (36) for Polish and (37) for Haya, where the least canonical combination  $<3,\text{loc}>$  is grammatical.<sup>20,21</sup>

- (36) Dałbym mu cię za żonę bez wahania.  
          give.COND.1SG 3.M.DAT 2.ACC for wife without hesitation  
          'I would give you to him as a wife without hesitation.' Polish
- (37) A-ka-mu-n-deet-ela.  
          3SG.SUBJ-PAST-3SG.REC-1SG.THM-bring-APPL  
          'S/he brought me to him.' (or: 'S/he brought him/her to me.') Haya

### 5. Conclusion

In this paper I have shown that the scarcity-of-resources approaches can be extended to capture not only the super-strong version but the full typology of the PCC if the scarcity-of-resources on the probe is not postulated as such, but rather is taken to incur in the course of those derivations that lead to ungrammatical object combinations. This is ensured by the mechanism of syntactic scale-driven Impoverishment and the way it interacts with Agree. Impoverishment is taken to be a local step of optimisation of the derivation, precisely of the step where the objects' features were transferred to the probe on transitive *v*. It is further taken to result from the interaction between a set of markedness constraints that penalise the presence of certain person-case feature combinations on the probe with a faithfulness constraint that protects the probe from feature deletion. In that sense, Impoverishment determines the optimal output for the continuation of the derivation, namely either an unharmed probe with its features or an impoverished probe without its features. The restrictiveness of the mechanism is ensured by deriving the markedness constraints from the harmonic alignment and local conjunction of the person- and case-feature scales, producing a total amount of four inherently ranked markedness constraints. The only degree of variation possible in this system is the relative ranking of the faithfulness constraint with respect to the markedness constraints, predicting and generating six language types: the total, super-strong, strong, weak and zero versions of the PCC, which are all attested, and the other-strong version, which was tentatively identified in Spanish. In order for Impoverishment to interact correctly with Agree, in line with much recent work breaking down syntactic operations into more fine-grained sub-operations, Agree was postulated to consist of the sub-operations Copy and Check and the order of application was set to be Copy > Impoverishment > Check, as this is the only order where Impoverishment can cause a tangible effect. Ungrammaticality is then the result of failed completion of Agree whenever Impoverishment bleeds its final step Check because the feature identity of the probe with its goal is not met and the uninterpretable feature on the probe cannot be deleted. All in all, the consequences of this approach are that (i) the Person-Case Constraint can be linked to Hale/Silverstein scales and analysed as a uniform phenomenon as the scales are the driving force of Impoverishment; (ii) no asymmetry between the representations of 3rd and local person is needed, meaning that 3rd

<sup>20</sup> The  $<3,1>$  combination cannot be tested in Polish as there is no clitic form of the 1st person accusative.

<sup>21</sup> In (37), both the more and the less canonical readings, i.e.  $<1,3>$  and  $<3,1>$ , are available for the same string. Under the Y-model of grammar adopted here, this suggests that both structures exist syntactically.

person is always specified in syntax which avoids complications for morphology; (iii) Agree, split into Copy and Check, can interact freely with other operations, resulting e.g. in impoverishment of probes as has been shown; (iv) PCC effects involving further  $\phi$ -features, and similar phenomena involving one probe for two arguments, can follow from the same mechanism.

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# **How modal particles and discourse relations interact:**

## Empirical evidence

Sophia Döring

This paper looks at German modal particles from the perspective of discourse structure. Using the discourse relations proposed by Rhetorical Structure Theory, the interaction between these relations and modal particles is analysed. I will show for two particles (*ja* and *doch*) that (a) the occurrence of these particles correlates with certain discourse relations (corpus study), and (b) that when given the choice between these particles, native speakers choose the particle depending on the discourse relation. The results are to be explained in a theory of Common Ground management.

### *1. Introduction*

German modal particles have been in the center of linguistic research for several years, mainly focusing on their semantics and pragmatics, lately also on their syntax (cf. Thurmair 1989; Lindner 1991; Jacobs 1991; König 1991; Kratzer 1999; Karagjosova 2004; Gutzmann 2008, 2009; Coniglio 2008; Zimmermann 2004, 2011).

Their meaning and function has been discussed extensively, but there is still controversy about their appropriate description. All of this discussion, however, has taken place almost exclusively on the sentence level. The interplay of modal particles with effects above the sentence level, for example with regard to discourse structure, has been neglected so far. The current paper sheds light on modal particles from the perspective of discourse structure, i.e. it will discuss what function modal particles have with respect to text coherence and discourse structure.

Two quantitative studies, a corpus study and a forced lexical choice experiment, will explore what discourse structure can tell us about the way modal particles are used by a speaker to indicate to the addressee how a proposition is related to another proposition. For the current purpose, I will work with discourse structure as it is modelled in Rhetorical Structure Theory (RST) by Mann & Thompson (1988).

The questions that this paper addresses are: In which discourse units do modal particles occur? Do the single particles show a preference for different discourse relations? And if so, what does this tell us with respect to the meaning of the particles?

## 2. Discourse relations

When using the notion 'discourse analysis' within linguistics, the main focus is usually coherence. A text is more than a unrelated sequence of sentences, the sentences are connected in a meaningful way. These relations are what glues the single building blocks of a text (discourse units) together, i.e. what makes it coherent.

Therefore, when analyzing coherence and discourse structure, it is most of the time the relations between discourse units that is focussed on. (I take discourse units to have the size of single sentences.) By defining a set of discourse relations one can account for the different ways in which discourse units can be connected with each other.

Rhetorical Structure Theory by Mann & Thompson (1988) is one of the most influential approaches for describing discourse coherence with relations and was taken up by many researchers in the field (e.g. Sanders, Spooren & Noordman 1992; Hovy & Maier 1995; Lagerwerf 1998, Carlson & Marcu 2001; Kehler 2002, etc.). In RST and subsequent work, discourse is assumed to have a hierarchical structure which can be visualized as a discourse tree (cf. 1). Another basic observation is that the relation between two discourse units is often asymmetric in the sense that one unit is of greater importance to the general aim or topic of the text (this unit is called the nucleus), while the other is supporting and could, in general, be left out – and understanding the main content of the discourse should not be seriously affected by it (this less important unit is called the satellite). According to this distinction between nucleus and satellite, discourse relations are divided into mononuclear and multinuclear relations. They are called mononuclear if the relation holds between nucleus and satellite. If the two connected units are parallel and of the same importance, i.e. both of them are nuclei, the relation is called multinuclear. Coherent discourse should ideally result in a hierarchical tree with just one root. See figure 1 for an example of a discourse structure in (1) taken from Mann & Thompson (1988):

- (1) The next music day is scheduled for July 21 (Saturday), noon-midnight. I'll post more details later, but this is a good time to reserve the place on your calendar.

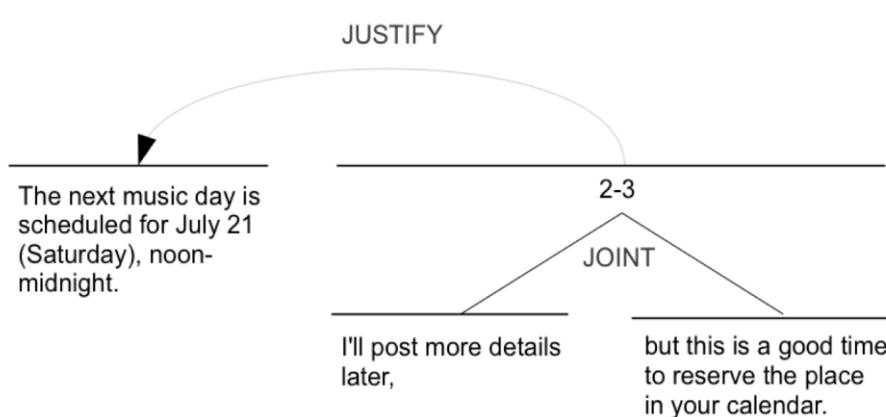


Figure 1: Example RST tree

In this small discourse tree, there is the multinuclear relation JOINT between discourse unit 2 and 3, and the unit of these two parts stands in a mononuclear relation to unit 1, namely a JUSTIFY relation. The hierarchical tree diagram mirrors the intuition that the information in discourse unit 1 is more important than the information given in the two following units.

Mann & Thompson (1988) define a set of 24 discourse relations:

#### Mononuclear Relations:

ANTITHESIS, BACKGROUND, CAUSE, CIRCUMSTANCE, CONCESSION, CONDITION, ELABORATION, ENABLEMENT, EVALUATION, EVIDENCE, INTERPRETATION, JUSTIFY, MOTIVATION, OTHERWISE, PURPOSE, RESTATEMENT, RESULT, SOLUTIONHOOD, SUMMARY

#### Multinuclear Relations:

CONTRAST, JOINT, LIST, SEQUENCE

For most of the relations, their name is transparent with respect to their effect and function. In the case of ELABORATION for instance, one discourse unit elaborates on the information given in the other one, in CAUSE and RESULT, there is a causal relation between the information given in the two units, and so on.

Subsequent approaches differ in how many discourse relations they assume: the span reaches from only two basic distinctions (Grosz & Sidner 1986) to over 70 relations (Carlson & Marcu 2001). For this study, I will stick to the RST classification of discourse relations. The size of the set is appropriate and as it is these relations that often are adapted by other approaches, these relations seem to be justified.

Before turning to general remarks about modal particles in the next section, it has to be mentioned that theories of discourse relations in general face some criticism. The main points of critique can be subsumed under the notion of the "laundry list complaint" raised in Kehler (2011). Mainly, it is controversial how an "ideal" set of relations would have to be like. This concerns the number of relations, their classification, their character and the way they are defined. A further problem is that the assignment of relations remains subjective and, as a result, inter-rater agreement is low in many studies because there is no unique formal feature to identify a discourse relation.

I cannot propose a solution to these problems within this article. I claim that discourse relations are meaningful and can offer interesting insights for other linguistic questions – and therefore it is worthwhile to establish a consistent set of relations, organized in a hierarchical way in order to facilitate analyzing a text for its discourse relations. I claim that the relations proposed within RST can be grouped according to the level at which they apply (e.g. events vs. speech act). The exact design of such a taxonomy, however, has to be dealt with in a separate paper.

### *3. The meaning of modal particles*

German modal particles are a closed class of expressions with a non-truth-functional meaning (cf. Thurmair 1989; Lindner 1991; Kratzer 1999; Karagjosova 2004; Zimmermann 2004, 2011). They express the speaker's attitude towards the proposition they appear in; for example they can convey that the speaker takes the proposition to be uncertain, uncontroversial or irreversible. Examples for these items are *ja*, *doch*, *halt*, *eben*, *auch*, *schon*, *wohl*, *denn*,

among others. German modal particles were treated as a phenomenon of spoken language for a long time. This is no longer the case: they can be found in newspaper articles as well as in other types of written language, too. Nevertheless, they occur more often in spoken language.

Some, but not all of the German particles, can be described as having a common-ground managing function. What is meant by this notion is that they refer to the addressee's knowledge and indicate whether the proposition is supposed to be already in the set of shared knowledge. Therefore it is feasible to account for their meaning within a theory of Common Ground like Farkas & Bruce's (2009) model which includes public as well as individual commitment sets.

For the current paper, I will concentrate on the modal particles: *ja* and *doch*. These two particles are well described (e.g. Thurmair 1989; Lindner 1991; Kratzer 1999; Karagjosova 2004; Zimmermann 2011) and overlap in some aspects of their meaning (see below). In the following, I will introduce the meaning and function of *ja* and *doch* in terms of a common ground theory and, at the same time, I will discuss expectations and predictions with respect to the particles' behavior in discourse.

### 3.1. *ja*

The main effect of *ja* is to indicate that the speaker takes the proposition *p* to be already known (cf. Thurmair 1989; Kratzer 1999; Zimmermann 2011). In (2), an example for the use of the particle *ja* is given:

- (2) *Den Ausflug müssen wir wahrscheinlich verschieben. Es wird ja morgen regnen.*  
 the trip have.to we probably delay it will JA tomorrow rain  
 'We will probably have to delay the trip. It will be raining tomorrow.'

The speaker in (2) indicates that the fact that it is supposed to rain is already known to the addressee or is at least uncontroversial. There are two different proposals for the meaning of *ja*: the strong one suggests that the proposition has to be known to the addressee (Thurmair 1989; Kratzer 1999), the weaker version claims that it only has to be uncontroversial (Kratzer & Matthewson 2009). However, in most of the naturally occurring examples with *ja*, the proposition is part of the shared knowledge. The truth-conditions of the sentence containing *ja* in (2) are the same as the truth-conditions the sentence would have without *ja*. It does not operate on the content level, but it adds an attitude of the speaker.

The basic contribution of *ja* can be sketched as in (3).

- (3)  $\llbracket ja(p) \rrbracket = p \ \& \ p \in CG$

From a common ground management perspective, this translates as: by using *ja*, the speaker expresses on the one hand that the proposition s/he asserts is part of his/her individual commitment set. Additionally, *ja* expresses that *p* is already in the common ground. As a consequence, the addressee can retrieve it from there. It fact, it can be argued that *ja* produces an invitation for the addressee to retrieve the information. This may lead to a faster processing of incoming information.

Applying this description to the example in (2), this means that the proposition 'It will rain

'tomorrow' does not have to be discussed again. In terms of common ground management this means that it does not have to be put on the table – i.e. the locus of the current Questions under Discussion in the discourse –, but rather the speakers signals to the addressee that it already is in the common ground. As a consequence, the first proposition, i.e. that the trip has to be postponed, can be accepted faster by the addressee since the information that it will rain stands in a causal relation to it.

Turning to discourse structure and discourse relations, it can be predicted from this analysis of *ja*'s meaning that it will occur in discourse units that express information already known, e.g. those linked by a BACKGROUND relation to another unit. This relation holds if the information in the satellite helps the addressee to understand the information given in the nucleus. Information that serves as background knowledge for the main point mentioned is likely to be already known or uncontroversial.

On the other hand, the particle *ja* should not be compatible with new information. A relation which tends to introduce new information is ELABORATION in which the speaker gives additional information on information given in the nucleus. The same prediction holds for non-factive information (as for example related by a CONDITION relation): *ja* is not expected here.

### 3.2. *doch*

The particle *doch* shares part of the meaning of *ja*: it also signals that the speaker takes the proposition to be uncontroversial. So it has the meaning expressed by *ja* as one of its meaning components but it additionally has a correcting or contrasting function (cf. Lindner 1991; Karagjosova 2004; Repp 2013): The speaker assumes that the addressee actually knows that p holds but is not aware of it at the time of utterance, the proposition is not active in the addressee's mind. See (4) for illustration:

- (4) A: Wenn wir das Auto nehmen, sind wir in zehn Minuten da.  
 If we the car take are we in ten minutes there  
 'If we take the car, we will be there in ten minutes.'
- B: Das Auto ist *doch* kaputt.  
 The car is DOCH broken  
 'But the car is broken.'

*Doch* indicates that the speaker thinks the addressee entertains commitments that are not compatible with the proposition that s/he asserts. The speaker may either have made it public or s/he thinks that it is highly likely that the addressee entertains such commitments. In the case of (4), speaker A signals with his/her utterance that, at the time of utterance, s/he does not take into account that the car is broken, so B reminds him/her of that. *Doch* indicates that – although speaker A is not aware of it at that point – the information that the car is broken should not be new to him/her. If it was obvious to B that A does not know that p holds, *doch* would have been inappropriate here.

The meaning of *doch* therefore can be described as in (5):

- (5)  $\llbracket \text{doch}(p) \rrbracket = p \ \& \ p \in \square \text{CG} \ \& \ S \text{ thinks that } A's \text{ commitment set contains a proposition } q \text{ which is incompatible with } p$

From a common ground management perspective, and more specifically, in terms of Farkas & Bruce (2010), there is a conflict between the addressee's commitment set and the common ground. It might be said that the speaker signals that adding the proposition *p* to the common ground might lead to a 'conversational crisis'. Farkas & Bruce (2010) establish the notion of a 'conversational crisis' and claim that such a crisis arises if the common ground of a discourse is incoherent because speaker and addressee have incompatible beliefs in their individual commitment sets that are supposed to be added to the shared knowledge (cf. Farkas & Bruce 2009:86).

By using *doch*, the speaker makes a move to avoid the crisis by reminding the addressee that *p* is already in the set of shared knowledge.

When making predictions about *doch*'s behavior in discourse, this 'incompatibility' aspect suggests a frequent use of the particle in contrastive discourse relations, such as CONTRAST, CONCESSION or ANTITHESIS. Because of the meaning component that *doch* shares with *ja* (the uncontroversiality), the same predictions hold: it is likely to occur in BACKGROUND, but unlikely to be part of discourse units that stand in an ELABORATION or CONDITION relation to another one.

Summing up this section, it can be stated that *ja* and *doch* share a meaning component: they both mark the proposition as uncontroversial and already known. Additionally, *doch* adds a contrastive component which leads to additional predictions with respect to their interplay with discourse structure. The meaning and function of both particles can be accounted for within a theory of Common Ground.

In the following section, I will present the first part of empirical evidence to verify the predictions made above for the interaction of particles with certain discourse relations.

#### *4. Empirical evidence I: Corpus study*

##### *4.1. Corpus and annotation*

To investigate if there is an interaction between modal particles and discourse relations, a corpus study was conducted. The study was carried using a corpus of 28 parliament speeches by the former German chancellor Helmut Kohl.

It was discussed above that modal particles occur more often in spoken than in written language – but they are used in written language, too. There are two possible concerns with using parliament speeches: first of all, many of the speeches are based on written manuscripts and are therefore not an optimal representation of spoken language. Secondly, the corpus consists of protocols of the speeches, which means that they are “corrected” for slips of the tongue, interjections, corrections. Crucially, an exemplary comparison of a protocol and the actual audio file of a speech showed that modal particles were deleted from the protocols as well.

However, the protocols still contain many of modal particles (see below for actual numbers) and in fact multiple speeches are spontaneous reactions to arguments mentioned in the previous debate. The corpus, therefore, is adequate for the research question.

The corpus contains more than 126.000 word tokens and was automatically annotated for part of speech using TreeTagger and the STSS tagset. This means that all modal particles were assigned the label ADV which contains particles as well as all types of adverbs. Before the actual analysis could be done, the modal particles had to be distinguished from answer particles, conjunctions, adjectives and other homonyms. This manual annotation was done for *ja*, *doch*, *halt*, *eben*, *wohl* and *schon* and results in a total of 585 modal particles.

Starting with the actual analysis, as a first step, the discourse relations were annotated manually for those contexts containing a modal particle using the RST classification of relations. In a second step, a base line for the analysis was identified. In order to have a degree for comparison, three speeches (27.000 word tokens) were annotated for discourse relations completely, i.e. for all sentences irrespective of the presence or absence of modal particles.

To have a baseline like this is crucial to interpret the results correctly. If for instance a high percentage of the particles were found in units with a SOLUTIONHOOD relation, it could still be due to the fact that this relation might be very frequent in argumentative texts. Therefore, the general distribution of relations in the specific text type must be taken into consideration.

The distribution of discourse relations across these sentences (restricted to those 20 relations that occurred at least 10 times) served as a baseline for the analysis of the occurrence of modal particles in particular discourse relations. It is called the expected frequency in the following. The null hypothesis is that the modal particles occur with equal probability in all relations, i.e. most modal particles should be found in the most frequent discourse relations.

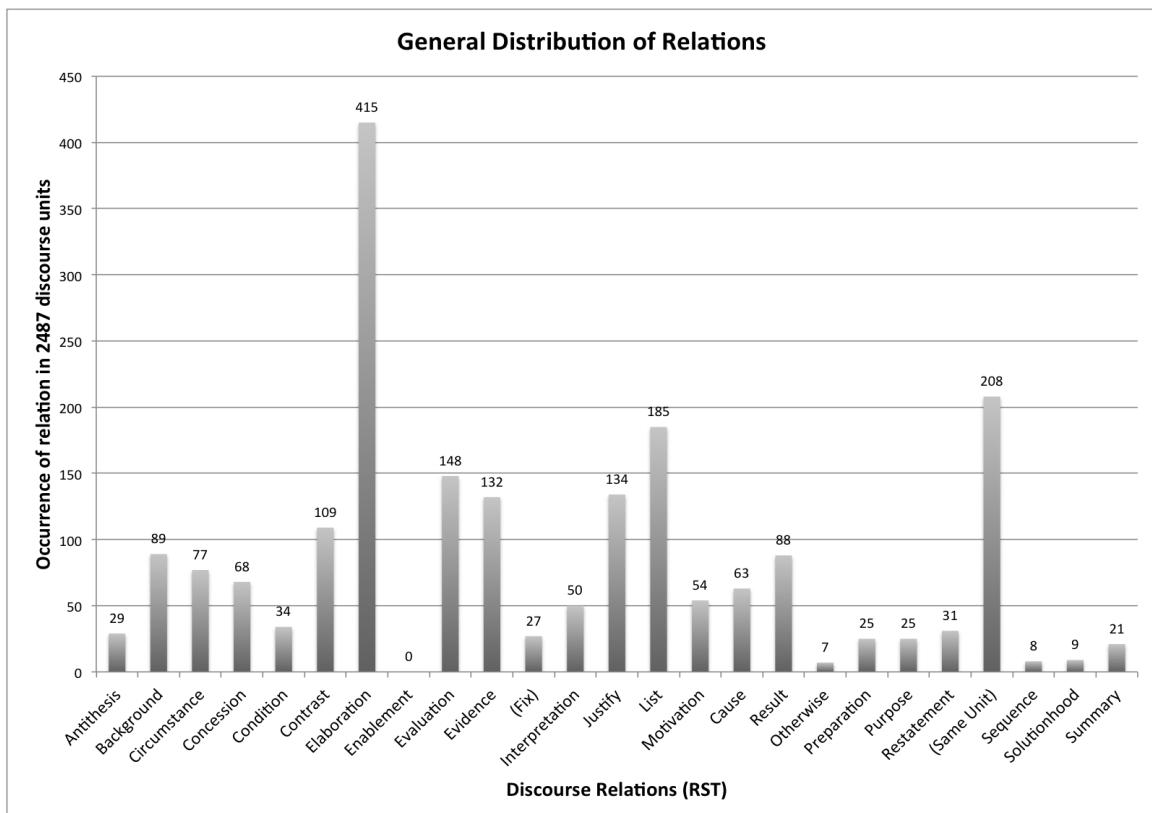


Figure 2: General distribution of discourse relations in three speeches  
(27.000 word tokens, 2487 discourse units)

What is most striking in figure 2 is the frequent occurrence of the discourse relation ELABORATION. The predominance of this relation is due to the fact that ELABORATION is probably the most general relation. Mann & Thompson (1988) define it as follows (where S stands for satellite and N for nucleus): "S presents additional detail about the situation or some element of subject matter which is presented in N or inferentially accessible in N" (Mann & Thompson 1988:273). With this function, ELABORATION is the most general way two discourse units can be related to each other and therefore occurs very often. This has to be

kept in mind for the analysis of the results.

The expected frequency shown in figure 2 will be used as a baseline for comparison for the results for *ja* and *doch*.

#### 4.2. Statistical analysis and results

The statistical analysis of the observed frequency of the occurrence of modal particles in different discourse relations revealed that *ja* and *doch* are not equally distributed over the relations (*ja*:  $\chi^2(19) = 189,6$ ,  $p < 0,001$ ; *doch*:  $\chi^2(21) = 416,61$ ,  $p < 0,001$ ). Figure 3 illustrates this for a selection of relations.

The analysis of the individual relations revealed the following results: *ja* occurred significantly more often than would be expected on the basis of the overall distribution of discourse relations, in discourse units that constitute BACKGROUND and EVIDENCE relations ( $p < 0,0001$ ), and with marginal significance more often than expected in CAUSE relations ( $p < 0,1$ ). On the other hand, it occurred significantly less often than expected in ELABORATION relations ( $p < 0,0001$ ), and with marginal significance less often than expected in CONDITION relations ( $p < 0,1$ ).

*Doch* did not show a preference for BACKGROUND, but occurred significantly more often than expected in JUSTIFY, EVALUATION, INTERPRETATION, MOTIVATION (for all  $p < 0,0001$ ) and EVIDENCE ( $p < 0,05$ ). *Doch* occurred significantly less often than expected in ELABORATION ( $p < 0,0001$ ) and CONDITION ( $p < 0,05$ ).

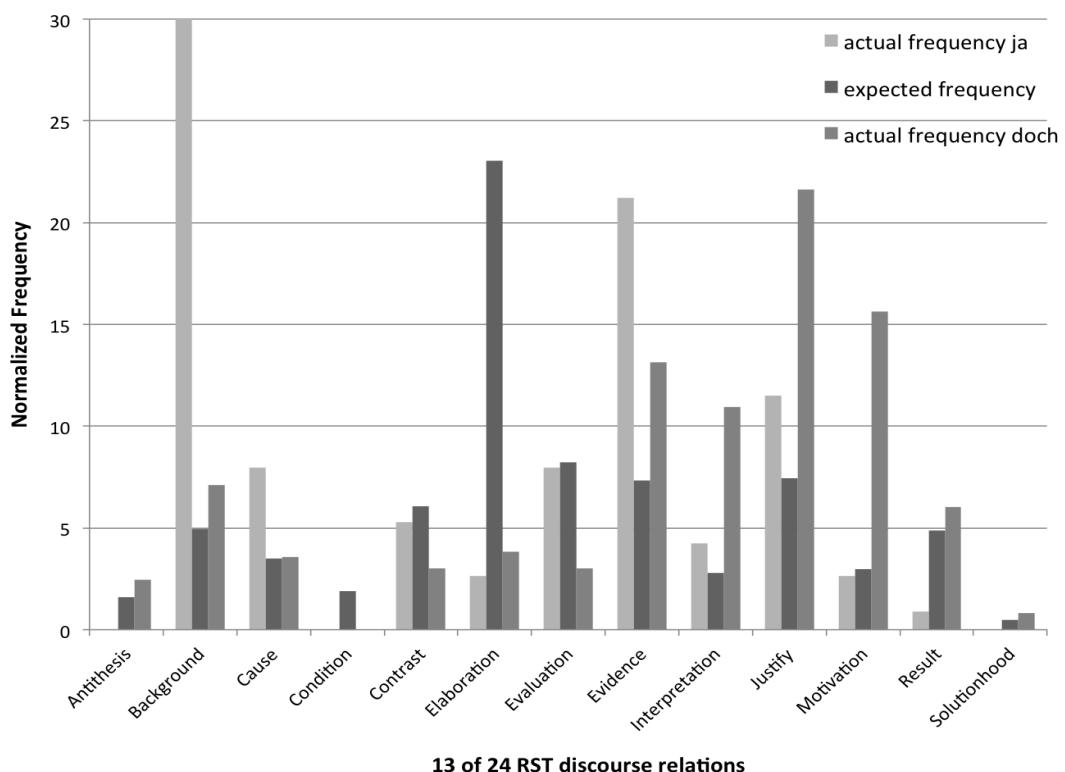


Figure 3: Distribution of *ja* & *doch*, correlated with expected frequencies; frequencies normalized (occurrences per 100 relations)

#### 4.3. Discussion of results

Overall, the findings in the last section confirm the predictions made in section 3, but there also are some unpredicted results. The frequent occurrence of *ja* in BACKGROUND is clearly what was predicted based on *ja*'s meaning. It follows straightforwardly from *ja* marking a proposition as already known or uncontroversial. The prediction that *ja* would not occur in discourse units providing new, additional information as in ELABORATION and non-factive information CONDITION is also confirmed.

The occurrence of *ja* in EVIDENCE and CAUSE, however, was not predicted from its meaning. I suggest that the use of *ja* in these discourse relations results from what I will call a 'manipulative use' of modal particles: The speaker exploits the meaning of a particle to strengthen his/her argument in the discourse by representing the proposition as uncontroversial because it is already part of the shared knowledge of speaker and addressee. It is plausible that an information given as evidence for another piece of information can be made stronger if the speaker marks it as not controversial. The same holds for information that stands in a causal relationship with another discourse unit.

Another unexpected result is the occurrence of *doch* in JUSTIFY, EVIDENCE, EVALUATION and INTERPRETATION. I will argue that the same explanation applies here: The speaker uses *doch* in a manipulative way, for instance to mark information that acts as EVIDENCE as uncontroversial and to pretend that the addressee was just not momentarily aware of it. The genre of parliament speeches is particularly well suited for these manipulative uses as the addressee – i.e. other representatives – cannot directly and immediately respond to the speaker.

The frequent occurrence of *doch* in MOTIVATION can be explained with the use of *doch* in imperatives, as for instance in the sentence in (6):

- (6) Sagen Sie *doch* endlich die Wahrheit!  
 Say you DOCH finally the truth  
 'Finally say the truth!'

The particle *doch* is used in imperative sentences frequently, so this finding is not surprising. This specific use of *doch* is compatible with the common ground managing function of *doch* that was suggested above. In these cases, the speaker orders or advises the addressee to do something that s/he was not going to do anyway. The speaker thinks that the addressee did not entertain the commitment that *p* (with a meaning like *A will do xyz*) – which is a presupposition of imperatives (cf. Kaufmann 2012).

The discourse relation MOTIVATION relates an imperative with a discourse unit that is supposed to motivate the addressee to perform the action described in the imperative sentence. This explains why so many instances of *doch* occurring in MOTIVATION can be found. As for the predicted but missing high frequency of occurrence of *doch* in CONTRAST, CONCESSION and ANTITHESIS, I tentatively assume that this might be due to the genre of the corpus. Taking a closer look at the sentences where contrast is expressed, it becomes clear that in parliament debates, it is generally accepted that the addressees (i.e. the other parties) hold a different view. In that sense, the speaker and the addressee agree to disagree, so contrastive utterances in this specific text type will not typically contain reminders of shared knowledge, but solely present the contrasting positions. This point, however, needs further research.

The results from the corpus study show that there is a clear interaction between discourse relations and certain modal particles: the two particles are not distributed evenly about all

discourse relations, and although *ja* and *doch* have a similar meaning, they seem to be preferred in different discourse relations. These findings, however, do offer a first hint to an interaction, but cannot be generalized immediately. One reason is that they are based on data of just one speaker at this point and they stem from a very specific text type. Another aspect is that the annotation of discourse relations remains a subjective decision, irrespective of how detailed the guidelines are. To overcome these problems, a lexical choice task was conducted to approach the topic from another direction.

### *5. Evidence II: Lexical choice task*

#### *5.1. Design and method*

In the lexical choice task, 48 subjects (aged 19 to 72) participated and read 32 three-sentence target discourse interactions (plus 40 fillers) on a computer screen. Their task was to choose a modal particle which they thought that would fit with the discourse most naturally, see (3) for an illustration. There was no time limit for their task.

They had the choice between *ja*, *doch*, and, as a filler, stressed *SCHON*, which were given in a drop-down menu. *SCHON* is a confirming-rejecting modal particle which was found to be preferred in EVALUATION relations. An example is given in (7):

- (7) Jetzt haben Sie Ihre Meinung geändert. Das ist schon merkwürdig.  
 now have you your opinion changed This is SCHON strange  
 Now you have changed your mind. This is (indeed) strange.

To test the interplay of modal particles and discourse relations, the relations between the first and the second sentence were manipulated: The sentences were connected either by a BACKGROUND relation (8B), or by JUSTIFY (8J). So while the surrounding context sentences stayed the same, the middle sentence was different depending on the condition.

BACKGROUND and JUSTIFY were chosen because the corpus study revealed them to be among the relations that are most highly correlated with the use of *ja* and *doch*, respectively (cf. figure 3). In the experiment, the BACKGROUND relation was implemented by presenting information that is obvious, uncontroversial and generally known. The JUSTIFY relation, on the other hand, was realized by using meta-textual utterances where the speaker defends his/her previous speech act.

The goal of the experiment was to test if the corpus correlations could be confirmed in a controlled study in which speakers had to make a conscious decision. In example 8, information about the introduction of all-day schools and the consequences for music schools are given. In the BACKGROUND condition in (8B), the second sentence contains general, basic information about music schools and thus builds the background to understand the first sentence. In the JUSTIFY condition on (8J), the speaker makes a rather meta-discursive comment, defending the utterance of the first sentence.

- (8) Wenn Ganztagsschulen eingeführt werden, verlieren Musikschulen und Sportvereine  
 If all.day.schools introduced will.be lose music.schools and sports.clubs  
 viele Mitglieder.  
 many members  
 'If all-day schools are introduced, music schools and sports clubs will lose members.'

[B] In Musikschulen machen Kinder \_\_\_\_ die größte Gruppe der Mitglieder aus.  
 In music.schools make children \_\_\_\_ the biggest group of.the members out  
 'Children make up the majority of students in music schools.'

[J] Dieser Aspekt muss \_\_\_\_ mal in den Vordergrund gerückt werden.  
 This aspect must \_\_\_\_ once in the foreground moved become  
 'This aspect needs to be emphasized.'

Ein solcher Mitgliederschwund ist für diese Einrichtungen verheerend!  
 A such loss.of.members is for these institutions damaging  
 'Such a loss of members is highly damaging for these institutions!'

### 5.2. Statistical analysis and discussion of results

The statistical analysis of the data revealed that participants' choice of *ja* and *doch* depended on the discourse relation ( $\chi^2(1) = 168,5$ ,  $p < 0,00001$ ). The individual analysis of cell contributions revealed (all  $p < 0,001$ ) that *ja* was chosen more often than expected when subjects saw a discourse in the BACKGROUND condition, and less often than expected in JUSTIFY. *Doch* on the other hand was chosen more often than expected in JUSTIFY and less often than expected in BACKGROUND. Figure 4 illustrates the total frequencies including those for the filler particle *SCHON*. The age of participants did not influence the results.

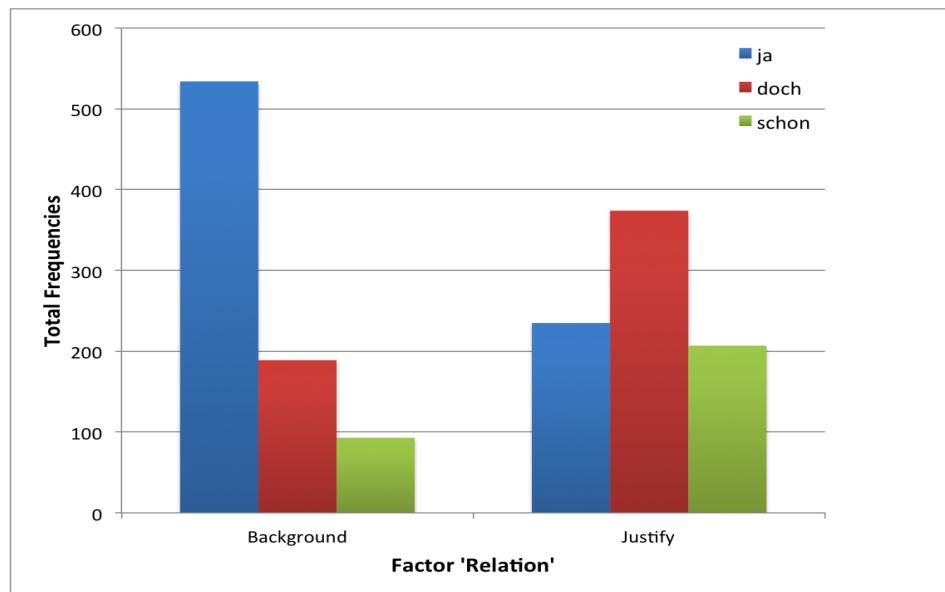


Figure 4: Choice of MPs *ja*, *doch* and *schon* in BACKGROUND and JUSTIFY

The results of the lexical choice task are in line with the correlations for the BACKGROUND and JUSTIFY relations that were observed in the corpus data. Although the difference between *ja* and *doch* is subtle and they could be interchanged in the respective sentences, the participants considered *ja* more appropriate when the sentence stood in a BACKGROUND relation to the preceding one, and *doch* more appropriate for JUSTIFY relations.

### 6. General discussion

The aim of this work is to shed light on modal particles from a new perspective and to analyze how these different types of pragmatic information interact with each other. The results from the corpus study already indicated that there is an interaction between certain discourse relations and the use of modal particles, but this finding could not be generalized. The lexical choice task, however, proves that speakers really are sensitive to discourse relations, and also to the way the relations were implemented in the experimental materials used here. Moreover, the results show that speakers consider different modal particles more appropriate for certain relations than for others. This is remarkable as not only *ja* and *doch* are very similar and can be interchanged without resulting unacceptability, but also the function of BACKGROUND and JUSTIFY may overlap. Still, the participants showed a significant preference for *ja* in BACKGROUND and *doch* in JUSTIFY. These findings also strengthen the entitlement of discourse relations as a category of linguistic interest.

The results show that there are different explanations for the interaction of modal particles with certain discourse relations. Some of them can be explained with the semantics of the particle which just matches the function of the relation (e.g. *ja*'s occurrence in BACKGROUND). Other correlations are due to the particle's occurrence in specific sentence types (e.g. *doch* in imperatives and therefore in the MOTIVATION relation) and some can only be explained when assuming that speakers use particles in a manipulative way to strengthen their arguments. Speakers use the modal particles' meaning to make their argument in a discourse appear uncontroversial. Interpreted within a theory of common ground, I claim that modal particles can be used to steer how the addressee handles incoming information. While it is partly their semantics that makes particles incompatible with certain discourse relations, it is this pragmatic effect which explains the rather unexpected preferences observed in the corpus study, e.g. *doch* in JUSTIFY or EVIDENCE.

### 7. Summary

So far, there is hardly any empirical research on modal particles or discourse structure. Modal particles have mainly been discussed on the basis of intuition data and within sentence boundaries. The present study offers new quantitative evidence. It revealed that a more fine-grained analysis of discourse structure enables us to gain better insight into the specific function of modal particles. The preference of speakers for *ja* and *doch* in discourse moves like JUSTIFY or EVIDENCE, which *prima facie* do not follow straightforwardly from a purely semantic account, can receive an intuitive explanation when the function of modal particles is analyzed with respect to their role in common ground management. It was shown that speakers exploit the particles' function to make their point indisputable. Thus, modal particles are used as devices that a speaker can employ to advise, and even to 'urge' an addressee to file incoming information in a certain way, to retrieve that information from common ground, and/or to highlight potential conversational crises. A detailed investigation of the use of modal particles in specific discourse relations therefore proves to be a very promising method to broaden our knowledge about these particles. It not only gives rise to conclusions on the adequacy of the proposed semantic accounts, but it also allows us take a first step in relating detailed accounts of textual coherence to theories of common ground management.

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## **Acoustic and perceptual parameters of voice quality relating to sagittal postural alignment:**

A study of the preliminary results of normal and dysphonic Portuguese speakers

Débora Franco

The characterization of a speaker's vocal quality can permit the identification of his particular phonetic settings and the use of his anatomic mechanism. I discovered by examining a corpus of European Portuguese that production and perception is significantly influenced by spine posture: fundamental frequency for all evaluated vocal behaviors, formants, roughness and grade of vocal alteration for vowels, and asthenia parameter for sequential speech, especially in the normal speakers group. The patterns of sagittal posture of the spine represent extra-linguistic characteristics that can supply essential information to characterize the individuality of vocal quality. They are essential in the study of dysphonia.

### *1. Introduction*

The study of phonetics has always given particular attention to the study of similarities within a language, which are fundamental to the description of phenomena and in the characterization of normative and distinctive patterns (Laver 1980; Guimarães 2007). Recently, particular interest has been shown in the study of phonetic features that do not alter the linguistic segment. These features are called phonetic settings and can differentiate and discriminate speakers (Laver 1980). This is a field of particular interest, for example, for the area of voice disorders and Forensic Phonetics (Hollien et al. 2014). This article is concerned with the anatomic feature of a speaker and not with his voluntarily-changeable body posture. Besides the common knowledge that body posture has an effect on speech production, few authors have described which voice parameters are modified when body posture is altered, and more specifically, the posture of the spine. My clinical experience in voice disorders or dysphonia rehabilitation has allowed me to observe that many of these patients complain of spinal pain. However, effects of posture alterations on voice quality are under-researched. In my opinion, an understanding of the association between voice quality and spinal posture can contribute to particular treatment strategies. This is my main reason for studying the effects of spinal posture on voice quality.

The semiotic function of communication can be better understood by considering the study of speech and vocal quality (Laver 1980). Voice quality is the result of a set of features constantly present in the speech production of a particular person (Abercrombie 1967; Laver 1980). This study results in an important contribution to the characterization of a community and a language.

European Portuguese (EP) has its own sonorous characteristics, segmental (linguistic sound system) and suprasegmental (prosodic and paralinguistic aspects), that can be recognized by analyzing phonetic, articulatory, acoustic and perceptual properties (Mateus et al. 2003; Sim-Sim 1998). "When humans talk, they act voluntarily and involuntarily, making language combinations and thus evidencing the particular use each makes of his code, which in turn enables us to appreciate the anatomical and physiological mechanism used for its expression" (Susanibar et al. 2013:326).

Speech activities involve several variations of the air flow manipulations in the glottis, velum, jaw, tongue and lips. The resulting acoustic signal is made both intentionally and involuntarily by the speaker (Löfqvist 1999). Voice quality is a major vehicle of information about the physical, psychological and social characteristics of the speaker (Laver 1980). It is "the characteristic auditory colouring of an individual speaker's voice, and not in the narrower sense of the quality deriving solely from laryngeal activity" (Laver 1980:1). For this study, voice quality will be defined as an audible sound, produced in the larynx, which conveys information about the anatomical characteristics of the speaker and of the phonetic settings which were used.

Vocal variations may be related to segmental or suprasegmental elements of the linguistic code. The variations found in the suprasegmental level go far beyond simply fundamental frequency and amplitude. Although the communicative function of certain vocal qualities tends to be universal, in many cases it is culturally determined (Ní & Gobl 1999). There are also phonetic properties of the acoustic signal with a sociolinguistic function that reflect social and geographical characteristics of dialect (Ní & Gobl, 1999). Apart from these, there are the biological properties of the speaker, such as sex and age (Löfqvist 1999). In this case, physical properties of the vocal apparatus play a role, particularly its size, configuration and muscle tone. The voices of men, women and children mostly reflect anatomical differences, although the intrinsic anatomy can be enhanced or depleted depending on the socio-cultural context (Ní & Gobl 1999). Voice quality is also affected by physical and psychological pathologies, as is documented by several researchers (Scherer 1987; Pribuisiene et al. 2006; Dogan et al. 2007). This condition seems to have a decisive role in vocal quality.

In addition to the linguistic and non-linguistic factors mentioned, voice quality also carries exclusive personal information and plays an important role in the identification and differentiation of speakers (Kuwabara & Sagisaka 1995; Ní & Gobl 1999). Kuwabara and Sagisaka (1995) characterize this information, including the sociolinguistic characteristics and psychological factors of vocal individuality, as software which can be programmable.

Paralinguistic, sociolinguistic and extralinguistic features constitute a background for the perceptual prominence of the linguistic articulation (Laver & Trudgill 1979; Laver 1980; Ní & Gobl 1999). The present study focuses on the extralinguistic aspects of voice quality which, by definition, are impossible for the speaker to control and consequently have no possibility of influencing the linguistic meaning (Laver & Trudgill 1979; Kuwabara & Sagisaka 1995). Kuwabara and Sagisaka (1995) called it hardware. The non-linguistic or extra-linguistic information, such as voice quality and speaking style, is essential to recognize and understand speech, as well as the communicative interaction between people. Vocal individuality allows

the identification of the person with whom we are interacting, but mainly because it enriches us with diversity (Kuwabara & Sagisaka 1995).

For a complete understanding of voice quality and obviously vocal pathologies, their etiology should be delicately analyzed. Understanding the characteristics of voice quality and the concept of normality applied to the human voice, allows us to develop bio-markers for dysphonia, which can enable us to plan future prevention activities of dysphonia. Clinical experience in the field of voice disorders or dysphonia has suggested abnormal laryngeal posture due to muscle adaptive changes. Researchers suggested that dysphonia is a result of various factors: poor postural habits, hypertonicity associated with psychological states, personality and other associated diseases, neuromuscular abnormalities, and organic lesions such as nodules, polyps, cysts and tumors (Morrison 1997; Van Houtte et al. 2011). Therefore, the dynamic nature of voice production does not require a unique method of voice quality assessment.

Bad posture is unhealthy because it is not balanced or efficient, resulting in postural perturbation (Mosculino 2008). This results in muscle weakness and adaptive lengthening, degenerative changes, pain, deformity, compensation, limitation of motion, decreased vital capacity, changes in sustentative and protective physiological functions, and instability (Jacques 2002). The existence of voice quality measurements sensible to posture alterations are unknown.

Acoustic analysis is fundamental in order to characterize the extra-linguistic influence in the production of a particular speaker. Acoustic assessment aims to quantify and characterize the sonorous signal (Teles & Rosinha 2008). It is of particular importance because it is assumed as a noninvasive instrument and has the ability to provide quantitative data (Jamieson & Parsa 2001; Eadie & Doyle 2005).

Several acoustic measures have been used in clinical practice to evaluate vocal production. For this purpose, sustained vowels and sequential speech are the vocal behaviors analyzed, as described in the literature (Zraick et al. 2005; Parsa & Jamieson 2001). Acoustic analysis based on sustained vowels has some advantages: the context of acquisition is controlled, facilitating the perception and the reliability of the analysis (Parsa & Jamieson 2001; Santos 2009). On the other hand, the dynamic function of laryngeal muscles is more complex in sequential speech production compared to the sustained vowels (Santos 2009). The assessment of vocal behavior in reading and conversation is fundamental.

Vocal behavior can be characterized by quality parameters which are strictly spectral (measures of perturbation and noise) or dynamic auditory parameters (Laver & Trudgill 1979). In the following methodology section, these aspects will be presented and clarified.

The voice is a medium that allows oral communication and thus it is understandable that listeners would be able to distinguish differences in the quality of a speaker's voice, especially if the speaker requires a good vocal performance for his occupation (Guimarães 2007). The judgment of the listener is also influenced by the physical characteristics of the speaker, which are invariant and involuntary (Laver & Trudgill 1979). However, studies of the subjective evaluation of the vocal quality of a particular person are scarce.

The term perceptual evaluation is recommended by the Voice Committee of the International Association of Logopedics and Phoniatrics (IALP) (Bless & Baken 1992). It is a comparison made by the listener between the number of qualities that he can hear in the voice of the speaker and those that for him should be considered as normal (Fex 1992).

For Teles and Rosinha (2008), this kind of evaluation has an impressionistic character when considering the vocal quality of the individual. The lack of a universal definition for standard voice quality influences how different evaluators judge voice, based on structural,

functional criteria, aesthetic, linguistic or other factors (Fex 1992). Although voice can be evaluated in an objective manner, as will be addressed below, the importance of perceptual evaluation remains. Perceptually, there are several scales for assessing voice: one focuses on the glottal source, the other essentially on evaluating the modeling of this signal at the level of the filters.

The understanding of the influence of body composition and body posture from the perspective of the variation of voice quality is still incipient. This work focuses on the analysis of the production and perception of segments of EP, in order to describe the speaker's own influences on his vocal quality, as well as to achieve a deeper knowledge of the phonetic variation of EP through the study of extra-linguistic variability.

The aim of this study was (1) to verify if there were significant differences in sagittal postural alignment between normal and dysphonic EP speakers, and (2) to verify effects on perceptual or acoustic parameters related to sagittal spine posture variables, namely *thoracic length curvature (TL)*, *lumbar length curvature (LL)*, and *kyphosis index (KI)*.

## 2. Methodology

### 2.1. Participants

Seventy-four individuals, 35 males (47.30%) and 39 females (52.70%) participated. Individuals were in the age group 20 to 50, speak EP as their first language, had no functional respiratory changes and gave their free and informed consent.

Exclusion criteria for the establishment of this sample were the following: presence of musculoskeletal pathology, craniofacial malformations, orthopedic trauma, spirometry changes, neurological disease, scarring resulting in head surgery, radiotherapy or other traumas and history of laryngeal surgery.

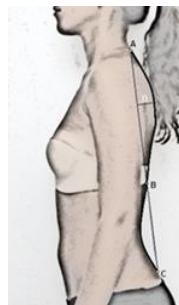
### 2.2. Data collection

The procedures for the formation of the corpus occurred in the Department of Otolaryngology, Speech and Communication Disorders, Hospital Santa Maria, Faculty of Medicine, University of Lisbon. Ninety-one potential participants were first assessed to determine eligibility for the collection of the corpus. For this purpose, they underwent a structured interview and a spirometry. Next, the speakers were subject to a postural assessment and a voice quality evaluation. The latter consisted of three phases: (a) ear, nose and throat assessment to evaluate anatomo-physiology of the vocal tract, (b) acoustic analysis to evaluate the voice quality production, and (c) evaluation of voice quality perception.

#### *Postural assessment*

For the body posture analysis, profile photographs were obtained using a digital camera (Sony Cyber-Shot DSC – W350, Sony Corporation, Tokyo, Japan), keeping the same distance for each of the speakers. For this purpose, the clothes covering the back of the body were removed so as to allow accurate identification of anatomical references and subsequent determination of the variables. Removal of footwear for consistent standing posture was also requested. During the procedures, subjects were instructed to remain in an upright position and with a natural posture (Fedorak et al. 2003; Roussouly & Nnadi 2010; Quek et al. 2013).

Additionally, Digimizer program – MedCalc Software Ltd (Ostend, Belgium) allowed treatment of the photographs. For analysis we considered the Flexicurve methodology (MacIntyre et al. 2011). Anatomical landmarks for the determination of each of the three postural variables analyzed are shown in Figure 1. The variables of sagittal spinal posture were: *thoracic length curvature (TL)*, *lumbar length curvature (LL)*, both in centimeters (cm), and *kyphotic index (KI)*. This index was calculated using the equation = thoracic width (TW) / TL × 100. All measurements were taken by a physiotherapist with experience in assessing the function of the spine.



*Figure 1: Representation of anatomical sites considered for the determination of the postural variables: the C7 vertebra (A), the inflection point between the thoracic spine and lumbar spine (B) and the space between L5 and S1 (C) vertebrae. Postural variables are: thoracic length curvature (distance between A and B), lumbar length curvature (distance between B and C) and kyphotic index (thoracic width (D) / TL × 100) (Franco et al. 2014).*

#### *Evaluation of dysphonia*

The ear, nose and throat assessment, through the nasoendoscopy exam, as well as, perception and production evaluation were used in a complementary way. This allowed the speakers to be categorized according to their voice quality: normal and dysphonic speakers. In this study, subjects were classified as normal or dysphonic speakers according to the methodology described by Guimarães and Abberton (2005). Specifically, a subject with vocal disorders or dysphonia was one with: (1) vocal complaints for more than 15 days, (2) evidence of structural lesion and/or (3) alterations in laryngeal dynamics that were reflected perceptually and acoustically. If a speaker experienced two or more of the aforementioned conditions, he/she was classified as dysphonic (Franco et al. 2014).

Laryngeal inspection was made by the ENT surgeon following a nasoendoscopic exam. The nasoendoscopy was used to obtain the most natural speech behavior and it also allowed the assessment of the upper airways, crucial for voice quality (Franco et al. 2014).

The reference values of perceptive and acoustic measures – grade component of the GRBAS scale (Hirano 1981), f0, jitter, intensity, shimmer and HNR – used to decide the diagnosis were in accordance with Hirano (1981), Guimarães and Abberton (2005), Behlau et al. (2001), Mendes and Castro (2005). As reported in the literature, jitter, shimmer and “noise” variables are the acoustic measures most commonly correlated to perceptual measures (Yiu et al. 2000). Butha et al. (2004) reported “noise” as being the perceived acoustical quality of the dysphonic voice. Furthermore, and according to Ortega et al. (2009), the negative predictive value of acoustic and perceptual assessment is very high, especially if tests are used together.

The normal speakers group consisted of 41 subjects (22 male and 19 female) with a mean age of  $31.02 \pm 9.54$  years. The dysphonic speakers group consisted of 33 subjects (13 male and 20 female) with a mean age of  $33.36 \pm 10.94$  years.

### *Evaluation of production*

The corpus was collected in a Faraday cabin, in audio format through a Marantz PMD660 recorder (Kanagawa, Japan), in mono, with a sampling frequency of 44,100 Hz. Speakers wore a unidirectional Beyerdynamic head-set, positioned laterally to the mouth while maintaining a constant distance of 5 cm. The obtained files were recorded in non-compressed format (PCM/wav).

Three corpora of five vocal behaviors (15 corpora) are part of the corpus analyzed for each of the speakers. The vocal behaviors analyzed were: the sustained production of EP vowels [u], [i], [a], corresponding to the extreme positions of the vowel triangle; a conversation about the image "Cookie Theft Picture" (Goodglass & Kaplan 1972), and a reading of the Portuguese version of the text "The story of Arthur mouse" (Guimarães 2002). In order to analyze production and perception of these EP segments, I proceeded with an acoustical and perceptive assessment of the corpus, as explained below.

Parameter	Characterization
	<p><i>F0</i> is dependent on:</p> <ul style="list-style-type: none"> <li>• Age and sex (Guimarães &amp; Abberton 2005; Baken &amp; Orlikoff 2000; Russel et al. 1995; Andrews 2006; Sussman &amp; Sapienza 1994),</li> <li>• Vocal behavior (Guimarães &amp; Abberton 2005; Russel et al. 1995; Baken &amp; Orlikoff 2000),</li> <li>• Vocal disorder or dysphonia (Klingholtz 1990; Murry et al. 1995; Guimarães &amp; Abberton 2005).</li> </ul>
Vocal dynamic measures	<p><i>F1, F2, F3 and F4</i>:</p> <ul style="list-style-type: none"> <li>• The descent of the larynx in men results in lower formants and lower formant dispersion (Fitch &amp; Giedd 1999),</li> <li>• There is evidence associating body size (height and weight), the size of the vocal tract and formants in men and women (Fitch &amp; Giedd 1999).</li> </ul> <p><i>Intensity</i>:</p> <ul style="list-style-type: none"> <li>• It relates directly to the subglottic pressure, resistance to the pressure of the vocal folds and the vocal tract configuration (Guimarães 2007).</li> </ul>
Vocal perturbation measures	<p><i>Jitter</i></p> <ul style="list-style-type: none"> <li>• A small degree of involuntary variability is acceptable, associated with neurological, emotional and biomechanical factors (Brockmann et al. 2011; Guimarães 2007), namely:</li> <li>• Coupling of the glottic and supraglottic region, affecting the dynamics of acoustic pressure; distribution of mucus during vibration; composition and asymmetry of the vocal cord; failure to maintain the contraction of the vocal musculature.</li> </ul> <p><i>Shimmer</i></p> <ul style="list-style-type: none"> <li>• It is the quantification of minor changes in signal amplitude (Guimarães 2007).</li> </ul> <p><i>Harmonic to Noise Ratio (HNR)</i>:</p> <ul style="list-style-type: none"> <li>• It relates the harmonic component versus the noise component of the acoustic wave (Guimarães 2007);</li> <li>• Important in the analysis of pathological voice.</li> </ul>
Spectral noise measures	

*Table 1: Characterization of each acoustical parameter considered in the assessment of production.*

Analysis of the utterances was made with the Praat 5.3.23 software (Boersma & Weenink 2010). The acoustic measurements were automatically processed based on the selection of a signal portion, corresponding to average values. I selected approximately 1.5 seconds of the signal, a medial zone, as it represents a sample with greater stability. In sequential speech all the utterances produced were considered, including short silences.

The variables considered for the production analysis were characterized in Table 1. The vocal dynamics measures were: *fundamental frequency (f0)*, *range of fundamental frequency (f0 range)*, *first formant (F1)*, *second formant (F2)*, *third formant (F3)*, *fourth formant (F4)*, *intensity*. Vocal perturbation measures were: *jitter*, *shimmer*. Finally, the only measure of spectral noise considered was: *Harmonic to Noise Ratio (HNR)*. In this research *jitter*, *shimmer*, and *HNR* variables were not considered in the corpus of sequential speech (Guimarães 2002, 2007).

#### *Evaluation of perception*

Perceptually, the voice quality was judged in relation to the glottal source (laryngeal signal), with the use of the scale GIRBAS. The GRBAS was developed by the Japanese Society of Speech therapy (Hirano 1981). GRBAS is the most known perceptual scale. It is used throughout the world for clinical and research purposes (Bhuta et al. 2004). Subsequently it was modified to include one more evaluative parameter, resulting in the new acronym GIRBAS (Piccirillo et al. 1998; Teles & Rosinha 2008; Gramuglia et al. 2013).

The GIRBAS acronym is composed of the initial grapheme of the various evaluated parameters: *G*, *Grade* or degree of vocal disorder; *I*, *Instability*; *R*, *Roughness*; *B*, *Breathiness*; *A*, *Asthenia*; *S*, *Strain* (Hirano, 1981). Each of the parameters is defined in Table 2, according to Behlau et al. (2001). These parameters are ranked in an ordinal scale of severity, with values that can vary from 0 to 3: 0 = normal voice or absence of disorder; 1 = mild disorder or in case of doubt the existence of alterations; 2 = moderate disorder; 3 = severe disorder (Hirano 1981).

Parameter	Characterization
G	<i>Grade of voice disorder</i> : overall impression of the voice, voice impact on the listener, the overall perception of the spectrum envelope, the source and filters; identifies the degree of voice changes as a whole.
I	<i>Instability</i> : fluctuation in pitch and / or voice quality.
R	<i>Roughness</i> : irregularity in the vibration of the vocal folds, indicating the sense of roughness on the issue.
B	<i>Breathiness</i> : audible turbulence such as a hiss, air leak at the glottis, a feeling of air in the voice.
A	<i>Asthenia</i> : vocal weakness, loss of power, reduced vocal energy, poorly defined harmonics.
S	<i>Strain or Stress</i> : Impression of hyperfunctional state, acute frequency, noise in the high frequencies of the spectrum and marked treble harmonics.

Table 2: Characterization of each of the parameters considered in the GIRBAS scale (Behlau et al. 2001).

#### 2.3. Statistical data analysis

Data was analyzed using SPSS Statistics 20 software (SPSS Corporation, Chicago, IL) and the statistical significance level was set at 5%.

Descriptive statistics measures were used to characterize the study sample: means and standard deviations (SD) for continuous variables; frequencies and percentages for categorical variables. Two-way analyses of variances (ANOVAs) were applied to evaluate the effect of dysphonia, sex, and sex  $\times$  dysphonia interaction, on the mean of each dependent variable (TL, LL and KI). The two-way ANOVA assumptions of normality and homogeneity of variance were assessed using the Shapiro-Wilk test and the Levene's test respectively.

Additionally, to explore relationships between postural variables and the variables of production and perception of voice quality the following tests were used: Pearson tests for continuous variables, Spearman tests for continuous and ordinal variables, and chi-square tests for continuous variables and nominals.

### 3. Results

The descriptive characteristics of demographic variables are summarized in Table 3, for both sexes. Three descriptive measures of sagittal spine variables (*TL*, *LL*, *KI*), according to dysphonia and sex, are presented in Table 4. *TL* and *LL* variables were measured in cm. Subsequently, the results of production and perception of vocal quality, respectively, are presented in Tables 5, 6, 7, 8, 9, 10, 11, 12, 13 and 14.

		Male		Female	
		n (%)	Mean (SD)	n (%)	Mean (SD)
Sex		35 (47.30)		39 (52.70)	
Age (years)			32.43 (9.94)		31.74 (10.52)
Height (cm)			174.65 (6.65)		158.89 (17.13)
Mass (kg)			74.40 (13.43)		59.78 (11.66)
Education level	Middle school	6 (17.14)		3 (7.69)	
	High school	18 (51.43)		19 (48.72)	
	College	11 (31.43)		17 (43.59)	
Dental characterization	Without alteration	32 (91.43)		28 (71.79)	
	Orthodontic braces	0 (0.00)		3 (7.69)	
	Orthodontic retainers	1 (2.86)		1 (2.56)	
	Dental prothesis	2 (5.71)		7 (17.95)	
Smoker	No	20 (57.14)		32 (82.05)	
	Yes	15 (42.86)		7 (17.95)	

Table 3: Descriptive measures of demographic variables of speakers according to sex ( $N = 74$ ).

		Male			Female		
		n (%)	Min/max	Mean (SD)	n (%)	Min/max	Mean (SD)
TL (cm)	Normal speakers	22 (62.86)	41.27/63.71	50.35 (5.90)	19 (48.72)	26.33/42.22	36.48 (4.20)
	Dysphonic speakers	13 (37.14)	45.22/61.71	52.49 (5.05)	20 (51.28)	30.64/47.23	39.70 (5.68)
	Total	35 (47.23)	41.27/63.71	51.15 (5.62)	39 (52.70)	26.33/47.23	38.13 (5.21)
LL (cm)	Normal speakers	22 (62.86)	0.00/18.80	10.09 (6.01)	19 (48.72)	8.66/22.28	15.69 (4.31)
	Dysphonic speakers	13 (37.14)	0.00/12.57	7.54 (4.69)	20 (51.28)	6.05/20.95	15.07 (4.32)
	Total	35 (47.23)	0.00/12.57	9.14 (5.63)	39 (52.70)	6.05/22.28	15.37 (4.27)
KI	Normal speakers	22 (62.86)	10.85/17.39	14.42 (2.00)	19 (48.72)	10.44/17.57	14.09 (2.14)
	Dysphonic speakers	13 (37.14)	12.34/18.76	15.41 (1.73)	20 (51.28)	12.50/19.43	15.17 (1.97)
	Total	35 (47.23)	10.85/18.76	14.79 (1.94)	39 (52.70)	10.44/19.43	14.65 (2.10)

Table 4: Descriptive measures of sagittal spine variables (TL, thoracic length curvature; LL, lumbar length curvature; KI, kyphosis index) for normal and dysphonic speakers, according to sex.

Concerning the *TL* variable, the two-way ANOVA yielded a significant main effect of sex ( $F(1,70) = 112.43$ ,  $p < .001$ ;  $\eta^2_p = 0.616$ , large effect), the mean *TL* being higher for men ( $M = 51.15$ ,  $SD = 5.62$ ) than for women ( $M = 38.13$ ,  $SD = 5.21$ ) and a significant main effect of dysphonia ( $F(1,70) = 4.55$ ,  $p = .036$ ;  $\eta^2_p = 0.061$ , medium effect), the mean *TL* being higher for dysphonic speakers ( $M = 44.74$ ,  $SD = 8.31$ ) than for normal speakers ( $M = 43.92$ ,  $SD = 8.67$ ); there was a non-significant sex  $\times$  dysphonia interaction ( $F(1,70) = 0.18$ ,  $p = .670$ ; obs. power = .071).

For the *LL* variable, the two-way ANOVA revealed a significant main effect of sex ( $F(1,70) = 31.41$ ,  $p < .001$ ;  $\eta^2_p = 0.310$ , large effect), the mean *LL* being higher for women ( $M = 15.37$ ,  $SD = 4.27$ ) than for men ( $M = 9.14$ ,  $SD = 5.63$ ); the dysphonia ( $F(1,70) = 1.83$ ,  $p = .181$ ; obs. power = .266) and the sex  $\times$  dysphonia interaction ( $F(1,70) = 0.18$ ,  $p = .670$ ; obs. power = .128) did not have a significant effect on the mean of the *LL*.

Regarding the *KI*, the two-way ANOVA indicated a significant main effect of dysphonia ( $F(1,70) = 4.85$ ,  $p = .031$ ;  $\eta^2_p = 0.065$ , medium effect), the mean *KI* being higher for dysphonic speakers ( $M = 15.27$ ,  $SD = 1.85$ ) than for normal speakers ( $M = 14.27$ ,  $SD = 2.04$ ); sex ( $F(1,70) = 0.37$ ,  $p = .547$ ; obs. power = .092) and the sex  $\times$  dysphonia interaction ( $F(1,70) = 0.01$ ,  $p = .921$ ; obs. power = .051) did not have a significant effect on the mean of the *KI*.

### 3.1. Results for the production

The results of a statistically significant relationship between postural variables and production variables in terms of voice (acoustic measures) are presented in Tables 5, 6, 7, 8 and 9 for each vocal behavior evaluated.

		TL	LL	KI
Normal Speakers	F0	r = -0.764, p < .01**	r = 0.487, p < .01**	-
	F0 SD	-	-	-
	F1	r = -0.639, p < .01**	r = 0.373, p < .05*	-
	F2	r = -0.634, p < .01**	r = 0.397, p < .05*	-
	F3	r = -0.509, p < .01**	r = 0.366, p < .05*	-
	F4	r = -0.371, p < .05*	-	-
	Intensity	-	-	-
	Jitter	-	-	-
	Shimmer	r = 0.318, p < .05*	-	-
Dysphonic speakers	HNR	-	-	-
	F0	r = -0.655, p < .01**	r = 0.654, p < .01**	-
	F0 SD	-	-	-
	F1	-	-	-
	F2	r = -0.407, p < .05*	r = 0.465, p < .01**	-
	F3	r = -0.397, p < .05*	-	-
	F4	-	-	-
	Intensity	-	-	-
	Jitter	-	-	-
Dysphonic speakers	Shimmer	-	-	-
	HNR	-	r = 0.394, p < .05*	-

Table 5: Significant correlations between postural and production variables for the segment [a] (\*\*p < 0.01, \*p < 0.05).

There are significant and strong relationships at two levels (p < 0.01, p < 0.05), for TL and LL variables. On the other hand, the KI variable does not result in any measurable difference in production, whether for vowel segments [a], [i] and [u] or in the behaviors of sequential speech.

		TL	LL	KI
Normal Speakers	F0	r = -0.708, p < .01**	r = 0.501, p < .01**	-
	F0 SD	-	-	-
	F1	-	-	-
	F2	-	-	-
	F3	r = -0.409, p < .01**	r = 0.422, p < .01**	-
	F4	-	-	-
	Intensity	-	-	-
	Jitter	-	-	-
	Shimmer	r = 0.318, p < .05*	-	-
Dysphonic speakers	HNR	-	-	-
	F0	r = -0.601, p < .01**	r = 0.519, p < .01**	-
	F0 SD	r = -0.402, p < .05*	r = 0.421, p < .05*	-
	F1	-	-	-
	F2	-	-	-
	F3	-	-	-
	F4	r = -0.406, p < .05*	r = 0.474, p < .01**	-
	Intensity	-	-	-
	Jitter	-	-	-
Dysphonic speakers	Shimmer	-	-	-
	HNR	-	r = 0.394, p < .05*	-

Table 6: Significant correlations between postural and production variables for the segment [i] (\*\*p < 0.01, \*p < 0.05).

	TL	LL	KI
Normal Speakers	F0 r = -0.734, p < .01**	r = 0.493, p < .01**	-
	F0 SD r = -0.468, p < .01**	-	-
	F1 r = -0.494, p < .01**	r = 0.347, p < .05*	-
	F2 -	-	-
	F3 r = -0.629, p < .01**	r = 0.524, p < .01**	-
	F4 r = -0.340, p < .05*	-	-
	Intensity -	-	-
	Jitter -	-	-
	Shimmer -	-	-
Dysphonic speakers	HNR -	-	r = .338, p < .05*
	F0 r = -0.659, p < .01**	r = 0.566, p < .01**	-
	F0 SD -	-	-
	F1 -	r = -352, p < .05*	-
	F2 -	-	-
	F3 -	-	-
	F4 -	-	-
	Intensity -	-	-
	Jitter -	-	-
	Shimmer -	-	-
	HNR -	-	-

Table 7: Correlation between postural variables and production variables for the segment [u] (\*\*p <0.01, \*p <0.05).

	TL	LL	KI
Normal Speakers	F0 r = -0.781, p < .01**	r = 0.525, p < .01**	-
	F0 SD r = -0.474, p < .01**	r = 0.456, p < .01**	-
	Intensity -	-	-
Dysphonic speakers	F0 r = -0.685, p < .01**	r = 0.692, p < .01**	-
	F0 SD r = -0.359, p < .05*	r = 0.487, p < .01**	-
	Intensity -	-	-

Table 8: Significant correlations between postural and production variables, for reading behavior (\*\*p <0.01, \*p <0.05).

	TL	LL	KI
Normal Speakers	F0 r = -0.712, p < .01**	r = 0.422, p < .01**	-
	F0 SD r = -0.323, p < .05*	-	-
	Intensity -	-	-
Dysphonic speakers	F0 r = -0.673, p < .01**	r = 0.679, p < .01**	-
	F0 SD r = -0.545, p < .01**	r = 0.736, p < .01**	-
	Intensity -	-	-

Table 9: Significant correlations between postural variables and production variables, for conversation behavior (\*\*p <0.01, \*p <0.05).

### 3.2. Results for the perception

The results of the existing working relationships between the postural variables and perceptual variables are presented in Tables 10, 11, 12, 13 and 14, for the GIRBAS scale in accordance with the vocal behavior performed.

As noted above, it again appears that the *KI* had no effect on perception parameters of *GIRBAS*.

		TL	LL	KI
Normal Speakers	Grade	$r_s = 0.405, p < .01^{**}$	$r_s = -0.426, p < .01^{**}$	-
	Instability	-	-	-
	Roughness	$r_s = 0.666, p < .01^{**}$	$r_s = -0.498, p < .01^{**}$	-
	Breathiness	$r_s = -0.400, p < .01^{**}$	-	-
	Aestheny	-	-	-
	Strain	-	-	-
Dysphonic Speakers	Grade	-	$r = -0.369, p < .05^*$	-
	Instability	-	-	-
	Roughness	-	-	-
	Breathiness	-	-	-
	Aestheny	-	-	-
	Strain	-	-	-

Table 10: Significant correlations between postural and perceptual variables for the segment [a] ( $^{**}p < 0.01$ ,  $^*p < 0.05$ ).

		TL	LL	KI
Normal Speakers	Grade	-	-	-
	Instability	-	-	$r_s = 0.355, p < .05^*$
	Roughness	$r_s = 0.501, p < .01^{**}$	$r_s = -0.453, p < .01^{**}$	-
	Breathiness	$r_s = -0.340, p < .05^*$	-	-
	Aestheny	$r_s = -0.333, p < .05^*$	-	-
	Strain	-	-	-
Dysphonic Speakers	Grade	-	-	-
	Instability	-	-	-
	Roughness	$r_s = 0.415, p < .05^*$	$r_s = -0.464, p < .01^{**}$	-
	Breathiness	-	-	-
	Aestheny	-	-	-
	Strain	-	-	-

Table 11: Significant correlations between postural and perceptual variables for the segment [i] ( $^{**}p < 0.01$ ,  $^*p < 0.05$ ).

	TL	LL	KI
Normal Speakers	Grade	-	-
	Instability	-	-
	Roughness	$r_s = 0.386, p < .05^*$	-
	Breathiness	-	-
	Aestheny	-	$r_s = 0.330, p < .05^*$
	Strain	-	-
Dysphonic Speakers	Grade	-	-
	Instability	-	-
	Roughness	$r_s = 0.351, p < .05^*$	-
	Breathiness	-	-
	Aestheny	-	-
	Strain	-	-

Table 12: Significant correlations between postural and perceptual variables for the segment [u] (\*\*p < 0.01, \*p < 0.05).

	TL	LL	KI
Normal Speakers	Grade	-	-
	Instability	-	-
	Roughness	$r_s = 0.367, p < .05$	$r_s = -0.314, p < .05$
	Breathiness	$r_s = -0.397, p < .05$	-
	Aestheny	$r_s = -0.390, p < .05$	-
	Strain	-	-
Dysphonic Speakers	Grade	-	-
	Instability	-	-
	Roughness	-	-
	Breathiness	-	-
	Aestheny	-	-
	Strain	-	-

Table 13: Significant correlations between postural and perceptual variables for reading behavior (\*\*p < 0.01, \*p < 0.05).

	TL	LL	KI
Normal Speakers	Grade	-	-
	Instability	-	-
	Roughness	-	-
	Breathiness	$r_s = -0.390, p < .05$	$r_s = 0.310, p < .05$
	Aestheny	$r_s = -0.403, p < .01$	-
	Strain	-	-
Dysphonic Speakers	Grade	-	-
	Instability	-	-
	Roughness	-	-
	Breathiness	-	-
	Aestheny	-	$r_s = -0.365, p < .05$
	Strain	-	-

Table 14: Significant correlations between postural and perceptual variables for conversation behavior (\*\*p < 0.01, \*p < 0.05).

#### 4. Discussion

The data analyzed in this paper suggests that the physical characteristics of the speaker have an influence on voice quality, considering the production and also the perception of voice quality. This statement is supported by the fact that strong and statistically significant correlations were obtained for especially two of the three postural variables considered: *TL* and *LL*. The nature of these correlations, generally positive in one case and negative in the other, are sustained by the fact that the normal configuration of the spine has two lordotic curvatures and one kyphotic curvature between them. This pattern is considered normal if it involves a balanced distribution of forces and thus *TL* and *LL* generally behave in an antagonistic way. However, in this study I only considered one lordotic curvature (namely, *LL*).

The spinal curvatures effectively alter the properties of the phonetics produced and perceived segments. Concerning the study of acoustic variables and sagittal spine posture, I could see that *f0* and formant variables of vowel [a] have a very strong and a strong relationship with *TL* and *LL* respectively, especially for the *TL* variable and for the normal speakers group. In the case of *TL*, there are negative correlations with these acoustic variables, in other words, the higher *f0* or formant values, the lower *TL*. Obviously in the case of *LL* there are positive correlations, as could be expected, concerning the spine alignment.

For vowel [i] the same trend can be observed. Interestingly, *HNR* has a positive relationship with *TL* in the dysphonic group, for both vowel [i] and vowel [a]. In other words, the higher the *HNR* value, the higher the *LL*.

For vowel [u], there seems to be a stronger negative correlation between production variables and *TL* in the normal group than in the group with dysphonia. A moderate positive relationship is showed between *f0*, *F1* and *F3*, in the case of dysphonic speakers, for *LL*. Again, the correlation is associated with the *f0* and also with some formants, particularly the *TL* variable. Interestingly, *HNR* seems to have a positive relationship with *KI* in the normal speakers group. No relationship is observed for *jitter* for the three vowel segments evaluated.

For reading and conversation behaviors, the same trend is observed. The acoustic properties of the segments are also affected by extralinguistic factors, for frequency variables. The lower the *TL*, the higher the *f0* and *f0 range*, especially in normal speakers. Additionally, the lower the *LL*, the lower the *f0* and *f0 range*. *Intensity* does not correlate with any spine posture variable, for sustained vowels and for sequential speech samples.

The results illustrate that the different muscle systems work inter-connectedly, thus providing further substantiation for the claim that spinal posture influences speech production. Objectively, what happens anatomically and physiologically to determine that the posture of the spine influences voice quality? The answer to this question points to the need for an analysis which takes into account the anatomical and physiological characteristics of the vocal tract and, more generally, the body. According to Behlau et al. (2001), the vertical axis between the cervical spine and the rest of the spine is the most important point of posture for speech. The muscle systems involved in speech activity are anatomically inter-connected and their cooperative actions have to be precisely and intricately coordinated in time (Laver & Trudgill 1979). When constant equilibrium is lost, more muscular compensations progressively develop, affecting spinal and laryngeal configuration (Lieberman 1998). For thoracic kyphosis, in cases with increased *TL*, the shoulders are in a rounded forward position, promoting increased muscle tension in the pectoral region and adaptive shortening of the abdominal and laryngeal muscles (Arboleda & Frederick 2006). The head assumes a position that projects the eyes to a downward gaze. A horizontal gaze is facilitated by the upper

cervical spine, which develops weakness in the anterior muscles of the neck (Rubin et al. 2007). In these cases, effects on the abdominal muscles can also be observed, impacting the inspiratory volume, restricting the descent of the diaphragm and the lateral expansion of the ribs. The airflow for vocalization is committed under this condition and can result in vocal fatigue and difficulty in the projection of the voice (Arboleda & Frederick 2006). In conclusion, the dynamic lung capacity, the breathing pattern, the characteristics and dynamics of vocal folds, the vocal performance, the composition and body posture, among other factors, being parts of a body, function as a gear or chain sprocket wheels in that they are all critical to the functioning of the speech system (Franco et al. 2014).

Acoustically, I conclude that  $f_0$  seems to be the measure that best reflects extralinguistic factors associated with the posture of the spine. On the other hand, perturbation measures (*jitter*, *shimmer*) and spectral noise variables (namely, *NHR*) have no clear relationship in various vocal behaviors. These results lead us to conclude that the degree of tension in the vocal folds is decisively influenced by the remaining body posture and not only by the configuration and position of the larynx.

Now looking at the results of the perception of voice quality, for the segment [a], I can observe a moderate positive relationship between the *grade* of alteration, *roughness* and *breathiness* and the *TL* in the non-dysphonic group. In the case of *LL*, there are moderate negative relationships for *grade* and *roughness* parameters. In other words, the higher the *grade* and *roughness* characteristics of the voice, the lower the *LL*. The existence of a greater number of correlations for the normal speakers group compared to dysphonic speakers is surprising.

For segment [i], the *TL* variable continues to be the most sensible postural variable for perceptual parameters. Also, *roughness* presents a correlation with *TL* and *LL* considering the two groups. In the case of segment [u], the same trend is observable, both for *TL* and for *roughness*. There also exists a moderate positive relationship between *KI* and *asthenia*.

For reading behavior, there only exists a relationship for the normal speakers group. A moderate negative relationship exists between *roughness* and *TL*. However, *breathiness* and *asthenia* have a moderate positive relationship for *TL*. On the other hand, *roughness* has a negative relationship with *LL*. In other words, the lower the *LL*, the lower the *roughness* parameter for normal speakers. No relationships exist between spine posture variables and perceptual variables.

In the case of conversation, a relationship exists between *breathiness* and *TL* and *LL*, for normal speakers. Additionally, the lower the *TL*, the higher the *breathiness* and *asthenia* parameters for normal speakers only. *Asthenia* has a moderate negative relationship with *KI* for dysphonic groups.

I concluded that the *roughness* parameter seems to be the one which suffers greater consequences of extralinguistic changes in the vowel segments evaluated. Again, considering the body anatomy and physiology, when a change in body posture occurs, muscular adaptations (with increasing degree of muscle tension) develop in the cervical spine and larynx. Consequently, there is greater rigidity in the vocal folds, resulting in a pattern of rigid and harsh vibration.

The results obtained allow us to conclude that detailed analysis of vowels seems to provide more objective information about the parameters of perception compared with the sequential speech corpora.

In the case of the *TL* variable, the degree of voice disorder also appears to be significantly associated with the adaptive postural patterns developed. Considering the *breathiness* and *asthenia* parameters, it appears that these variables are influenced mainly by *TL*. These

variables are related to a pattern of incomplete glottal closure and may be explained by two distinct dynamics. Firstly, due to a pattern of muscular hypertension that leads to an increase in the rigidity of the vocal folds, preventing an appropriate glottal closure. On the other hand, speakers with reduced vocal resistance or voice crack (functional pattern, to a lesser extent, is typical in women but pathological in the case of the men) leads to incomplete glottal closure and an escape of excessive air during phonation. Whether in one case or the other, it is interesting to note that these aspects may be distinctive of the vocal quality of a particular speaker.

It is important to consider that the GIRBAS scale was developed to assess vocal pathology and, consequently, the extracted results limit the analysis that can be done regarding the perception of segments and utterances produced. Although a normal voice may be characterized by slight breathiness or slight hoarseness, this in many cases is due to other factors (for example, smoking habits). Therefore, it is important to apply another perceptual scale in future studies, so as to extract comparative data.

Considering the analysis of the data, I concluded that the production and perceptual properties of voice quality do not relate to the *KI* variable. Therefore, this characteristic of the speakers did not seem to have an impact on the phonetic settings for oral production.

This study verified that the same changes in the same segment in different people may have a different effect due to compensation relationships and interaction between different segments of the spine (Wang et al. 2012). Several researchers have reported that alterations in the muscular tension of the larynx appear to correlate with psychological factors and personality factors (Van Houtte et al. 2011). Accordingly, there seems to be a common pattern between speakers, useful in their identification, and which is also very important in the treatment of deviations and voice disorders.

The existence of a greater number of correlations for normal speakers compared to dysphonic speakers is surprising. In my opinion, a small sample size may be one of the reasons for this disparity. This limits the degree to which this sample can be considered representative of voice quality and morphological characteristics as well as perceptual characteristics of voice quality in the general population. Dysphonia studies highlight other pathologies frequently coexisting with voice pathologies, particularly gastroesophageal reflux and pharyngolaryngeal reflux. Their importance in voice phenomena is largely known (Koufmann 1996; Morrison 1997; Sataloff 2008). In this study, I took some of these factors into consideration when applying the inclusion and exclusion criteria, according to an assessment for eligibility using an interview and spirometry. However, gastroesophageal reflux and pharyngolaryngeal reflux were not considered as exclusion criteria. Unfortunately, I did not find studies which compared sagittal spine posture and perceptual and acoustic parameters in normal and dysphonic speakers. That could have helped us with an additional interpretation.

Finally, I present another topic to be considered in future studies. In this work, the segments [a], [i] and [u] were studied in an isolated context, by the conduct of sustained phonation. It would be important to study these segments in a speech context and compare them with the data presented. Speech samples, due to their complexity, allow the analysis of segmental and suprasegmental aspects involved in the communication process, allowing a more detailed description of the changes in the performance of pathological voices (Morsomme & Jamart 2001).

Longitudinal studies should be developed in order to provide information about the cause-effect relationship between sagittal spine posture and dysphonia, taking into account the knowledge of two aspects: (1) the magnitude of changes in spine curvature measures that can

cause dysphonia, and (2) the magnitude of alterations in vocal dynamics and in the larynx that can cause changes in the sagittal spine posture.

### 5. Conclusion

Spinal posture changes some properties of produced and perceived phonetic segments. The results can support research into the phonetics of a language, in this case of EP. Therefore, it can characterize the extralinguistic variability of a particular community and vocal individuality. This is a field of study which various other disciplines have shown an increasing interest in, as is the case of research in vocal pathology or the study of phonetics in the area of voice forensics. The development of knowledge about extralinguistic patterns in a certain language allows the understanding of less common but prominent patterns of linguistic and vocal individuality, especially at the level of the anatomical constitution of the speaker and adjustments made during speech. Particularly in the area of voice disorders, the understanding of how spinal posture influences voice quality allows us to develop biomarkers for dysphonia. This is fundamental for the planning of future prevention activities of dysphonia.

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# A temporal evidential in Aymara

Claudius Klose

Evidentiality has received various analyses, most of them modal or illocutionary ones. Data from Aymara give substantiation to another kind, a temporal evidential analysis. The *far distant* paradigm is described in the literature as marking indirect evidentiality. In this article it is analysed as introducing a *learning time* which follows the reference time, thereby giving rise to past, mirative and indirect evidential readings. This analysis also accounts for its uses in combination with negation or stative predicates in direct evidential contexts. The learning time does not constitute *at-issue* meaning, as it projects over propositional-level operators.

## 1. Introduction

Evidentiality is the expression of information source (Aikhenvald 2004) or how the speaker acquired the information being expressed by uttering a sentence marked with an evidential marker. Evidential systems often differentiate between information acquired by the speaker's own senses, by hear-say or by inference, but can differ greatly across languages. Willett (1988) divides evidentiality into direct and indirect evidentiality. For direct evidentiality the speaker acquired the knowledge about the proposition expressed by his own senses and for indirect evidentiality not by his own senses. The latter case is subdivided into reportative and inferential.<sup>1</sup> This taxonomy is illustrated in Figure 1.

Cuzco Quechua for example has a three-way evidential system with markers for direct (1), reportative (2) and conjectural evidence (3). In all three sentences the speaker asserts *p* (it is raining) but the source of information, expressed by 'EV', differs in each example. In (1) the speaker sees it raining with his own eyes, in (2) somebody told the speaker that it is raining and in (3) the speaker has some other sort of evidence which makes him conjecture that it is raining (Faller 2002).

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<sup>1</sup>For a more fine grained typology of evidentiality see Aikhenvald (2004).

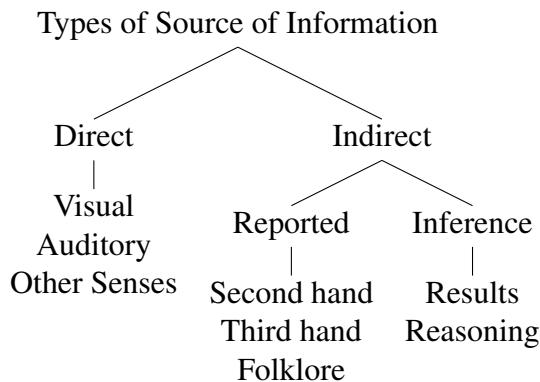


Figure 1: Willett's taxonomy of Evidentiality

(Willett 1988)

- (1) Para-sha-n-**mi**.  
rain-PROG-3-MI  
*p* = 'It is raining'  
EV = speaker sees that *p*

(Faller 2002:3)

- (2) Para-sha-n-**si**.  
rain-PROG-3-SI  
*p* = 'It is raining'  
EV = speaker was told that *p*

(Faller 2002:3)

- (3) Para-sha-n-**chá**.  
rain-PROG-3-CHA  
*p* = 'It is raining'  
EV = speaker conjectures that *p*

(Faller 2002:3)

Some authors subsume evidentiality under modality (Izvorski 1997; Matthewson et al. 2007; McCready & Ogata 2007; Peterson 2010), some analyse it as illocutionary operators (Faller 2002, 2012; Peterson 2010; Murray 2010) or as working on the verbal projection level (Faller 2004). Sauerland & Schenner (2008) give it a presuppositional analysis. In this article I will put forward a combination of a temporal and a presuppositional analysis of evidentiality for Aymara. The far distant (FD) verbal inflectional paradigm in Aymara presupposes a learning time

(LT) which is situated after the reference time (RT), following a similar analysis for the Bulgarian indirect evidential (Koev 2011). The learning time is the point in time at which the speaker gets to know the propositional content of the assertion the speaker is making. This learning time hypothesis will account for the three readings of the far distant, the indirect evidential, the past and the mirative reading.

The article is structured as follows: The main verbal inflectional paradigms, their functions and how they express evidentiality are introduced in Section 2. Section 3 presents the proposal for the meaning of the far distant and explicates how the three readings of the far distant arise. Section 4 presents cases of sentences marked with the far distant in direct evidential contexts, showing that information source cannot be the defining criterion for the far distant meaning, but that learning time can. Data showing the (semantically) projective behaviour of the far distant is presented in section 5. Finally section 6 summarizes the article.

The temporal and aspectual terminology and its use throughout the article follows Klein (1994): Three times are distinguished, utterance time (UT), event time (ET) and reference time (RT). The utterance time is the time at which the utterance takes place, the event time is the time at which the eventuality described by the utterance takes place and the reference time determines the viewpoint from which the event time is looked upon. The boldfaced part of sentence (4) exemplifies the times distinguished.

(4) When I came home, **the thieves already had left.**

UT: time at which the sentence was uttered

ET: time at which the thieves left

RT: time at which the speaker came home

Tense relates the utterance time to the reference time. Below the relations between utterance time and reference time for present tense, past tense and future tense are schematized. Present tense indicates that reference time and utterance time overlap ( $\circ$ ), past tense that the reference time precedes ( $<$ ) the utterance time and future tense that the reference time follows ( $>$ ) the utterance time.

Present: RT  $\circ$  UT

Past: RT < UT

Future: RT > UT

Aspect describes the inner temporal structure of an event, relating the event time to the reference time. The meaning of the progressive is inclusion ( $\subseteq$ ) of the reference time in the event time, that of perfectivity is inclusion of the event time in the reference time. This is schematized below.

progressive: RT  $\subseteq$  ET

perfective: ET  $\subseteq$  RT

Aymara is one of the three languages of the Aymaran language family spoken by over two million people mainly around Lake Titicaca in western Bolivia and southern Peru. Typologically

speaking, it is an SOV, agglutinating language where the verb shows agreement with both the subject and object.

The Aymara language data in this article were elicited during three fieldtrips in and around La Paz (Bolivia) between 2010 and 2013 and is my own unless indicated otherwise.

## 2. Evidentiality marking in Aymara

In the literature the main verbal inflectional paradigms are described as marking evidentiality in Aymara. The *simple inflection* (SI) and the *near distant* (ND) mark direct evidentiality, the *far distant* indirect evidentiality (Hardman et al. 1988; Hardman 2001). The finite verb in Aymara inflects for subject and for object (5) and (6). The inflection is a fusion of agreement marking (subject and object) and tense marking.<sup>2</sup>

- (5) Jupa-w juma-r quillq chura-tätam.  
he-DECL you-ALL money give-3>2.FD  
'He gave you money.'
- (6) Naya-w juma-r quillq chura-täsmä.  
I-DECL you-ALL money give-1>2.FD  
'I gave you money.'

(Yapita & van der Noordaa 2008:36)

Below in Table 1 I give a simplified morpheme template. Aymara has an extremely rich morphological structure with a huge variety of optional suffixes, so for the sake of comprehension I give only the root and the last three slots which are important in the context of the article. The verbal root is followed by the slot which hosts the aspect marker. The person/tense slot follows and the final suffix on a constituent is the sentence type/focus marker slot.

<b>morphemes:</b>	ROOT	ASP	PERS	SENTENCE TYPE
<b>example:</b>	iki	ska	ni	wa
<b>gloss:</b>	sleep	PROG	FUT	DECL
<b>translation:</b>	'He will be sleeping.'			

Table 1: Morpheme template

The licit combinatorial possibilities of subject and object agreement lead to a total of nine inflectional forms for a paradigm. Aymara has a system of four grammatical persons, which is determined by inclusion or exclusion of the first and second person, arriving at the Aymara equivalent of 'I', 'you', 's/he' and (inclusive) 'we'. There is no obligatory number distinction on nouns or verbs. Although (pro)nouns can bear the plural suffix *-naka* and verbs may bear the plural marker *-px-*. The latter marker is morphologically separate from the person marker.

<sup>2</sup>Here I use the term 'tense' informally and do not want to commit to the claim that 'tenses' always indicate a relation between utterance time and reference time in Aymara.

The nine resulting forms of an inflectional paradigm are given in Table 2 below for the simple inflection (SI), the near distant (ND) and the far distant (FD). The number before the dash in the *person* column indicates the grammatical person of the subject and the number after the dash the person of the object. The forms in which the object is marked for the third person are the same as the intransitive forms, seen in the first four lines of the table.

person					
trans	intr	SI	ND	FD	
1-3	1	-t	-yät	-tät	
2-3	2	-ta	-yäta	-täta	
3-3	3	-i	-:n	-tayna	
4-3	4	-tan	-yätan	-tätan	
1-2		-sma	-yäsmä	-täsmä	
3-2		-tam	-yätam	-tätam	
2-1		-ista	-istana(-istästa)	-istästa	
3-1		-itu	-itana	-itütu	
3-4		-istu	-istana	-istüstu	

Table 2: Inflectional paradigms for the simple inflection, the near distant and the far distant

### 2.1. The simple inflection

Sentences marked with the simple inflection are ambiguous between present and past interpretations (7). With a stative predicate, such as the verb with the progressive marking in (8) the interpretation is restricted to a present reading. In both cases the speaker has direct evidence.

- (7) Ch'uq manq'-ta.

potato eat-1.SI  
'I eat/ate potato.'

- (8) Iki-sk-i-wa.

sleep-PROG-3.SI-DECL  
'He is/#was sleeping.'

### 2.2. The near distant

Sentences containing the near distant describe past events for which the speaker has direct evidence (9).

- (9) Masuro-x futbol anatä-yat-wa.  
yesterday-TOP football play-1.ND-DECL  
'Yesterday I played football.'

The near distant may give rise to mirative readings. That is the case in (10) where the speaker unexpectedly finds a set of keys on the table.

- (10) Aka-n-ka-ska-n-wa.  
 here-LOC-VBLZ-PROG-3.ND-DECL  
 'Here they are.' (but I forgot that I put them there.)

(Hardman et al. 1988:146)<sup>3</sup>

### 2.3. *The far distant*

The most important of the verbal inflectional paradigms for this article is the far distant paradigm, as it is this one for which I present an analysis. The third person subject/third person object form of the far distant paradigm, *-tayna* (3>3) is the most pervasive and will occur most frequently in this article. Forms involving the first and second person are possible, but due to their indirect evidential readings, less common. A sentence containing a first person verb usually relates to an event which the speaker has witnessed directly. A sentence containing a second person verb would be to tell the addressee about an event in which the addressee has most likely participated and the speaker has only indirect evidence for. So the use of a form marking the first or second person is rare for the far distant. Still those forms occur, as we will see in subsection 3.2.

#### 2.3.1. *Past readings*

The primary use of the far distant is to indicate that the proposition described by the utterance is situated in the past (11).

- (11) Jup wawä-ka-sa-x        usu-ta-tayna-wa.  
 he child-VBLZ-SU-TOP ill-RES-3.FD-DECL  
 'As a child he was ill.'

#### 2.3.2. *Indirect evidential readings*

Additionally the far distant expresses that the speaker did not witness the event expressed, as specified in brackets in (12).

- (12) Masayp'u-x jallu-tayna-wa.  
 last:night-TOP rain-3.FD-DECL  
 'Last night it rained.' (but I didn't see it myself)

The far distant is frequently embedded by *situwa* (third-person-subject/first-person-object form of *saña*) 'he says to me', indicating that the source of information is a report (13). The same sentence marked by the far distant without *situwa* could still be interpreted as a report.

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<sup>3</sup>The gloss and translation are my own. The translation was originally in Spanish.

- (13) Inesa-x kullaka-pa-mp sara-tayna si-tu-wa.  
 Ines-TOP sister-3.POSS-COM go-3>3.FD say-3>1-DECL  
 ‘S/he told me that Ines went with her sister.’

### 2.3.3. *Mirative readings*

The third function of the far distant is to express mirativity, the expression of new information, surprise or unexpectedness (Aikhenvald 2012; DeLancey 2012; Peterson 2013). In English mirativity is expressed in a variety of different ways (14).

- (14) Alvin made it!  
 Surprisingly, Alvin made it.  
 Wow, Alvin’s here.  
 I’m amazed Alvin made it!  
 What a surprise Alvin is here!

(Peterson 2013:2)

The mirative use of the far distant in Aymara can be seen in the examples (15) - (17).<sup>4</sup> Furthermore the far distant does not necessarily give rise to a past interpretation (see their English translations). In these examples the speaker does not have indirect evidence either, but direct evidence.

- (15) Aka larankha k’allk’ü-tayna-wa.  
 that orange sour-3.FD-DECL  
 ‘That orange is sour.’ (contrary to what I expected)

The speaker asserts after trying an orange that it tastes sour to her surprise (15). In (16) the speaker had assumed that the dog was just sleeping but it turned out to be dead and the speaker utters (16).

- (16) Anu-x jiwa-ta-tayna-wa.  
 dog-TOP die-RES-3.FD-DECL  
 ‘The dog had been dead/The dog is dead.’

Sentence (17) is uttered on unexpectedly finding the set of keys on the table.

- (17) Aka-n-ka-ska-tayna-wa.  
 here-LOC-VBLZ-PROG-3.FD-DECL  
 ‘Here they are.’ (But I didn’t put them there.)

(Hardman et al. 1988:146)

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<sup>4</sup>The mirative examples all contain stative predicates. Stative predicates show behavioural patterns which require further investigation. They disallow past readings when combined with the simple inflection.

### 3. The temporal evidential analysis

The proposal made here follows Koev (2011) who analyses the Bulgarian indirect evidential as indicating a temporal relation between the reference time and the learning time, whereby the learning time follows the reference time ( $RT < LT$ ).<sup>5</sup>

- (18) Inesa-x kullaka-pa-mp sara-tayna.  
 Ines-TOP sister-3.POSS-COM go-3>3.FD  
 'Ines visited her sister.' (The speaker came to know indirectly, possibly by report)

For (18) this would mean that the time at which the speaker learned about the proposition  $p$  *Ines visited her sister* lies after the time at which Ines visited her sister<sup>6</sup> and as a prerequisite for being able to talk about  $p$ , before the time of utterance. For an easier understanding of the temporal relations expressed by the example sentences I will frequently throughout the article provide a time line as in Figure 2 for sentence (18).

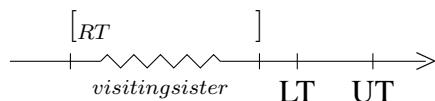


Figure 2: Temporal structure for a sentence marked by the far distant

The zigzag lines represents the event time, in this case the time during which Ines visited her sister, UT is the time of utterance at which the speaker says (18), LT is the learning time at which the speaker got to know  $p$ , where  $p$  is *Ines visited her sister* and RT is the reference time, indicated by the brackets.

The meaning proposed here for the far distant is given in (19).

- (19)  $\llbracket \text{Far Distant} \rrbracket^{g,c} = \lambda A_{\langle i,t \rangle}. \text{the context provides a time } t \text{ such that the speaker}^7 \text{ learns at time } t \text{ that } A(t') \& t > t'. \lambda w_s. [A(t')(w)]$

The far distant takes as its argument a function  $A$ , which maps time intervals to propositions, and yields a proposition. It is presuppositionally restricted and requires a context given time  $t$  for which holds that the speaker learned at time  $t$  that  $A$  holds for an earlier time  $t'$ . If that restriction is met, the denotation is the set of worlds in which  $A$  holds at that earlier time  $t'$ . So the main contribution of the far distant comes in the form of a presupposition. This assumption is backed up by the projective behaviour which will be discussed in section 5. The far distant occupies the head position of the TP, illustrated in Figure 3.

<sup>5</sup>For the simple inflection I assume that learning time precedes or coincides with the reference time (SI:  $LT \leq RT$ ).

<sup>6</sup>Actually it lies after the reference time of *visited* but for an aspectually unmarked verbal predicate I assume that the default interpretation is perfective and hence the learning time lies after the whole eventuality described by the verb. In this assumption I follow (Coler 2010:269) who claims this for Muylaq' Aymara.

<sup>7</sup>The learning is not always anchored to the speaker. In questions it refers to the learning time of the addressee. But I leave the implementation of that for future work.

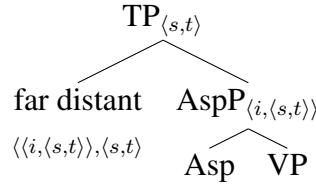


Figure 3: Phrase structure of the TP and AspP

### 3.1. Past readings

The past interpretation of the far distant derives from the interaction of the meaning of the far distant (where the learning time lies after the reference time) and the additional assumption that the learning time is factual, i.e. that it describes the time at which a learning event actually took place and hence lies in the past or happened simultaneously to the utterance event ( $LT \leq UT$ ). One could also assume a hypothetical learning time, so that if the speaker marks the utterance by the far distant marker, the speaker only conveys that at some point, maybe in the future s/he will learn that  $p$ . For (20) that would mean that the speaker's father will come tomorrow at some time after the speaker will learn about it. But a future reading is not available for the far distant in (20).

- (20) \*Qharuro-x      tata-ja-x      juta-tayna-wa.  
 tomorrow-TOP father-1.POSS-TOP come-3.FD-DECL  
 Intended: 'My father will come tomorrow.'

The unavailability of a future reading supports the assumption of a past or present learning time ( $LT \leq UT$ ). The past meaning, the meaning we want to arrive at, is the precedence of the reference time to the utterance time ( $RT < UT$ ). So the far distant meaning together with the assumption about factual, non-future LT requires that RT precedes UT, which is the meaning of the past tense and represented in (21).

- (21)  $(RT < LT) \wedge (LT \leq UT)$        $\rightarrow RT < UT$   
 (FD meaning)    (factual learning time assumption)    (past meaning)

Sentence (22) has a past interpretation without any source of a temporal past interpretation other than the verbal inflection such as a temporal adverb or subordinate clause and supports the present analysis.

- (22) Maria-x    janq'u-t    uta-p      pinta-tayna.  
 Maria-TOP white-ABL house-3.POSS paint-3.FD  
 'Maria painted her house white.'

The time line in Figure 4 represents the temporal structure expressed by sentence (22). The event time, represented by the zigzag line is included in the reference time since perfective is the default assumption for zero-marking of grammatical aspect. The learning time follows the reference time, according to the far distant marking and the learning time precedes the utterance time, though in principle it should be possible that the learning time is simultaneous with the

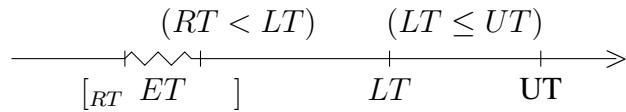


Figure 4: Past reading of the far distant

utterance time but may not lie after it.

### 3.2. Indirect evidential readings

The learning time analysis conversationally implicates an indirect evidential interpretation. To witness an event directly, i.e. through one's own senses, one has to be present at the event and learn or perceive it as it happens, not afterwards. When the speaker states that s/he learned about the event after the time of the event which s/he is describing s/he is implying that s/he was not present at the event. Such a learning event would commonly be a report by another person or a conjecture. This is consistent with the data in (23), where the speaker talks about his father breaking his leg but was not present and was only afterwards told about it.

- (23) Kayu p'aki-si-tayna.  
foot break-REFL-3.FD  
'He broke his foot.'

After the described foot-breaking event in (23) there is a learning time at which the speaker learned that his father broke his foot. As the speaker learned afterwards about the foot breaking he was not present while it happened and did not see it himself. In (24) the learning time indicated by the far distant in the subordinate clause is made explicit by the matrix verb *situwa* ('she told me') and coincides temporally with it. If the matrix verb *situwa*, which constitutes the entire matrix clause, is omitted and if the sentence consists of only a simple, unembedded clause as in (25) then the sentence can still be interpreted in the same way as in (24). That is, in both sentences the speaker bases his/her information on a report.

- (24) Inesa-x kullaka-pa-mp sara-tayna si-tu-wa.  
Ines-TOP sister-3.POSS-COM go-3>3.FD say-3>1-DECL  
'S/he told me that Ines visited her sister.'
- (25) Inesa-x kullaka-pa-mp sara-tayna.  
Ines-TOP sister-3.POSS-COM go-3>3.FD  
'Ines visited her sister.' (The speaker came to know indirectly, possibly by report)

There are exceptions to the rise of the indirect evidential conversational implicature. For example if one is not aware of what one is perceiving. Thus the speaker may be present at the event and may be even participating in it but only afterwards realizes that s/he did. This is indeed the case for the far distant in Aymara. Example (26) can be uttered after the speaker had worked for some time, but did not notice how tiring the work was. After finishing the work the speaker realizes how tired s/he is.

- (26) Qar-xasi-tät-wa.  
 tire-PDR-1.FD-DECL  
 ‘I got tired’ (but I didn’t notice)

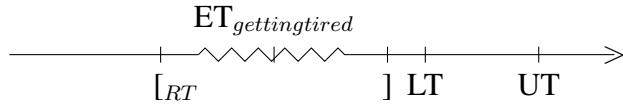


Figure 5: Delayed awareness of an event

Figure 5 illustrates the temporal structure of example (26). The reference time, which includes the time during which the speaker was working and getting tired (ET) precedes the time at which the speaker realizes that s/he had gotten exhausted. Similarly, sentences marked with the far distant in Aymara are often used when the speaker talks about things s/he has done while being drunk and not remembering what s/he was doing while being intoxicated.

The indirect evidential interpretation of the far distant is an implicature which is triggered by the *learning-time-after-reference-time* meaning of the far distant. This is supported by the Aymara data presented in this subsection. There are exceptions to the indirect evidential interpretation in cases of delayed awareness of the speaker which is congruent with the analysis.

### 3.3. Mirative readings

DeLancey (1997) characterises mirativity as information “which is new to the Speaker, not yet integrated into his overall picture of the world” (DeLancey 1997:35-36). Stating that the time of learning the proposition  $p$  follows the reference time indicates that a) the described event is situated in the past as we have seen above in subsection 3.1, and b) the speaker did not witness the event himself since he only learned about  $p$  afterwards (see subsection 3.2). Also the learning event expresses that there is a change in the knowledge state of the speaker, which is a prerequisite for surprise and this knowledge change lies after the event described by  $p$ . So the speaker was unaware of  $p$  when it started, i.e. he did not expect it. In itself the indication that there was a learning time is not informative as the speaker had to get to know about  $p$  at some point in order to be able to talk about it. Yet, in a situation where the context excludes interpretation a) because  $p$  still holds at the utterance time and excludes b) because the speaker perceives  $p$  as  $p$  is happening the use of the far distant becomes uninformative. The only way to keep the utterance informative and the speaker cooperative is to take the change in knowledge on the part of the speaker to be the information the speaker wants to convey. So I take the mirative interpretation of the far distant to be an conversational implicature. This would predict that the mirativity interpretation is cancelable. If the context is set up in such a way that  $p$  holds at the utterance time and the speaker is perceiving  $p$  while it happens the Aymara sentence (15) expresses surprise. The speaker utters (15) when biting an orange. The orange is sour at the utterance time and the speaker perceived that directly and thus what is expressed by (15) is surprise. Yet a mirative interpretation is not restricted to the far distant alone. The near distant can also give rise to mirative interpretations as in (27). The comments made for the next two

examples (27) and (28) fit the present analysis. For the near distant I assume that its meaning is that reference time and learning time coincide ( $RT = LT$ ). The past interpretation is again excluded by the context because the speaker sees the keys lying before him on the table while uttering (27). But as the speaker decided not to use the far distant marking he is expressing that he didn't learn about the keys' whereabouts until afterwards.

- (27) Aka-n-ka-ska-n-wa.  
here-LOC-VBLZ-PROG-3.ND-DECL  
'Here they are.' (but I forgot that I put them there.)
- (28) Aka-n-ka-ska-tayna-wa.  
here-LOC-VBLZ-PROG-3.FD-DECL  
'Here they are.' (but I didn't put them there.)

(Hardman et al. 1988:146)

The learning time analysis correctly predicts the mirative interpretation of the far distant. It is an conversational implicature which arises in combination with a contextual restriction which excludes the past and indirect evidential interpretation.

#### *4. Direct evidential interpretations of the far distant*

Up to now we have seen that the learning time analysis is capable of deriving the three described readings of the far distant, including mirativity, which covers cases of direct evidentiality. The mirative uses constitute an exception to a pure evidential analysis, one which specifies the source of information. For the delayed awareness cases it might be argued that they are actually cases of indirect evidentiality. But there are at least two more types of cases unrelated to mirativity in which the far distant can be used, namely where the speaker bases an assertion on direct evidence instead of indirect evidence. This is the case if the predicate is stative (4.1) or when the far distant together with negation is used to disclaim a false report, by which a conversational implicature about the beliefs of the speaker with respect to the report arises (4.2).

##### *4.1. Stative predicates*

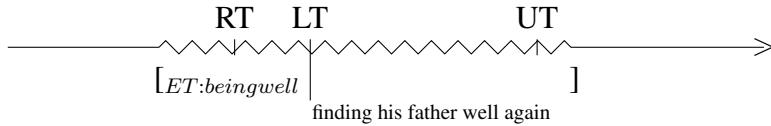
Assertions for which the speaker has direct evidence and which are marked by the far distant are felicitous if the predicate is stative. A pure evidential analysis of the far distant would require the information to be based on indirect evidence and would not account for such data. The learning time analysis on the other hand is able to do the job. Together with the meaning of the progressive ( $RT \subseteq ET$ ) it predicts the felicity of such a construction. The learning time follows the reference time but because the reference time is, by the meaning of the progressive, included in the event time, the learning time may (but need not) be included in the event time as well. In (30) the predicate is marked by the far distant marker as well as by the progressive marker *-ska-*. Sentence (30) may serve as an answer to (29) in the following context: The speaker's dad got sick. A while after the speaker got that information he finally managed to travel to Oruro to

see him. When he arrived his father had gotten well again. The speaker comes back to La Paz where I ask him how he is (29) and the speaker answers with (30).

- (29) Tata Jaime-x kunjama-sk-i-sa.  
 father Jaime-TOP how-PROG-3-Q  
 'How is Jaime?'

- (30) Wali-ska-tayna-wa.  
 good-PROG-3.FD-DECL  
 'He is fine.'

The context makes clear that the speaker of (30) had witnessed his father's being well personally, hence an analysis specifying the information source would not serve. A mirative interpretation does not arise either as the speaker has known for some time that his father has gotten better and surprise requires that the information has been acquired recently. Still the construction is felicitous in the direct evidential context suggesting that the temporal structure expressed by the sentence is as explained and illustrated in Figure 6. The learning time follows the reference time and both reference time and learning time are included in the event time.



*Figure 6: direct evidence for a state*

The learning time analysis would also predict that if it was precluded that the learning time can follow the reference time by a restriction imposed by the context, the use of the far distant should be infelicitous. That turns out to be the case in Aymara. If the learning time is set by the context to the beginning of the eventuality, due to the progressive marker, it is infelicitous for the speaker to say that his father is well using the far distant (32) as an answer to (31). The sentence marked by the simple inflection (33) can serve as an answer to (31). The context is as follows: The speaker's father got sick and so he travels to Oruro to visit his father after a long time of not having seen him. While the speaker is there his father gets better. He comes back to La Paz and answers my question (31) about his father's well-being with (33).

- (31) Tata Jaime-x kunjama-sk-i-sa.  
 father Jaime-TOP how-PROG-3-Q  
 'How is Jaime?'

- (32) #Wali-ska-tayna-wa.  
 good-PROG-3.FD-DECL  
 'He is fine.'

- (33) Wali-sk-i-wa.  
 good-PROG-3-DECL  
 'He is fine.'

The following two time lines in Figure 7 illustrate the problem which leads to the infelicity of (32): In the upper one the learning time follows the reference time but the reference time is not included in the event time which is required by the progressive marker. In the lower one the reference time is included in the event time but now the reference time cannot precede the learning time, which in turn is required by the far distant.

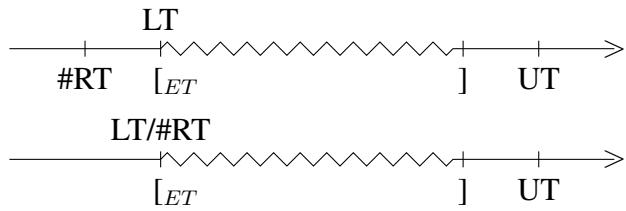


Figure 7: Conflict between the far distant and the progressive

The data presented in this subsection showed that the learning time analysis is capable of explaining the use of the far distant with stative predicates when the context indicates that the speaker has direct evidence for an assertion. It also predicts the infelicity of such a construction if the context excludes the possibility that the learning time follows the reference time.

#### 4.2. Belief implicature

Another case where it becomes clear that the far distant is indicating the learning time and not the information source is the contrast between the far distant and the simple inflection when used to disclaim a report by a third person. This contrast manifests itself in stating whether the speaker does or does not believe a report by a third person. This is a conversational implicature which arises by the speaker's choice of indicating that the learning time follows the reference time and not that it precedes it or is equal to it. It is triggered by the co-occurrence of the far distant with negation. Stating that the learning time of *not p* lies after (the reference time of) *p* conversationally implicates that the speaker thought that *p* at some time prior to the learning time. This is observable in Aymara when the speaker uses the far distant together with negation in order to disclaim a report by a third person (34). The speaker indicates by uttering (34) that he believed the report which stated *p* and only afterwards came to believe that the report was wrong ( $\neg p$ ). The context provides direct evidence for the speakers assertion of  $\neg p$  and is as follows: Lisa told José that Maria had painted her house white. After that José went to the house and saw Maria painting her house green. José meets a friend and tells him (34).

- (34) Maria-x uta-p-xa jani-w janq'u-t pint-ka-tayna-ti, naya-x  
 Maria-TOP house-3.POSS-TOP NEG-DECL white-ABL paint-NEG-3.FD-NEG I-top  
 jupa-r choxña-t pint-ir uñj-ta.  
 she-ALL green-ABL paint-AG see-1.  
 'Maria did not paint her house white, I saw her paint it green.'

The temporal structure of (34) and the corresponding context are illustrated in Figure 8.

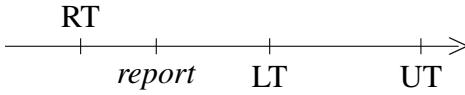


Figure 8: Initially believing a false report by use of far distant

The reference time precedes the learning time, representing the time at which the speaker saw that Maria actually painted her house green as is required by the far distant. The conversational implicature that the speaker initially believed *p* corresponds to the time of the report, which stated *p*. Using the simple inflection instead of the far distant would be infelicitous in this context. If the learning time was forced to precede the reference time by a change in context the far distant should not be used, which is indeed borne out. The following context is changed in such a way, that the witnessing event precedes the report. The sentence marked by the far distant (35) is infelicitous. By using the simple inflection instead the conversational implicature does not arise and so the sentence does not convey that the speaker initially believed the report (36). This sentence serves as a felicitous assertion in the following context: José saw that Maria painted her house green. Then Lisa tells him (incorrectly) that Maria painted her house white. After that José meets a friend and tells him about it.

- (35) #Maria-x uta-p-xa jani-w janq'u-t pint-ka-tayna-ti, naya-x  
 Maria-TOP house-3.POSS-TOP NEG-DECL white-ABL paint-NEG-3.FD-NEG I-TOP  
 jupa-r choxña-t pint-ir uñj-ta.  
 she-ALL green-ABL paint-AG see-1.  
 'Maria did not paint her house white, I saw her paint it green.'
- (36) Maria-x uta-p-xa jani-w janq'u-t pint-k-i-ti, naya-x  
 Maria-TOP house-3.POSS-TOP NEG-DECL white-ABL paint-NEG-3.SI-NEG I-TOP  
 jupa-r choxña-t pint-ir uñj-ta.  
 she-ALL green-ABL paint-AG see-1.  
 'Maria did not paint her house white, I saw her paint it green.'

The temporal structure of the context is represented in Figure 9.

The learning time, the time at which the speaker saw Maria paint her house green, coincides with the reference time and precedes the false report. Since the learning time coincides with the reference time the far distant is infelicitous. The speaker has direct evidence for his assertion in both cases.



*Figure 9: Not believing a report by use of the simple inflection*

In both contexts the speaker has direct evidence, in that he witnessed Maria painting the house green. What changed between the this context and the previous one is the time at which the report was made. In the first case the report precedes the time at which the speaker witnesses the house painting and in the second the report follows the time at which the speaker witnesses the house painting. In the former case the far distant has to be used and in the latter the simple inflection. That is predicted by the account of the learning time, but unaccounted in an information source account.

This section showed two types of cases in which the far distant is used even though the speaker has direct evidence for his assertion, which are not covered by a pure information source analysis. Both types, the far distant in combination with stative predicates and the combination with negation triggering the believe implicature were explained by the learning time analysis.

### 5. Projective behaviour of the far distant

So far the claim for the far distant was that it indicates that the learning time follows the reference time, but little was said about the level on which the far distant is contributing to meaning. In section 3 it was briefly mentioned that the indication of the learning time being situated after the reference time is a presupposition and is hence not a part of the propositional content of the assertion. The far distant projects through propositional-level operators, such as negation and verbs of saying. Projection is one feature of presuppositions. In this respect the Aymara far distant patterns like the Bulgarian indirect evidential proposed by (Koev 2011:120). The existence presupposition triggered by the definite article in English in sentence (37) does not scope under negation nor under verbs of saying.

- (37) The car is broken.  
presupposition: There is a car.

The presupposition stays the same, unaffected by negation (38) or a verb of saying (39).

- (38) The car is not broken.  
presupposition: There is a car.
- (39) He says the car is broken.  
presupposition: There is a car.

The learning time meaning component of the far distant in Aymara patterns alike. This will be shown in subsection 5.1 and 5.2.

### 5.1. Scope of the far distant with respect to negation

The far distant does not take scope under negation. Example (40) can only have the interpretation given in the translation. It can not be understood as meaning that the learning time does not follow the reference time.<sup>8</sup>

- (40) Maria-x uta-p-xa jani-w janq'u-t pint-ka-tayna-ti.  
           Maria-TOP house-3.POSS-TOP NEG-DECL white-ABL paint-NEG-3.FD-NEG  
           ‘Maria did not paint her house white.’  
           NOT: ‘I did not learn afterwards that Maria painted her house white.’

### 5.2. Scope of the far distant with respect to verbs of saying

The far distant does not scope under verbs of saying. The far distant also in question (41) does not scope semantically under the verb of saying. So the question’s meaning is as it is given in the translation. It does not mean *Who told you that you learned after Maria painted her house white that she did.*

- (41) Khiti-ch janq'u-t pinta-tayna si-stam?  
       who-Q white-ABL paint-3.FD say-3>2.SI  
       ‘And who told you that (she) painted her house white?’

Those two tests showed cursorily that the far distant projects and behaves in that respect like a presupposition. There is a more fine grained test battery presented in Tonhauser et al. (2013) using the Family-of-Sentences diagnostics. Projective content passing that test can be further subdivided testing for two further criteria. That would be work for the future to more accurately determine the meaning contribution of the far distant.

## 6. Conclusion

In this article I have argued that the Aymara far distant verbal inflectional paradigm is best seen as indicating that the learning time follows the reference time. This idea of a temporal evidential was first put forward in Koev (2011) for Bulgarian and by courtesy of the present article receives cross-linguistic support. The learning time account explains the three readings of the far distant: past, indirect evidential and mirative. The account manages to explain cases in which the far distant is felicitously used although the speaker bases an assertion on direct evidence. It also explains cases in which it co-occurs with stative predicates and cases in which, together with negation, an implicature arises about the belief of truth or falseness of a report. These cases remain unaccounted by an analysis which takes the indication of information source to be the meaning of the far distant. The meaning of the far distant comes in the form

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<sup>8</sup>Example (40) cannot be understood as saying that the speaker does not have indirect evidence for the utterance either.

of a presupposition as it projects and thus does not contribute on the propositional-level. The present account presents a unified analysis for the different functions of the far distant and is therefore preferable to the information source account.

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# P-omission under sluicing, [P clitic] and the nature of P-stranding

Tatiana Philippova

This paper discusses preposition (P) omission under sluicing (*John talked with someone but I don't know \_ who*) and the ability of P to take a clitic pronoun as a complement (*We talked about 'im*), correlated with P-stranding (the ability of P to stay in situ when its complement undergoes movement, *Who are you talking with\_?*) through generalizations that were proposed in Merchant (2001) and Abels (2003a,b) respectively. These studies establish P-stranding as a necessary condition for both phenomena, but I show that the correlations may stem instead from the ability of Ps to project independent Prosodic Words in the P-stranding languages.

## 1. P-omission under sluicing and P-stranding

### 1.1. Sluicing and the Preposition Stranding Generalization

This section presents a study of preposition omission under sluicing in Russian.

*Sluicing* is an ellipsis construction having the meaning of a constituent interrogative and the surface form of a *wh*-phrase. The term was coined by Ross (1969), who was the first to look at sentences like (1):

- (1) [He is writing something] but you can't imagine what.

*Interpretation:* He is writing something but you can't imagine what he is writing.

The stranded *wh*-phrase is commonly referred to as the sluicing *remnant*; it often has a *correlate* ('something' in (1)) in the *antecedent* clause (bracketed in (1)).

The fact that the interpretation of the remnant is parallel to that of a full *wh*-interrogative (as well as the existence of the so-called 'connectivity' effects such as morphological case matching between the correlate and the remnant) motivated the idea, first proposed in Ross (1969), that at a deeper level of representation a full clause is present while the sentential part is elided only later on in the derivation. More recently this idea was implemented in the seminal work by Merchant, Merchant (2001), where sluicing is derived through *wh*-movement and subsequent deletion of the embedded clause TP at PF:

- (2) He is writing something but you can't imagine [CP what<sub>i</sub> [TP ~~he is writing~~ t<sub>i</sub>]].<sup>1</sup>

Interestingly, when the correlate of the *wh*-remnant is a complement of a preposition (P), the remnant may appear with or without that P:

- (3) John talked with someone but I don't know {who; with whom}.

Merchant (2001) examines sentences of this type across an impressive range of languages. In his sample only those that have P(reposition)-stranding allow for P-less remnants. This leads him to posit the following generalization:

(4) **Preposition Stranding Generalization (PSG)**

*A language L will allow preposition stranding under sluicing iff L allows preposition stranding under regular wh-movement.* (Merchant 2001:107)  
i.e. *P-omission*  $\leftrightarrow$  *P-stranding*

The correlation is illustrated below for English (5) and Russian (6), which are P-stranding (5b) and non-P-stranding (6b) respectively:

- (5) a. John talked **with** someone but I don't know { $\backslash$ **with**;  $\backslash$ **with**} who.  
b. Who did John talk **with** \_?

- (6) a. Ivan govoril s kem=to no ja ne znaju { $\backslash$ s; \* $\backslash$ s} kem.<sup>2</sup>  
Ivan talked with who.INS=INDF but I not know with who.INS  
'Ivan talked with someone but I don't know (with) who.'  
b. \*Kem Ivan govoril s \_?  
Who.INS Ivan talked with  
'Who did Ivan talk with?'

(Merchant 2001)

Although the PSG connects phenomena that are quite distinct superficially, it directly follows from Merchant's movement-and-deletion approach to sluicing: the absence of an overt preposition in the remnant is due to the fact that it was first stranded in the TP by *wh*-movement and then deleted along with the TP, as illustrated in (7).

- (7) John talked with someone but I don't know [CP who<sub>i</sub> [TP ~~John talked with t<sub>i</sub>~~]].

Thus, P-omission under sluicing necessarily involves P-stranding as a step in the derivation and is only expected to be licit in the P-stranding languages. For this reason, Merchant calls P-omission 'P-stranding under sluicing'. In this paper I will stick to a more theory-neutral 'P-omission (under sluicing)'.

<sup>1</sup> The elided TP need not be strictly identical to the antecedent TP, rather it should be e-GIVEN (see Merchant, 2001).

<sup>2</sup> In accordance with the Leipzig Glossing Rules, here and throughout the paper the following abbreviations are used: ACC (accusative), DAT (dative), GEN (genitive), INS (instrumental), NOM (nominative); PRF (perfective aspect); COMP (complementizer); REFL (reflexive); INDF (indefinite) is the gloss for the Russian and Polish indefinite particles attaching to *wh*-words to form indefinite pronouns; NEG – negative particle; Q – question particle; 1, 2, 3 – 1st, 2nd and 3rd person respectively; SG (singular), PL (plural); M (masculine), F (feminine); the equality sign '=' marks clitics.

Note that if the PSG holds, it provides support for Merchant's analysis of sluicing. The cross-linguistic picture, however, is less clear-cut than the PSG predicts, namely the ban against P-omission under sluicing turns out to be *weaker* than the ban against P-stranding in the non-P-stranding languages. A number of recent studies reported and analyzed grammatical instances of P-omission under sluicing in Romance (Rodrigues et al. 2009; Almeida & Yoshida 2007 a.o.), Slavic (Szczegielniak 2008; Nykiel 2013; Stjepanović 2012 a.o.) and a few other unrelated languages (e.g. Indonesian in Sato 2011, Amis in Wei 2011).

Notably, the data provided in Merchant (2001) already reveal a great deal of variation with respect to P-omission: native speakers of a range of languages (Dutch, Hebrew, French, Italian and Spanish) sometimes do accept sluicing remnants without an overt P.<sup>3</sup>

(8) *Hebrew*

- a. Adam diber ‘im mishehu, aval ani lo yode'a {√‘im; ?‘im} mi  
Adam spoke with somebody but I not know with who  
'Adam spoke with someone but I don't know who.'
- b. Adam katav le=mishehu aval ani lo yode'a {√le=; \*le=} mi  
Adam wrote to=somebody but I not know to= who  
'Adam wrote to someone but I don't know who.'

(9) *French*

- a. Elle a parlé avec quelqu'un, mais je ne sais pas {√avec; ?avec} qui  
She has talked with someone but I NEG know not with who  
'She talked to someone but I don't know who.'
- b.\*Anne l'a offert à quelqu'un, mais je ne sais pas {√à; \*à} qui  
Anne it-has offered to someone but I NEG know not to who  
'Anne offered it to someone, but I don't know who.'

(Merchant 2001:98-99)

The contrast between the (a) and (b) sentences in (8-9) suggests that the acceptability of P-omission under sluicing depends on a particular preposition used in the correlate. That there is variation within the class of prepositions is also recognized by Almeida & Yoshida (2007:351, fn.2), who note that not all Ps allow P-omission under sluicing in Brazilian Portuguese. To the best of my knowledge, this intra-language variation has not yet been investigated in a systematic way and it is the goal of this section to try to establish its nature and see what it may imply for P-stranding. The study of P-omission under sluicing in Russian to be presented in this section is therefore guided by the following research questions:

- 1) Is P-omission under sluicing indeed contingent on a particular P? If yes, what property of P is responsible for this intra-language variation?
- 2) If P-omission does not involve P-stranding per se, why is it freer in the P-stranding languages?

*A priori*, there seem to be two plausible answers to the first research question: i) a categorial/structural split within the group comprising prepositions is responsible for the observed contrast; ii) a purely phonological contrast between them, not stemming from (i), is

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<sup>3</sup> Dutch stands apart from other languages in the group in that it has limited P-stranding (only by the so-called R-pronouns and, probably, null operators, see van Craenenbroeck 2012).

relevant: as seen from (8-9) the more acceptable sentences contain phonologically heavier Ps.<sup>4</sup> Let me elaborate on the first option. It is a recurrent idea in the linguistic literature that prepositions do not form a uniform class. In particular, the category P is notoriously hard to classify along the lexical/functional dimension (cf. e.g. Botwinik-Rotem 2004) so it is not surprising that there exist proposals splitting Ps into the functional and the lexical class. I will focus here on the proposal by Yadroff & Franks (1999) as it specifically pertains to Russian Ps. Based on a variety of criteria spanning ‘the gamut of linguistic modules, from phonology to semantics’, Yadroff and Franks divide the category P into a) functional elements, which are merely a morphological realization of nominal functional features and as such do not project in syntax, and b) lexical elements, etymologically derived from lexical categories (N,V,A) and projecting in syntax, but distinct from them in lacking functional superstructure. Under such an approach one would expect functional Ps to be impossible to omit under sluicing because they are not independent syntactic elements, i.e. they ‘come’ with the noun. Another contrast within the group of Ps that might influence the pattern of P-omission is that between strandable and non-strandable Ps. Certain Russian Ps appear in constructions that look like P-stranding. Consider:

- (10) Komu ty èto sdelal nazlo?  
 Who you this did on-evil  
 ‘You did that to spite who?’

Two ways of analyzing sentences like (10) were proposed. The first option (as presented in Abels 2012) is that (10) involves extraction out of a PP, but extraction not of the complement of P (which is disallowed due to P being a phase), but of the complement of its complement. This analysis is motivated by the fact that all strandable Ps (except for *radi* ‘for the sake of’ whose ability to strand is actually dubious) consist of two morphemes – a P-morpheme and an N-morpheme, as shown in Table 1 below.

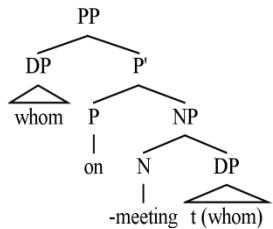
<i>v-sled</i> (P-N) ‘following, after’
<i>vo-preki</i> (P-N) ‘despite’
<i>na-vstrechu</i> (P-N) ‘towards’
<i>na-perekor</i> (P-N) ‘in defiance’
<i>na-zlo</i> (P-N) ‘to spite (somebody)’
<i>na-pererez</i> (P-N) ‘cutting across’
<i>v protivoves</i> (P N) ‘as a counterbalance’
? <i>radi</i> ‘for (the sake of)’

Table 1. ‘Strandable’ Ps in Russian

<sup>4</sup> ‘Im’ is originally CVC, whereas *le-* is underlyingly just C with an epenthetic vowel whose quality is determined by the following phonetic context (but most of the time it is realized as a schwa).

Their internal structure can thus be represented as in (11) for *navstreču* ‘towards’ (literally, ‘on-meeting’), adapted from Abels (2012). Notably, all strandable prepositions also allow postpositional use – this fact is captured under this approach by movement of the complement of N to Spec PP.

- (11)



This analysis faces two problems. First, according to Podobryaev (2009), the apparent P-stranding only involves Ps heading adjunct phrases, hence direct extraction from them should be ruled out by Condition on Extraction Domains (Huang 1982). This problem is also encountered in other languages: Ps like *during*, that normally disallow stranding in English, allow extraction of their complement's complement:



Secondly and more importantly, numerous Ps in Russian are morphologically complex in precisely the way the Ps from Table 1 are, but only a small subset of them allows stranding. Since one would not want to treat non-strandable morphologically complex Ps on a par with the simple ones, something other than this complexity must be responsible for stranding.

An alternative is proposed in Podobryaev (2009): strandable Ps are ‘ambivalent’ in that they take their complements either to the right or to the left with stranding only being possible when the complement is base-generated on the *left*. To derive ‘stranding’, the whole PP is copied and moved to the left periphery of the clause and its copies undergo distributed deletion (in terms of Fanselow & Ćavar 2002):

- (13) [Komu **nazlo**] ty éto sdela [komu nazlo]?  
   who.DAT on-evil you this did   who.DAT on-evil  
   ‘You did that to spite who?’

For most Russian Ps the derivation in (13) is impossible since they do not allow the [DP/NP P] base-generated order, whereas the inverted splits of PPs (that is, appearance of P-complement to the left of the P in the resulting string when it has originally been merged to the right) are banned (cf. Podobryaev 2009; Fanselow & Ćavar 2002).<sup>5</sup> Note that, while this analysis generates P-stranding, it cannot derive P-omission (under the assumption that sluicing is derived via the same kind of movement as (13)):

<sup>5</sup> This constraint is postulated in Fanselow & Ćavar (2002). To the best of my knowledge, its nature remains unclear.

- (14) Petja sdelal èto nazlo komu=to, no ja ne znaju  
Peter did this on-evil who.DAT=INDF but I not know  
[CP [PP komu nazlo] [TP Petja sdelal èto [PP komu nazlo]]]  
who.DAT on-evil Peter did this who.DAT on-evil  
‘Peter did that to spite someone but I don’t know (to spite) who’.

This is so because in sluicing the lower copies must entirely get deleted along with TP-ellipsis, so partial pronunciation of the highest copy does not seem to be licensed. Thus if P-stranding is derived as Podobryaev proposes, it should not have the expected influence on P-omission.<sup>6</sup>

To sum up, if the PSG works we expect to find a categorical contrast between strandable and non-strandable Ps in Russian with respect to their ability to be omitted under sluicing. If variation within the class of Russian Ps cannot be attributed to P’s strandability, the PSG and with it the movement-and-deletion analysis would be compromised.

In the following subsections I present a study of P-omission in Russian showing that variation is indeed found and address the research questions posed at the outset.

### *1.2. P-omission under sluicing in Russian*

The principal example (6a) that Merchant (2001) used to show ungrammaticality of P-omission under sluicing in Russian contained a very short, non-syllabic proclitic preposition *s* ‘with’, which is also classified as functional in Yadroff & Franks (1999) and is not strandable. A natural question that arises is whether P-omission under sluicing in Russian is equally ungrammatical for any P or whether we find variation in acceptability as a function of P, as we apparently do in Hebrew and French. In order to find this out, I conducted an acceptability judgment survey, involving sentences exhibiting P-omission under sluicing for a wide range of different Ps.

#### *1.2.1. Materials*

The questionnaire used for the survey comprised 39 (43) sentences of Russian, of which 31 (35) were target sentences and 8 were filler sentences, presented in pseudo-random order, constant for all participants.<sup>7,8</sup>

Target sentences all exhibited P-omission under sluicing (indicated by    in (15)) and had a similar structure: in all of them the correlate PP was linearly final in the antecedent and every PP performed the role of a VP- (15a) TP- (15b) or NP-modifier (15c).

<sup>6</sup> Unless, as suggested to me by Idan Landau (p.c.), the derivation of P-omission under sluicing is cyclic, that is, distributed deletion eliding the P upstairs and the *wh*-phrase downstairs, precedes TP-ellipsis eliminating the complement-less copy of the PP. Due to lack of evidence for such a strict ordering of the two PF-processes, I am not exploring that option in any detail here.

<sup>7</sup> The actual questionnaire presented to participants contained 35 target sentences, but 4 of them were left out from the analysis: they involved two-word Ps that could not be considered on a par with other Ps.

<sup>8</sup> Fillers were predominantly monoclausal sentences containing PPs like (i):

(i) Čto naxodit-sja [PP **naprotiv** novogo muzeja]?  
What find.3SG-REFL opposite new.GEN museum.GEN  
‘What is situated in front of the new museum?’

- (15) a. Sergej napisal ètu rabotu [PP **pod** čjim=to rukovodstvom]  
 Sergej wrote this work under whose.INS=INDF supervision.INS  
 ne možesh uznat' \_\_čjim?  
 not can.2SG find-out whose.INS  
 'Sergej wrote this paper under somebody's supervision, could you find out whose?'
- b. Scenu ubrali ot-sjuda [PP **posle** kakogo=to meroprijatija]  
 Stage.ACC removed.3PL from-here after what.GEN=INDF event.GEN  
 no ja ponjatija ne imeju \_\_ kakogo.  
 but I idea not have what.GEN  
 'They removed the stage from here after some event, but I have no idea what.'
- c. Ètot lingvist znajet očen' mnogo jazykov, [PP **vključaja** odin iz kel'tskix],  
 This linguist knows very many languages including one[ACC]of Celtic.GEN.PL  
 tol'ko ja ne pomnju \_\_ kakoj iz nix  
 only I not remember what[ACC] of they.GEN  
 'This linguist knows a lot of languages including one of the Celtic ones – I just don't remember which of them.'

The sluice-containing clause was conjoined to the antecedent either by means of a conjunction (*no* 'but', *tol'ko* 'only/it is just that...', *pravda* '(but) actually') or asyndetically, or instantiated a separate matrix clause. The sluicing remnants were predominantly complex *wh*-phrases with an elided NP-complement: *kakoj/kakaja (imenno/iz nix)* 'what.M/F (exactly/of them)' in 20 sentences; *čej/čja* 'whose.M/F' in 7 sentences; *kotoryj/kotoraja (iz nix)* 'which M/F (of them)' in 2 sentences.<sup>9</sup>

Table 2 gives a summary of prepositions used in the correlate.

Phonological weight	No. of sentences	Examples
Non-syllabic	3	<i>k</i> 'to', <i>s</i> 'with'
Monosyllabic	7	<i>na</i> 'on', <i>dlja</i> 'for'
Disyllabic	11	<i>radi</i> 'for', <i>vmesto</i> 'instead'
Trisyllabic	6	<i>okolo</i> 'beside, near' <i>vopreki</i> 'in defiance of'
Quadrисyllabic	4	<i>naperekor</i> 'athwart' <i>blagodarja</i> 'owing to'

Table 2. Prepositions used in the experimental items

### 1.2.2. Participants, procedure and data treatment

59 native speakers of Russian, including 15 'naïve' speakers and 44 linguists or students of linguistics, unaware of the aim of the study, participated in the survey.

<sup>9</sup> The remaining two sentences contained *kto iz nix* 'who of them' and *skol'ko* 'how many'.

The 43 sentences were organized as an online questionnaire using SurveyGizmo Online Survey Software.<sup>10</sup> The questionnaire was prefaced by written instructions: participants were asked to judge each sentence based solely on their linguistic intuition and not on the degree of its compliance to prescriptive or stylistic norms; they were asked to do it as soon as they had read (preferably, out loud) and understood a sentence. They had to judge sentences by choosing one of the following five fixed answer options, presented on the screen as a scale from left to right:

- *Ploxoje* ‘Bad’ – absolutely unacceptable, no one would say a sentence like this;
- *Režet slux* ‘Sounds bad to the ear’ – admissible, but I would never say a sentence like this;
- *Prijemlemoje* ‘Acceptable’ – admissible, but sounds clumsy;
- *Xorošeje* ‘Good’ – the sentence is well-formed, I could say a sentence like this;
- *Otličnoje* ‘Excellent’ – the sentence is excellently formed, one can’t put it better.<sup>11</sup>

In addition, an empty field was provided under each sentence where participants were encouraged to leave their comments, specifying their reservations about a sentence or providing a ‘better’ version of it.

The speakers’ responses and metadata were automatically collected by the SurveyGizmo software and downloaded in Excel file format for analysis.

For each sentence (and P), columns of cross-speaker judgments in numerical form were obtained, which enabled the calculation of its mean acceptability, aimed at assessing the status of P-omission in the Russian grammar. To test the purely phonological hypothesis, the columns for individual sentences (and Ps) were then grouped together according to the phonological weight of the preposition they contained.

### 1.2.3. Results and discussion

Strikingly (in view of the PSG), none of the sentences with P-omission under sluicing received the minimal possible mean judgment (i.e. 1): instead, as Fig. 1 shows, mean judgments ranged from 2.3 to 4.4. Furthermore, the majority of the sentences (84%) received a mean judgment of ‘acceptable’ or better, with only 16% judged worse than ‘acceptable’ (and still not even coming close to ‘bad’).

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<sup>10</sup> <http://www.surveygizmo.com/>

<sup>11</sup> The disambiguation of each answer option was presented on the first page of the questionnaire. For quantitative analysis the verbal judgments were converted into numbers from ‘1’ for ‘bad’ to ‘5’ for ‘excellent’.

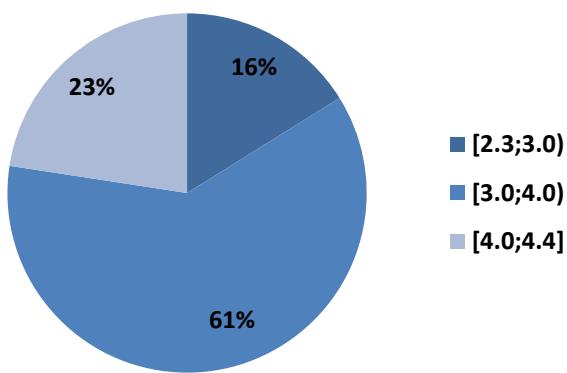


Figure 1. Percentage of sentences in each mean judgment value interval

61% of the sentences got the two highest judgments from more than 50% of the speakers; each sentence received a ‘5’ from 3 speakers at least and 29% of sentences were not judged ‘bad’ by any speaker. All this strongly suggests that P-omission under sluicing is not categorically unacceptable in Russian, contrary to what the PSG predicts.

As for the question of whether there is variation within the class of P, the distribution of mean judgment values presented above already suggests that the data are gradient. All the target sentences were composed so that the only source of ungrammaticality stemmed from P-omission. Of course, there still might have been factors uncontrolled for (e.g. combinations that were not very successful stylistically – judging by the participants’ comments, this affected the judgments despite the fact that they were explicitly asked not to take into account stylistic considerations) and the sentences were not minimally different. Bearing these reservations in mind, note that the acceptability of sentences with P-omission was found to correlate with the phonological weight of the preposition in the sluicing correlate. As seen from Table 3, the heavier the P, the more acceptable its omission. The contrast between light and heavy prepositions is illustrated below:<sup>12</sup>

- (16) a. ?Maša kupila èto platje **k** kakomu=to prazdniku,  
     Maša bought this dress to what.DAT=INDFholiday.DAT  
     no ja ne pomnju \_\_ kakomu.  
     but I not remember what.DAT  
     ‘Mary bought this dress *for* some holiday but I don’t remember which.’
- b. Pëtr sdelal Maše predloženije **nakanune** kakogo=to prazdnika,  
     Pëtr did Maša proposal on-eve what.GEN=INDFholiday.GEN  
     no ja zabyl \_\_ kakogo.  
     but I forgot what.GEN  
     ‘Peter proposed to Mary *on the eve of* some holiday but I forgot which.’

<sup>12</sup> The mean value judgment was 3 (‘acceptable’) for (16a) and 3.97 (‘good’) for (16b).

	<b>0-SYLL</b>	<b>1-SYLL</b>	<b>2-SYLL</b>	<b>3-SYLL</b>	<b>4-SYLL</b>
<b>MEAN</b>	2.93	3.06	3.33	3.49	3.59
<b>SD</b>	1.07	1.05	1.08	1.04	0.95

*Table 3. Mean judgments of sentences with P-omission under sluicing, grouped according to P weight (non-linguists)<sup>13</sup>*

A one-way between subjects ANOVA was conducted to compare the effect of P's prosodic weight on the acceptability of sentences with P-omission for the non-, mono-, di-, tri- and quadri-syllabic P conditions. There was a significant effect of P-weight on the acceptability of P-omission at the  $p<.05$  level for the five conditions [ $F(4, 457)=4.70$ ,  $p=0.001$ ]. Post-hoc analysis was conducted to find out which of the five groups were significantly different from each other: for that, 10 individual t-test comparisons were performed, whose results were corrected by the FDR (False Discovery Rate) procedure. This analysis revealed a significant difference in acceptability between 0-SYLL and 3-SYLL [ $t(131)=-2.92$ ,  $p=0.004$ ]; 0-SYLL and 4-SYLL [ $t(102)=3.32$ ,  $p=0.001$ ]; 1-SYLL and 3-SYLL [ $t(191)=-2.90$ ,  $p=0.004$ ]; 1-SYLL and 4-SYLL [ $t(162)=3.25$ ,  $p=0.001$ ] conditions; a marginally significant difference between 0-SYLL and 2-SYLL [ $t(207)=2.16$ ,  $p=0.032$ ]; 1-SYLL and 2-SYLL [ $t(267)=2.01$ ,  $p=0.045$ ] conditions and a non-significant difference for the remaining pairs: 0-SYLL vs. 1-SYLL [ $t(146)=-0.66$ ,  $p=0.508$ ]; 2-SYLL vs. 3-SYLL [ $t(252)=-1.19$ ,  $p=0.235$ ]; 2-SYLL vs. 4-SYLL [ $t(223)=-1.67$ ,  $p=0.096$ ] and 3-SYLL vs. 4-SYLL [ $t(147)=0.58$ ,  $p=0.562$ ]. Thus, there appears to be a contrast in acceptability of P-omission between non- and mono-syllabic Ps on the one hand and Ps that are disyllabic or heavier on the other, with the former being less susceptible to omission.

The correlation between the phonological weight and the acceptability of P-omission is also reflected in the pattern of participants' comments: the number of suggestions to insert a P in the sluice had a tendency to decrease upon increase of P's weight (Table 4); moreover, for each non- and monosyllabic P there was at least 1 speaker, whereas this was true for only about a half of the Ps in each of the other groups (compare the 2<sup>nd</sup> and 3<sup>rd</sup> columns from the right of Table 4).

<b>Preposition group</b>	<b>No. of P-insertions</b>			<b>No. of inserted Ps</b>	<b>Total no. of Ps</b>	<b>No. of insertions per P</b>
	<b>NON-LING</b>	<b>LING</b>	<b>TOTAL</b>			
<b>0-SYLL</b>	15	20	35	3	3	11.67
<b>1-SYLL</b>	11	32	43	7	7	6.14
<b>2-SYLL</b>	7	11	18	6	11	1.64
<b>3-SYLL</b>	0	1	1	1	6	0.17
<b>4-SYLL</b>	1	2	3	2	4	0.75

*Table 4. No. of suggestions to insert the omitted P in the sluice*

<sup>13</sup> Data from linguists were analyzed as well but then discarded since, on average, they judged sentences with 2-, 3- and 4-syllabic Ps significantly higher than non-linguists (t-test for each pair yielded  $p<0.05$ ). Thus, as a by-product of this study comes the expected conclusion that linguists are not representative speakers. Nonetheless, the general pattern of responses was the same and even more pronounced for linguists and both groups of speakers taken together. That is, linguists more clearly perceived the contrast between sentences in the non-syllabic and mono-syllabic P conditions on the one hand and di-, tri- and quadri-syllabic conditions on the other.

Thus, it was the sentences involving omission of non-syllabic and monosyllabic Ps that were rated lowest and where the participants wanted to insert the P most often. This divide appears related to the fact that all the light Ps are phonologically proclitics, usually analyzed as adjoined to the following prosodic word (PWD) whereas heavier Ps (at least, most of them) apparently constitute PWDs of their own (cf. Gribanova 2009; Padgett 2002).

That phonological weight of P is a factor affecting P-omission under sluicing is independently supported by Sag and Nykiel's findings for Polish, a Slavic language related to Russian: monosyllabic prepositions were rated worse than multisyllabic prepositions if omitted from sluicing remnants (Nykiel 2013; Sag & Nykiel 2011), but the construction was still acceptable with both of them, as in Russian. Importantly, Joanna Nykiel (p.c.) points out that the effect of P weight is not reducible to the P function (predicative as in *They are on the road* vs. non-predicative as in *They rely on you*) and the argument/modifier status of the PP.<sup>14</sup> Furthermore, she notes that the idea that multisyllabic Ps involve more complex syntax and semantics would not work very well for Polish Ps which are mostly one-word long and non-compositional.

To conclude, there are clear indications that the phonological weight of P in the correlate affects the pattern of P-omission under sluicing. This lends plausibility to the purely phonological hypothesis presented at the outset.

Let me now consider the alternative hypothesis, namely, that variation within the group of prepositions is a reflection of a categorial/structural distinction. As was noted above, a small set of Ps in Russian appear to be strandable. Three of them, one trisyllabic and two quadrисyllabic, were used in the survey (boldfaced in Table 1) but their omission from the sluice was judged similarly ( $M=3.60$ ,  $SD=0.97$ ) to the omission of *non-strandable* tri- and quadrисyllabic Ps ( $M=3.51$ ,  $SD=1.01$ ): the t-test found the difference between the groups to be statistically non-significant [ $t(147)=-0.45$ ,  $p=0.652$ ]. The lack of a categorical contrast between strandable and non-strandable Ps suggests that the P's ability to strand is not a decisive factor in the pattern of P-omission under sluicing in Russian.

The second option introduced above was that a lexical/functional split à la Ydroff & Franks (1999) is responsible for the variable ability of Ps to be omitted under sluicing. One of the characteristics that distinguish the two is P's etymological source: basic, underived Ps belong to the functional class, while those derived from lexical categories (N, V, A) belong to the lexical; furthermore, there exists a natural correlation between the phonological weight of prepositions and their etymological source – underived Ps tend to be lighter than derived Ps. So one may wonder if the observed sensitivity of P-omission to P-weight is just a reflection of a categorial distinction. The group of disyllabic Ps used in the experimental sentences was the only non-homogeneous group of prepositions in the sense that it contained both underived (6) and derived (5) Ps, whereas the non- and monosyllabic ones were all underived and the tri- and quadrисyllabic ones were all derived. The categorial split hypothesis then predicts a significant difference between underived and derived disyllabic Ps. This prediction, however was not borne out: not only was the difference between the groups not significant [ $t(164)=0.392$ ,  $p=0.696$ ], but also the sentences with omitted underived Ps ( $M=3.36$ ,  $SD=1.04$ ) were actually judged slightly better than those with derived Ps ( $M=3.29$ ,  $SD=1.13$ ). Furthermore, under this approach, one would expect underived disyllabic Ps to pattern

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<sup>14</sup> According to Joanna Nykiel (p.c.), when the weight of P is controlled for, Ps heading adjunct PPs are less likely to be omitted from the sluice than those heading argument PPs. Since in the survey presented here only sentences with adjunct PPs were used, it is imaginable that this factor contributed to the somewhat degraded nature of these sentences. I leave an experimental study investigating the role of this factor for further research.

together with non- and mono-syllabic Ps ( $M=3.02$ ,  $SD=1.05$ ), but the sentences with the former were in fact rated significantly higher [ $t(236)=-2.39$ ,  $p=0.018$ ]. On the other hand, there are data that might seem to stand in favor of the discussed hypothesis. For instance, a disyllabic underived P *čerez* ‘through, across’ was judged very low ( $M=2.33$ ,  $SD=0.82$ ), suggesting that it probably patterns with non- and monosyllabic Ps. However, in fact it turns out that it was rated even significantly lower than the monosyllabic group [ $t(117)=-2.56$ ,  $p=0.012$ ], which suggests that the surprisingly low acceptability of this sentence might be due to factors other than P-omission. In addition, a highly significant difference [ $t(461)=3.10$ ,  $p=0.002$ ] was indeed found between underived ( $M=3.15$ ,  $SD=1.06$ ) and derived Ps ( $M=3.45$ ;  $SD=1.05$ ). However, this piece of data is also compatible with the phonological hypothesis, given that there is a correlation between phonological weight and etymological source; moreover, if this contrast were due to a categorial contrast one would expect to also find it within the group of disyllabic P, but, as was shown above, there was no such contrast. Furthermore, the acceptability contrast between omission of derived and underived Ps, though significant, is not categorical, as would be expected if a syntactic violation was involved. For these reasons and due to the fact that acceptability of P-omission gradually increases along with P-weight, I conclude that the purely phonological hypothesis captures the facts better.

To summarize, although it is clear that other factors might have influenced the results, the phonological weight of P does play a role in the pattern of P-omission.

### 1.3. *On the type of wh-phrase in the remnant*

A comment is in order as to why the results of the survey presented above turn out to be quite different from the Russian P-omission data presented in Merchant (2001). In particular, why is the omission of *s* ‘with’, ungrammatical in Merchant’s example (6a), judged acceptable by speakers in my survey? A possible source of this discrepancy lies in the choice of the sluicing remnant: while Merchant’s sentences have bare *wh*-phrases as P-less remnants, my survey involved only one sentence of this type, whereas the majority of the sentences contained complex *wh*-phrases, i.e. the Russian equivalents of *what/whose/which NP* (with an elided NP).

This should not be overlooked, especially in view of the fact that a contrast between sentences involving P-less remnants of different types has been repeatedly noticed in the literature. For instance, Szczegielniak (2008) reported D-linked remnants (*which-NPs*) to be the only ones tolerating P-omission in Polish while Rodrigues et al. (2009) observed a strong preference for this kind of remnant over bare *wh*-phrases in Spanish.<sup>15</sup> The contrast is illustrated in (17), taken from Szczegielniak (2008:ex.5, 6).

- (17) a. Anna tańczyła z kim-ś ale nie wiem \*(z) kim  
Ann danced with who.ACC-INDF but not know.1SG (with) who.ACC  
'Ann danced with someone but I do not know who.'
- b. Anna tańczyła z jednym mężczyzną, ale nie wiem (z) którym  
Ann danced with one.ACC man.ACC but not know.1SG (with) which.ACC  
'Ann danced with one man, but I do not know which.'

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<sup>15</sup> In fact, Rodrigues et al.’s (2009) position is less clear: while speaking in terms of preference, they star their examples with bare *wh*-phrases as ungrammatical.

To account for these data, Szczegielniak (2008) proposed that the underlying structure of sentences exhibiting P-omission under sluicing in Polish is an interrogative cleft, rather than a simple interrogative clause. The derivation thus proceeds as in (18): first, the PP containing the *wh*-phrase is moved out of the VP for a cleft-like structure to be formed; then *which* raises out of the clefted PP across the expletive marker *to*, possibly, for additional emphasis (cf. Szczegielniak 2008) and, finally, all the material below the raised *which* gets elided.

- (18) Anna tańczyła z jednym mężczyzną, ale nie wiem  
 Anna danced with one.ACC man.ACC but not know.1SG  
 którym<sub>2</sub> → [z t<sub>2</sub> mężczyzną] → Anna tańczyła t<sub>1</sub>  
 which.ACC it with man.ACC Anna danced  
 ‘Anna danced with one man but I don’t know which.’

This analysis captures the relevant contrast since clefts of this kind (involving extraction out of the DP complement of a P), as argued by Szczegielniak, can only be formed with complex, or D-linked, *wh*-phrases.

Similarly, Rodrigues et al. (2009) proposed that sluicing with P-omission in Spanish is derived from a cleft source, namely a cleft based on a specifical copular sentence:

- (19) Juan ha hablado con una chica, pero no sé [CP cuál  
 Juan has talked with a girl but not know which  
 [IP es [DP la chica [RC con la que ha hablado Juan]]]]]  
 is the girl with the that has talked Juan  
 ‘Juan has talked to a girl, but I don’t know which girl it is that he has talked to.’

Both analyses thus attempt to account for the exceptions to the PSG while leaving it intact.

An obvious question that arises is whether the Russian data discussed above may be subject to a similar treatment. Insofar as these two particular analyses are concerned, the answer is negative. The account proposed for Spanish is clearly untenable for Russian P-omission, e.g. (20a): this kind of cleft requires its pivot *wh*-phrase to bear nominative case morphology. This is in conflict with the well-known morphological case-matching requirement on the sluicing remnant and its correlate and since in the sentences under discussion the correlate’s case is determined by P, it may never be nominative:

- (20) a. Correlate.INS = Remnant.INS → OK  
 Ivan govoril s kakim=to akcentom no ja ne ponjal, kakim.  
 Ivan spoke with what.INS=INDEF accent.INS but I not understood what.INS  
 ‘Ivan spoke with some accent but I didn’t get what (accent).’
- b. Correlate.INS ≠ Remnant.NOM → BAD  
 Ivan govoril s kakim=to akcentom no ja ne ponjal,  
 Ivan spoke with what.INS=INDEF accent.INS but I not understood  
 kakoj \*(eto byl accent [RC s kotorym govoril Ivan]).  
 what.NOM it was accent with which.INS spoke Ivan  
 ‘Ivan spoke with some accent, but I didn’t get what (kind of) accent it was.’

Whereas the non-elliptical cleft with a nominative *what*-NP (20b) is acceptable, albeit clumsy, its truncation is ungrammatical, so it cannot provide a source for sluicing.

The alternative cleft structure proposed by Szczegielniak does derive the case-matching effect, characteristic of sluicing in the case-marking languages. In this case, however, a

necessary step in the derivation is the raising of *which* out of the clefted PP across an expletive pronoun, which Szczegielniak claims to be licit in clefts, but not in simple *wh*-interrogatives. I know of no construction in Russian that allows this kind of movement: the construction that seems to be most similar to the Polish one requires pied-piping of the P (compare 21a and b).<sup>16</sup> Interestingly, the movement of the whole PP is also not licit (21c).

- (21) a. [S kakim]<sub>2</sub> èto [t<sub>2</sub> turoperatorom]<sub>1</sub> vam tak ne povezlo t<sub>1</sub>?  
**With** what.INS it travel company.INS you so not lucky  
 b.\*Kakim<sub>2</sub> eto [s t<sub>2</sub> turoperatorom]<sub>1</sub> vam tak ne povezlo t<sub>1</sub>?  
 What.INS it **with** travel company.INS you so not lucky  
 c.\*[S kakim turoperatorom]<sub>1</sub> eto t<sub>1</sub> vam tak ne povezlo t<sub>1</sub>?  
**With** what.INS travel company.INS it you so not lucky  
 ‘Which travel agency was it that you were so unlucky with?’

Thus, this alternative is not suitable for Russian either. In fact, even its validity for Polish is doubtful: an experimental study involving judgment tasks presented in Nykiel (2013) provides convincing evidence that sentences like (21b) are not grammatical in Polish. In addition, as pointed out by Nykiel (2013), Szczegielniak’s analysis predicts NP complements of *which*-phrases to never surface in the sluice, contrary to fact.

To summarize, neither the structure proposed for Spanish, nor the one proposed for Polish allows us to derive P-omission under sluicing in Russian and, furthermore, none of these approaches is capable of capturing the prosodic weight effect.

The point of this subsection has been to draw attention to the observation that P-omission under sluicing is more acceptable with complex than with simple *wh*-phrases as remnants. The quite high acceptability of P-omission in Russian that I reported on in previous subsection might then at least in part be due to the fact that the sentences examined predominantly involved complex *wh*-remnants. Still, the nature (and sharpness) of the contrast is not clear: for Polish, Szczegielniak (2008) considers it a grammaticality contrast and accordingly accounts for it syntactically, whereas Nykiel (2013) experimentally obtains a mere acceptability contrast and provides an analysis couched in processing terms. For Russian, the acceptability of P-omission sentences à la Merchant relative to those involving complex *wh*-remnants remains to be established (experimentally) before an analysis can be proposed. At this stage, I have merely shown that analyses accounting for P-omission in non-P-stranding languages via positing a cleft rather than an interrogative clause as a source for sluicing are not applicable to the Russian data.

#### *1.4. How does P-omission under sluicing inform us about P-stranding?*

In this section, so far, I have presented a study of P-omission (stranding) under sluicing in Russian. It was shown that the construction is possible in the language, contrary to what the PSG predicts. Furthermore, a correlation was established between the phonological weight of P in the correlate and the acceptability of P-omission in the sluice: the heavier the P the more acceptable its omission. Given that the light (non- and monosyllabic) Ps are also the most basic ones (not derived from a lexical item of a different category), which puts them in the functional class in terms of Ydroff and Franks’ classification, I also entertained the option that the difference in acceptability between the groups is due to a categorical distinction

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<sup>16</sup> The same holds of bare *wh*-phrases, hence, no relevant contrast is observed between them in Russian.

between the two. Although this option has its advantages, I rejected it for its inability to capture the absence of a categorical contrast in acceptability: one would expect functional Ps (which are merely morphological realizations of nominal functional features) to be inseparable from their complement and thus unable to be omitted as opposed to the lexical Ps, but the contrast between them was found to be graded instead. The plausibility of the hypothesis that the pattern of P-omission is phonologically conditioned was strengthened by independent evidence from Polish (Nykiel 2013; Sag & Nykiel 2011). Finally, I pointed out another factor that appears to affect the acceptability of P-omission, namely the choice of the remnant *wh*-phrase: it was reported in the literature to be more acceptable with *which*-NP remnants than with bare *wh*-phrase remnants. Whether P-less sluices with bare *wh*-phrases are strictly ungrammatical (as claimed in Szczegielniak 2008 for Polish) or merely degraded with respect to sluices with complex (D-linked) *wh*-phrases (as Nykiel 2013 experimentally found for Polish) remains to be established for Russian.

The fact that P-omission under sluicing is possible in non-P-stranding languages, as shown in previous studies as well as in the present paper, means that P-stranding does not instantiate a *necessary and sufficient* condition for this phenomenon, contrary to the PSG. Rather, it is merely a *sufficient* condition for P-omission: Merchant (2001) showed that English and Northern Germanic languages, the core of the P-stranding group, all allow P-omission. These facts imply one of the following:

1. there exist *alternative mechanisms* for the derivation of (P-omission under) sluicing, one of them being P-stranding, available for the group of P-stranding languages;
2. there exists a *universal mechanism* responsible for P-omission.

If the first option is correct, our findings concerning P-omission in Russian do not shed any light on the nature of P-stranding. However, there are reasons to doubt the viability of the P-stranding analysis of P-omission even for Germanic: for instance, there are contexts in which English prepositions may be omitted (22a) but not stranded (22b).

- (22) a. We are willing to use force under certain circumstances but we will not say in advance \_\_ which ones.  
 b.\*What circumstances will we use force under \_\_?

Chung et al. (1995:273)

In case the mechanism is universal, and, thus, not involving P-stranding, the correlation between P-stranding and P-omission observed by Merchant is either a coincidence, or – which is more likely – a reflection of a more general mechanism (possibly, a property of P) responsible for the two phenomena. My findings concerning the pattern of P-omission under sluicing in Russian suggest what kind of property may underlie both P-omission and P-stranding and thus account for the greater freedom of P-omission in the P-stranding languages. We saw that for Russian the heavier the P gets the more acceptable its omission becomes; it is also known that phonological weight correlates with the prosodic status of a lexical item – the heavier it is the more likely it is to form an independent prosodic word (PWD). Thus, non-syllabic and monosyllabic underived Ps that we found to be least susceptible to P-omission are standardly analyzed as proclitics, i.e. segments/syllables adjoining to the following PWD, whereas heavier Ps are assumed to constitute PWds of their

own (Gribanova 2009; Padgett 2002).<sup>17</sup> Thus the findings obtained may be put in the following way: the closer the P gets to being a PWd, the more susceptible to omission it becomes. If this conclusion is cross-linguistically valid, what allows P-omission to occur more freely in the P-stranding languages must be the prosodic uniformity of prepositions in such languages. This predicts free P-omission under sluicing in languages where all prepositions project PWds. The P-stranding languages may indeed turn out to be of this type: Selkirk (1996) argues that Ps along with other function words in English project a PWd when final in a phonological phrase; in addition, according to Dixon (2007), many English Ps including certain monosyllabic ones (*up, in, on, out, with* etc.) only have a full, stressed form, so they must always project a PWd, whereas all English Ps *can* project PWds. Thus, if P-omission is conditioned in a similar way across languages, the pattern of P-omission under sluicing in non-P-stranding languages like Russian may inform us about the nature of P-stranding (in English, for example). It does so by connecting the rare ability of Ps to form independent prosodic words and their ability to be stranded.

As an aside, let me note that Nykiel (2013:fn.23) also proposed a more general grammatical property to explain greater freedom of P-omission in the P-stranding languages, namely, the specific mutual semantic dependencies that verbs and prepositions have developed in English and, apparently, other P-stranding languages. It is not clear, though, how this proposal fares with the instances of sluicing where the PP is, for example, an adjunct to a nominal phrase (23) and thus is clearly not semantically dependent on any verb.

- (23) She wore a dress *of* a bright color, but I can't remember \_\_ what (color).

Careful discussion and comparison of the two proposals is, however beyond the scope of this paper, so I leave it for future work. To emphasize, the point of this section has been to show that examining P-omission in languages that do not allow P-stranding may shed new light on the nature of the latter.

## 2. [P clitic] and P-stranding

### 2.1. \*[P clitic] and Abels (2003a,b) account

This section deals with a different phenomenon involving prepositions, namely, their ability to take clitic pronouns as complements. Like P-omission under sluicing this ability was proposed to only hold of Ps in the P-stranding languages (Abels 2003a,b), but I provide evidence that it is not the case. Nevertheless, studying [P clitic] collocations may again inform us about P-stranding. The aim of this section is then to emphasize the point that the investigation of superficially different P-related phenomena may let us better understand the nature of P-stranding.

Abels (2003a) and a section of Abels' (2003b) chapter on adposition stranding deal with the cross-linguistic ban on the appearance of clitic pronouns in the P-complement position, formulated as \*[P clitic]. This is illustrated for a sample of languages in (24-27), showing that clitics but not full pronouns in this position render sentences ungrammatical.

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<sup>17</sup> Whereas these studies provide evidence for the non-PWd status of basic, light Ps (based on the application/non-application of the phonological rules operating on the PWd-domain or its edges), the PWd status of heavier Ps is postulated rather than experimentally established.

- (24) Prema {\*=joj | √njoj} trće Serbo Croatian  
 Toward =her her run  
 ‘They are running towards her.’

(25) Sobre {\*=la | √ella} habló Pedro. Spanish  
 About =her her talked Pedro  
 ‘Pedro talked about her.’

(26) Gi {\*=ton | √aftón} milise o Petros. Greek  
 About =him him talked the Petros  
 ‘Petros talked about him.’

(27) Sun zoo da {\*=shi | √shii}. Hausa  
 3PL come with =him him  
 ‘They came with him.’

(Abels 2003b:ex. 296)<sup>18</sup>

Although this tendency had been noticed before Abels, he was the first to point out that the ban does not hold in the P-stranding languages. Indeed, English (28) and other Germanic languages (29) violate \*[P clitic] ‘on the surface’, whereas Gbadi (30) ‘does so at an earlier stage of derivation’, i.e. although on the surface the clitic is hosted by a perfective element, it is apparently base-generated as the complement of the postposition.

- (28) We talked about=im for quite some time. English

(29) Han trodde på=na.<sup>19</sup> Swedish  
 He believed on=her  
 ‘He believed in her.’

(30) wa y=É<sub>i</sub>-bÓ [PP<sub>i</sub> klÚ] jÍlÉ-É<sup>20</sup> Gbadi  
 they PRF=it<sub>i</sub>-Q t<sub>i</sub> on put-Q  
 ‘Have they put food on it (the table)?’

Abels therefore put forward the following typological generalization:

- (31) A language allows clitic pronouns as the complements of *P* iff that language allows *P*-stranding and has clitic pronouns (Abels 2003b:ex.297).

(31) can be formally presented as  $[P \text{ clitic}] \leftrightarrow [P \text{ trace}] \& \exists \text{clitic}$ , where the trace is that of the moved complement of P. Thus, on a par with Merchant's PSG, considered in the previous section, which established P-stranding as a necessary condition for P-omission under sluicing,

<sup>18</sup> The notation used in the examples is adopted from Abels (2012).

<sup>19</sup> Abels (2003a,b) gives similar examples from Icelandic and Norwegian as well.

<sup>20</sup> The Gbadi sentence (except for the gloss) is presented as in the initial source of the example, Koopman (1984). Capital letters are used for vowels not associated with the advanced tongue root feature and diacritics above the vowels indicate tone. While these details are irrelevant for my purposes, I leave them to remain faithful to the source of the example.

this generalization posits P-stranding as one of the necessary conditions for [P clitic]. But is it indeed the case? If not, why does [P clitic] occur in P-stranding languages and (allegedly) not in non-P-stranding languages? Is there a more general property that underlies both phenomena, as I hypothesized for P-omission in the previous section? The goal of this section is to answer these questions.

Abels (2003) proposes that \*[P clitic] reduces to a more general ban on P-stranding, which in turn falls out from the ban on extracting complements of phase heads, as illustrated in (32) below:

- (32) \*[P clitic]<\*[P trace]<\*[ $\alpha$  trace], where  $\alpha$  is the head of a phase.

An explanation of the [P clitic] generalization in terms of (32) requires the following assumptions: a) pronominal clitics are bare heads that undergo obligatory syntactic movement; b) movement is a last resort operation aimed at establishing a more local relation between two elements: this ensures immobility of complements of phase heads, i.e. the \*[ $\alpha$  trace] filter: movement of the immediate complement of  $\alpha$  is disallowed since it has to proceed through Spec  $\alpha$ P and this step of movement is not motivated, hence illicit. Given these assumptions, if a clitic is base-generated as a complement of P, the unavoidable result of the derivation will be [P t], ungrammatical in non-P-stranding languages, in which Ps are phase heads, and licit in P-stranding languages, in which Ps are not phase heads.<sup>21</sup> Thus, the idea is that pronominal clitics are allowed as complements of P in the P-stranding languages since they are able to undergo movement from there.

## 2.2. Abels (2003a,b): theoretical and empirical problems

Abels' account of \*[P clitic] in terms of P-stranding naturally explains why ...clitic...[P t<sub>clitic</sub>]... is illicit in the non-P-stranding but grammatical in the P-stranding languages, though the only instance of actual movement of a clitic out of a PP is only observed in the Gbadi language (30).

However, the primary aim of the author seems to be to explain why we see clitics in what appears to be their base-generated position in P-stranding but not in non-P-stranding languages, i.e. why [P clitic] is allowed in the surface structure in one group of languages but not in the other. This forces Abels (2003a,b) to postulate that the pronoun undergoes (vacuous) covert movement in the P-stranding languages – clearly an unwelcome move in absence of independent evidence for it. Moreover, in his later work (Abels 2012), Abels specifies that his generalization only holds of *special* clitics (those having a designated syntactic position distinct from that of full DPs and strong pronouns) and says that the Germanic light pronouns may not instantiate this kind of clitic and thus may not need to move. If this is the case, [P clitic] strings in the core P-stranding languages may be grammatical for reasons that have nothing to do with P-stranding. In other words, Gbadi is the only P-stranding language that provides direct evidence for the account of \*[P clitic] in terms of \*[P trace].

As regards non-P-stranding languages, according to Abels, clitics may not surface in the P-complement position because it is not the position where they check their special features.

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<sup>21</sup> In Abels' later work (Abels 2012) Ps are taken to be phase heads in all languages, so what determines P-stranding is not non-phasehood of P but rather the presence of an additional (DrP) projection between P and DP (P's thematic complement).

The option to move to the special position covertly (available for the P-stranding languages) is blocked by positing that the ban on P-stranding is active in covert syntax. This claim, however, is problematic in view of the conjecture made in Chomsky (1995) that overt and covert movement might have different properties: as noted in Huang (1982) the bounding conditions on overt movement are relaxed when movement takes place in the LF component (i.e. covert syntax). Then, it is not unreasonable to assume that the ban on P-stranding may be relaxed in covert syntax as well. For example, Aoun et al. (1987) view the ban on P-stranding as a violation of the proper government condition: overt gaps must be governed by a lexical head at the PF-level, but Ps do not have phonological properties of such heads. It follows that ‘although in most languages prepositions cannot be stranded syntactically, they can be stranded by LF movement’ (Aoun et al. 1987:566).<sup>22</sup> Given this, it is not clear why the covert movement option should not be available for pronouns in the [P clitic] sequences in non-P-stranding languages.<sup>23</sup> In sum, while it is obvious why the cases in which the clitic has overtly moved out of the PP are ruled out in non-P-stranding languages and allowed in the P-stranding languages (although the only evidence for the latter comes from one language), what the analysis actually sets out to explain is why clitics are possible/impossible in the P-complement position *on the surface* and this necessitates recourse to covert movement for which no independent evidence is provided.

Keeping the aforementioned theoretical problem in mind, let us address empirical data which challenge Abels’ generalization. These data come from Serbo Croatian, a focus non-P-stranding language considered in Abels (2003a,b). On a par with ungrammatical instances of [P clitic] reported by Abels (24, repeated here as (33)) there are cases where such collocations are actually licit: (34) where the clitic is 1<sup>st</sup> or 2<sup>nd</sup> person accusative pronoun (Popova 1986) and (35) where the clitic is a special *n*-initial form of the 3<sup>rd</sup> person masculine accusative pronoun.<sup>24</sup>

- (33) Prema {\*=joj | √njoj} trče  
 Toward =her her run  
 ‘They are running towards her.’

(Abels 2003b:ex.296)

- (34) Majka je ovo {za té; záte} spremila  
 Mother has this for you.ACC for-you.ACC prepared  
 ‘Mother prepared this for you.’

(Dimitrova-Vulchanova 1999:ex.34)

<sup>22</sup> As an illustration they provide sentences in (ii) (their 62) where ‘[an in situ *wh*-item to the right of the preposition moves to Comp at LF, where it is paired with the item that is moved there in the syntax’ (Aoun et al. 1987:566).

(ii) a. Who spoke to who?  
 b. Qui a parlé avec qui?

<sup>23</sup> This discussion may be a bit outdated in view of the currently popular approach that all movement takes place in syntax and covert movement corresponds to PF-privileging (pronunciation) of the lower copy and LF-privileging (interpretation) of the higher copy (see e.g. Bobaljik 2002).

<sup>24</sup> Abels (2003a,b) argues against considering *nj* a clitic, in contrast to Bošković (2001), and does not consider 1<sup>st</sup> and 2<sup>nd</sup> person clitics at all.

- (35) (da) na {\*=ga | √=nj} =je ljut  
 COMP on =he.ACC =he.ACC =is angry  
 '(that) he is angry with him.'

(Bošković 2001:ex.117)

(34) shows that the P-clitic collocation is pronounced with a single stress either on the clitic or on the P and is even spelled as a single morphosyntactic word in the latter case; in addition, this is only allowed with monosyllabic Ps (cf. Dimitrova-Vulchanova 1999). (35) with *nj* is licensed, according to Bošković (2001), since *nj* not being a second-position (special) clitic (in contrast to *ga*) does not have to move and thus the proclitic preposition *na* and the enclitic *nj* may satisfy each other's prosodic requirements so that the resulting combination is tonic (not a clitic).<sup>25</sup> The phonological process that Bošković discusses looks like prosodic word formation, which seems to take place in PPs like in (34) as well. It is thus logical to attempt to analyze them in the same way. However, the problem is that *te* 'you.ACC' and *me* 'me.ACC', unlike *nj*, are second position clitics (i.e. special clitics) as (36) illustrates.

- (36) Ti si želio da =me =ih lišiš.  
 You.NOM are wanted COMP =me.ACC =them.GEN deprive.2SG  
 'You wanted to deprive me of them.'

(Bošković 2001:ex.112a)

The case of *nj* does not pose an insurmountable problem for Abels: in Abels (2003a,b) he argues against considering it a clitic, whereas in Abels (2012) he analyzes its Old Church Slavonic correlate as composed of two morphemes – a clitic morpheme and a prothetic *n*-morpheme that projects additional structure between the P and the D(P): this additional structure makes the clitic (covertly) mobile as it is no longer an immediate complement of a phase head. Viewing *nj* as a simple (not special) clitic, as in Bošković (2001), is yet another option for Abels (2012).<sup>26</sup>

On the other hand, the case of the 1<sup>st</sup> and 2<sup>nd</sup> person accusative clitics *te* and *me* is a serious challenge for his generalization: when these clitics occur as complements of monosyllabic ACC-assigning Ps they suddenly do not move to the second position (see 34). Moreover, the option that they move there covertly is not available, since, unlike in the case of *nj*, there is no evidence for an additional morpheme between the P and the D that would enable such movement. Finally, such examples are not amenable to an explanation in terms of the three analytic options proposed in Abels (2012) for superficial exceptions to \*[P clitic]: 1) *te* and *me* must be viewed as special rather than simple clitics as they are Wackernagel second-position clitics (cf. 36); 2) they are clearly not treatable as agreement morphemes on the P; 3) Ps allowing *te/me* as their complements are quite basic ones, so it is quite unlikely that they are not true Ps. Thus, sentences like (34) instantiate true counterexamples to Abels' generalization. In particular, the grammaticality of [P clitic] in Serbo Croatian means that either the clitic moves covertly and the ban on P-stranding does not hold in covert syntax or there is simply no movement. Both options are problematic for Abels: if we allow for P-stranding in covert syntax for (34) how can we ban it in (33)? Secondly, if second-position

<sup>25</sup> Bošković (2001) notes that very often cross-linguistically, when a proclitic and an enclitic, or a prefix and a suffix, are combined, the prosodic subcategorizations of the proclitic and the enclitic, or bound morphemes in general, cancel each other out so that the combination proclitic+enclitic/prefix+suffix as a whole is not prosodically dependent. This option according to him is subject to both inter- and intra-language variation.

<sup>26</sup> Though not for Abels (2003a,b): recall that originally the generalization was aimed at explaining the distribution of all clitics and only in his later work did he weaken it to pertain to special clitics only.

clitics do not always move, how can we be sure that their special position is the result of movement at all (they could be base-generated there)? The latter, base-generation, option appears to be more viable in absence of direct evidence for movement. This, in turn, means that special clitics can apparently satisfy their needs PP-internally under certain conditions, possibly when they constitute a well-formed PWd with the P. And if special clitics do not always move, the whole account of \*[P clitic], crucially based on the assumption that they do, is flawed. Furthermore, the fact that there exist abundant superficial exceptions to \*[P clitic] and not even all of them can be ‘dealt with’ using alternative explanations (see Abels 2012) make us suspect that such a uniform ban simply does not exist.

### *2.3. \*[P clitic] as a phonological restriction. Why not in P-stranding languages?*

Let me now address some implications of examples like (34) in which a second-position clitic appears to be in its in situ position. They seem to suggest that when movement to the second position is not possible (e.g. when it incurs a P-stranding violation) there might be an additional mechanism for licensing such clitics in situ. As the prosodic properties of the P-clitic string in (34) suggest, this mechanism might be phonological. Clitic movement in general is at least in part driven by prosodic deficiency of these elements (see Cardinaletti & Starke 1999, who argue for a two-step movement of clitics vs. one-step movement of weak pronouns), but Ps are also prosodically deficient. So while movement of a clitic out of the PP might satisfy its prosodic requirements, the stranding of P will yield phonological ill-formedness. If, however, the clitic stays in situ the two weak elements might under certain conditions form an independent prosodic word, which results in a pronounceable string. Another way to implement this idea is to say that there is always movement when a special clitic is involved and in those cases when it originates as a complement of P you cannot pronounce the head copy which leaves the P stranded (which causes a PF-crash), but you can sometimes pronounce a lower copy instead. The latter is only possible when the P and the clitic form a tonic unit.

If even special clitics may be licensed in situ under certain phonological conditions it is all the more likely that this also holds of simple clitics. Then, irrespective of what kind of pronoun the P-complement pronouns in the core P-stranding languages are (see 28–29), their licensing in situ may be phonologically conditioned. The question that arises is whether [P clitic] collocations are indeed easier to come across in the P-stranding languages. If so, it may tell us something about P-stranding itself.

### *3. Conclusion*

In this paper I have addressed two phenomena, P-omission under sluicing and [P clitic], both of which were proposed in the literature to be conditioned by P-stranding. I showed, using the data from Slavic languages, that P-stranding cannot be a necessary condition for either of these constructions. Instead, the data from Russian suggest that a proper analysis of P-omission under sluicing (in Russian and probably other languages) should be at least in part prosodic since the pattern of P-omission was found to be sensitive to prosodic weight of the P. In particular, Ps that form independent prosodic words are omitted more freely. If, furthermore, P-omission under sluicing (and maybe sluicing itself) is conditioned uniformly across languages, the fact that it is freer in the P-stranding languages suggests that P is a more prosodically uniform category in these languages. Indeed, it is a peculiar property of

prepositions in English, a P-stranding language, that all of them are able to project independent PWds. It is likely that the two quirky properties of Ps are connected. Thus, it may be the ability of Ps to form PWds that is a prerequisite for both P-stranding and unrestricted P-omission under sluicing. In other words, the pattern of P-omission under sluicing in Russian may in principle inform us about the nature of P-stranding in languages such as English.

As for the second phenomenon, contrary to the prediction of Abels (2003a,b), there are instances of [P clitic] in Serbo Croatian, a non-P-stranding language. They suggest that clitics, even the 2<sup>nd</sup> position special clitics, need not move. This in turn lends plausibility to the base-generation approach to the 2<sup>nd</sup> position clitics. And if clitics do not move in the process of derivation, the account of the phenomenon in terms of P-stranding is untenable. In addition, what makes Abels' analysis suspect is the abundance of counterexamples for which he proposes alternative solutions. This may indicate that there is simply no general (syntactic) ban on [P clitic], but there probably is a phonological restriction on such strings. And in that case a phonological, not a syntactic account is called for.

Finally, if in the P-stranding languages P-clitic collocations are indeed more common it may tell us one of the following: 1) their clitics are different from those in the non-P-stranding languages considered; 2) their Ps are different: as pointed out above, at least in English, all Ps are able to project their own PWds and in this way they might provide appropriate phonological hosts for clitics; 3) probably both 1) and 2) are true.

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# **Gapping in European Portuguese**

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Gapping has been classically characterized as an ellipsis. However, recent literature (Johnson 2009) has regarded it as Across-the-Board movement in the English language. This paper aims to analyze these proposals and giving its own for European Portuguese, emphasizing some of the differences between the two languages as the source for these contrasts.

## *1. Introduction*

Gapping has never been subject to an in-depth analysis in European Portuguese (EP), although some of its general properties have been described in previous work (Matos 1992, 2003, 2005, 2013). However, detailed analyses of Gapping exist for the English language, both prior to the Principles and Parameters framework, such as in Ross (1971), Sag (1980), and within the Minimalist Program, Johnson (2009) and Vicente (2010). With that in mind, we can compare how Gapping behaves in English and EP so as to determine the degree to which they are either different or alike.

This paper will make an initial analysis of *Gapping* in EP, contrasting it with the more recent proposals made for English. I will especially focus on the connection between Gapping and Across the Board movement and on the compatibility or incompatibility of Gapping with the CP node. The analysis will be developed in the Principles and Parameters framework.

I will begin by presenting the main properties of Gapping as described in the literature, briefly analyzing its structure and using it to contrast with the properties proposed for English. Finally, I will problematize the compatibility of Gapping with the CP node.

## 2. The main properties of Gapping in European Portuguese

Gapping occurs when the verb, or verb sequence, is omitted, as in (1a) and (1b). Optionally some arguments or adjuncts of the main verb may also be omitted, as long as two of them are left overt, as in the examples in (1c) vs. (1d):

- (1)    a. O Paulo vai ao cinema e o Pedro ~~vai~~ ao teatro.  
 The Paulo goes to-the cinema and the Peter ~~goes~~ to-the theatre.  
 ‘Paul is going to the cinema and Peter to the theatre.’
- b. A Joana tem estudo alemão e a Ana ~~tem estudo~~ francês.  
 The Joana has studied German and the Ana ~~has studied~~ French.  
 ‘Joana has been studying German and Ana French.’
- c. A Maria deu chocolates ao Manuel e a Rita ~~deu chocolates~~ ao Rui.  
 The Maria gave chocolates to-the Manuel and the Rita ~~gave chocolates~~ to-the Rui.  
 ‘Mary gave chocolates to Manuel and Rita to Rui.’
- d.\*O João tem ido às aulas e o Miguel ~~tem ido às aulas~~.  
 The John has gone to-the classes and the Miguel ~~has gone to the classes~~.  
 \*John has been going to classes and Miguel ~~has been going to classes~~.

In EP, Gapping requires the omission of the entire verb sequence when this includes (semi-) auxiliaries and a main verb, as in the examples (2a-c). However, the clauses may only present the omission of a shared auxiliary verb as in (2d). In opposition the omission of a shared main verb is ungrammatical, as shown in (2b) and (2c). These facts will be important later in the paper.

- (2)    a. A Joana tem estudo alemão e a Ana ~~tem estudo~~ francês.  
 The Joana has studied German and the Ana ~~has studied~~ French.  
 ‘Joana has been studying German and Ana French’
- b.\*#A Joana tem estudo alemão e a Ana tem ~~estudo~~ francês.  
 The Joana has studied German and the Ana has ~~studied~~ French.  
 c.\*Eu tenho ido comprar revistas à loja e ele tem ido ~~comprar~~ livros à feira.  
 I have gone to-buy magazines to-the shop and he has gone ~~to buy~~ books to-the market.
- d. O Pedro tem caçado e o João ~~tem~~ pescado.<sup>1</sup>  
 The Pedro has hunted and the John ~~has~~ fished.  
 ‘Peter has been hunting and John fished.’

Lastly, in Gapping the clauses need to have the same polarity, i.e., they need both to be either positive or negative.

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<sup>1</sup> A ConSOLE reviewer suggests (2d) is not the best example and a better one would be as in (i) because Gapping requires there to be new information on the second conjunct or Gapping is not favorable:

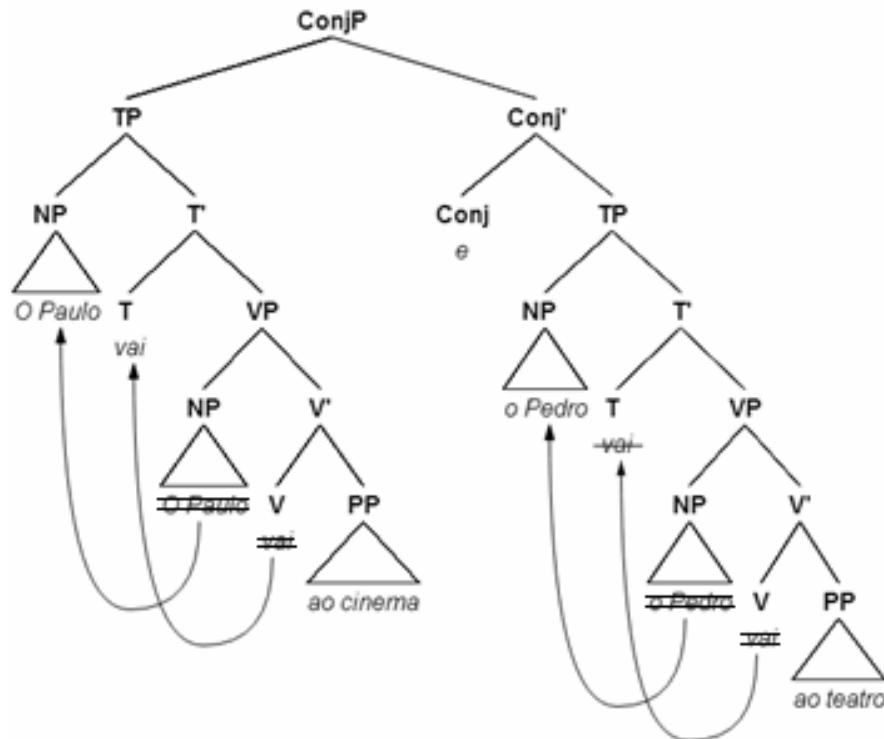
(i)    O João tem ido à escola e o Rui ~~tem~~ ido ao cinema.  
 The João has gone to-the school and Rui ~~has~~ gone to-the cinema.

While this is true, it is simply more natural to omit the entire verb sequence in this particular case and as such the original example is the clearer one.

- (3) a. O Pedro é inteligente e o João é simpático.  
     The Peter is intelligent and the João is nice.  
     ‘Peter is intelligent and John nice.’
- b. O Pedro não é inteligente nem o João é simpático.  
     The Pedro no is intelligent nor the João is nice.  
     ‘Peter is not intelligent nor John nice.’
- c. \*O Pedro é inteligente e o João não é simpático.  
     \*The Pedro is intelligent and the John not is nice.
- d. \*O Pedro não é inteligente e o João é simpático.  
     \*The Pedro not is intelligent and the John is nice.

These are some of Gapping’s main properties in EP. I believe that these properties are adequately accounted for by an ellipsis approach. A proposal for its structure as well as its explanation can be found below in (4):

- (4) O Paulo vai ao cinema e o Pedro vai ao teatro.  
     The Paulo goes to-the cinema and the Pedro goes to-the theatre.  
     ‘Paul is going to the cinema and Peter to the theatre.’



In (4), the double-striked constituents have been moved from their base position while the single-striked constituents have been gapped.

I assume Kayne's (1994) coordination configuration for these structures. According to the representation in (4), the clauses are connected at the TP level through a Conj head that projects ConjP and takes these TPs as its Specifier and Complement. Each clause is independently derived with each verb moving to T and leaving a copy at its base position. The ellipsis then omits the verb and other redundant constituents from the second clause. This representation will be what I will base my arguments on for the problem addressed below.

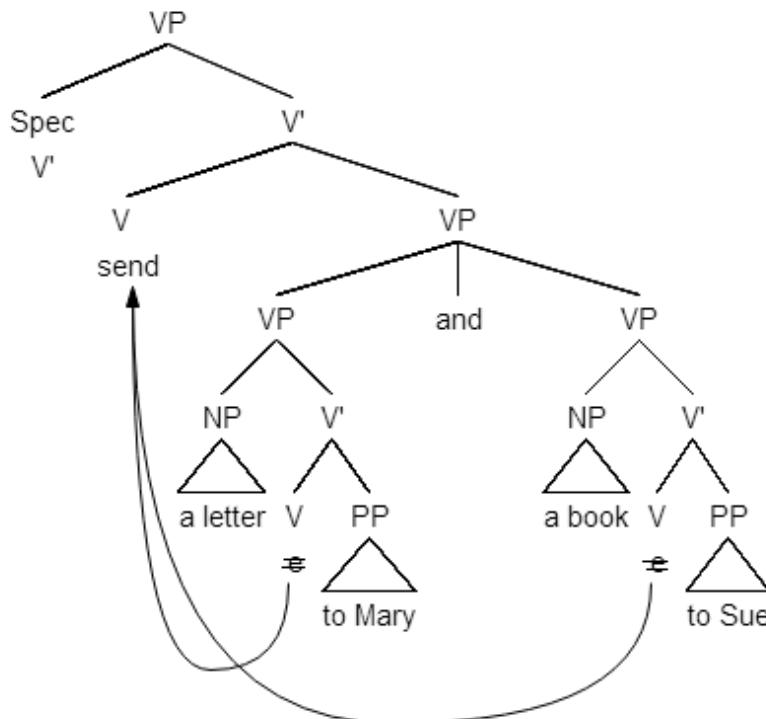
## 2. Gapping: a structure of ellipsis or ATB movement?

Considering English, Larson (1988) and Johnson (2006, 2009) have argued that Gapping works as Across the Board movement and not as an elliptic construction.

As Colaço (2006) stresses, ATB movement requires two coordinate terms, each one presenting an empty category that is bound by a phonetically overt constituent in a position that allows it to license the empty categories through c-command.

This configuration does not occur in the structures which I assume to capture Gapping in EP, like (4). In his article, Larson suggests the following representation (which only features the relevant part of the derivation for this paper's purposes):

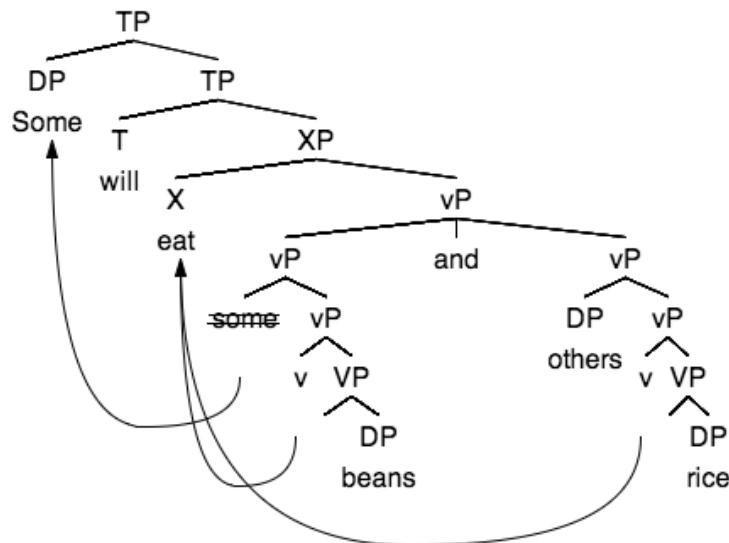
- (5) John sent a letter to Mary and a book to Sue.



Larson was the first to suggest an analysis for Gapping in which the constituents are coordinated at the VP level and ATB movement of the verbs raises them to the highest V in the VP Shell (Larson's Shell).

Johnson (2006, 2009) presents a similar although not identical structure.<sup>2</sup> He develops this treatment in detail under the Minimalist Program (Chomsky, 1995) and relates Gapping to Pseudogapping. The example (6), taken from Johnson's article, illustrates his analysis for Pseudogapping:

- (6) Some will eat beans and others eat rice.



Adopting the Minimalist Program, Johnson assumes that the verb's subject is firstly merged in vP and defends vP coordination with the verb's occurrences raising across the board to a functional projection he calls XP. To defend the coordination at this low level, Johnson mentions the existence of Pseudogapping, which is distinguished from 'regular' Gapping by leaving the auxiliary verb(s) overt, such as 'will' in example (6).

However, this analysis presents some problems, especially regarding European Portuguese. First of all, the structure in (6) violates the Coordinate Structure Constraint by extracting the subject 'some' of the first clause from the coordinate structure while leaving its correspondent 'others' in the second clause in its basic position. Second, there are several empirical arguments in favor of the fact that Gapping in EP requires the coordination to be, at least, at the TP level. The arguments are as follows:

- i) As previously said, Pseudogapping does not exist in EP. The (semi-)auxiliary verbs' omission is mandatory when they form part of the sentence, as seen in example (2), repeated below as (7):

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<sup>2</sup> A ConSOLE reviewer points out that the two structures given are fundamentally different because Larson's example shares the same subject between the conjuncts, while in Johnson's example the subjects are disjoint. As such, they should not be treated equally but as separate conditions. However, these were the examples given by the respective authors and thus, it is not appropriate to analyse them differently here.

- (7) \*Eu tenho ido comprar revistas à loja e ele tem ido ~~comprar~~ livros à feira.  
 ‘I have gone to-buy magazines to-the shop and he has gone ~~to-buy~~ books to-the market.’

Furthermore, it is important to recall that in EP we have the opposite of Pseudogapping, which is the possibility to omit the auxiliary while leaving the main verb overt, cf. (2d). Additionally EP is a language of generalized verb movement, which is to say that both auxiliary and main verbs may raise to T. Thus, if a verb sequence is composed of one (or several) auxiliary verb(s) as well as the main verb, the (first) verb moves to T. Given all of this, there is no plausible justification for a vP or another kind of low-level coordination in EP as presented in English.

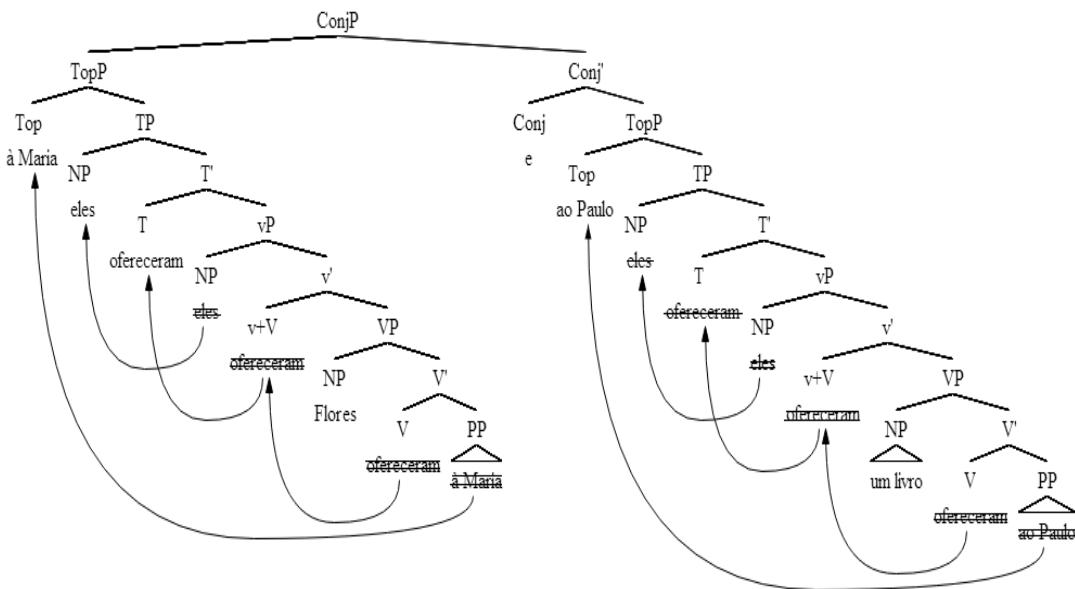
ii) In EP, it is only possible to value the uninterpretable  $\Phi$ -features of T when the verb moves to T head. In addition, although in EP the subject may occur in a post-verbal position and remain *in situ*, in Spec vP, (cf. Costa 2004) it is often claimed that even in these cases there is an expletive null *pro* in Spec TP to check T’s strong EPP feature. If ATB movement applies and the coordinate terms have different subjects, it becomes impossible to check these features in the second term of the coordinate sentence.

iii) The compatibility between Gapping and the topicalization of constituents. Matos (2013) presents an example like (8), which shows that Gapping in EP is compatible with topicalization:

- (8) À Maria eles ofereceram flores e ao Paulo ~~eles ofereceram~~ um livro.  
 To-the Maria they offered flowers and to-the Paulo ~~they-offered~~ a book.  
 ‘To Mary they offered flowers and to Paul a book.’

We can confirm from the example in (8) that coordination necessarily includes both topicalized constituents because the alternative would mean that not only their movement would be asymmetrical but also that the Coordinate Structure Constraint would be violated. I propose structure (9) for example (8):

(9)



With these three arguments, I conclude that in EP, in Gapping the coordination occurs at least at the TP level.

#### 4 . Gapping and the CP Node

Matos (2005) claims that in Gapping, the clauses must be coordinated at the TP level and the whole structure must remain inside the CP phase. However, if we accept the articulated analysis initially presented in Rizzi (1997), Matos' proposal must be revised. As seen in the structure in (9), the coordination includes TopP which, despite being included in CP(=ForceP), is part of the left periphery of the sentence above TP (cf. Duarte 1996; Rizzi 1997, 2004).<sup>3</sup> It should be noted that Clitic Left Dislocation doesn't seem to differ from topicalization as far as being compatible with Gapping is concerned, as we can see in (10):

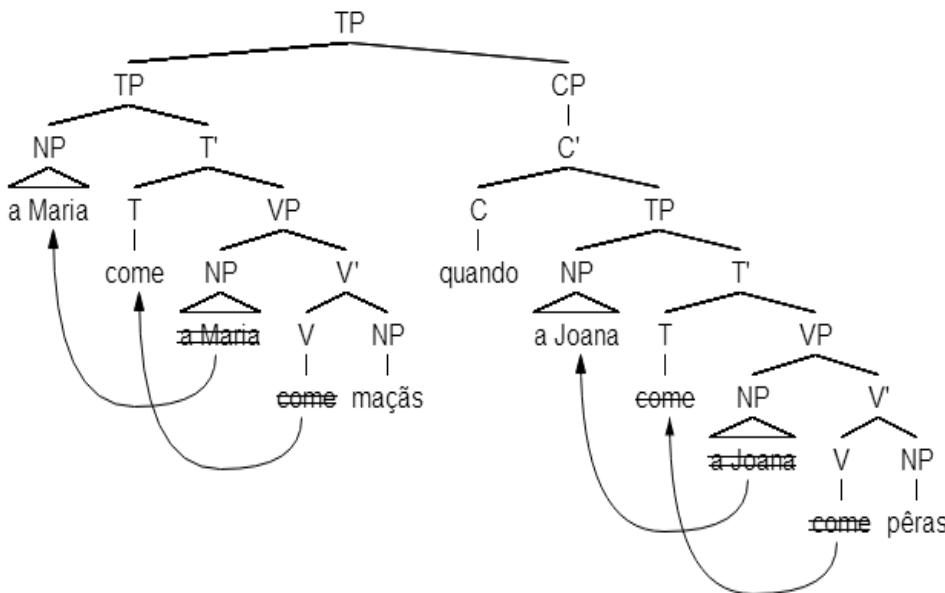
- (10) Ao Pedro, a Maria dá(-lhe) livros e ao Paulo, ~~a Maria dá~~ (-lhe) chocolates.  
 To-the Pedro, the Maria gives (him) books and to-the Paulo, ~~the Maria gives~~ (him) chocolates.  
 'To Peter, Mary gives books and to Paul, chocolates.'

As such, if we accept Rizzi's proposals, it is possible to update Matos' (2005) assumption by claiming that Gapping is not necessarily limited to TP coordination. However, it still stands that it does not go beyond CP(=ForceP) in subordinate clauses, both in islands and in some non-island contexts.

The ungrammatical examples of Gapping in (11) and (12) present island domains, Adjunct Island in (11), Sentential Subject Island in (12a) and Complex DP Island in (12b):

<sup>3</sup> It should be noted that while Duarte (1996) doesn't adopt the TopP representation *per se* for topicalization, she adopts it for Clitic Left Dislocation and also assumes that TopP occurs above TP.

- (11) \*A Maria come maçãs quando a Joana ~~e~~<sup>ome</sup> pêras.  
 The Maria eats apples when the Joana eats pears.



- (12) a. \*A Maria come maçãs e que a Ana ~~e~~<sup>ome</sup> pêras é óbvio.  
 \*Maria eats apples and that Ana eats pears is obvious.
- b. \*A Ana gosta de livros e nós temos um amigo que ~~gosta~~ de chocolates.  
 \*Ana likes books and we have a friend who ~~likes~~ chocolates.

An initial explanation for this fact is that Gapping cannot go beyond the CP phase. However, consider the ambiguity in example (13a) and its possible interpretations in (b) and (c):<sup>4</sup>

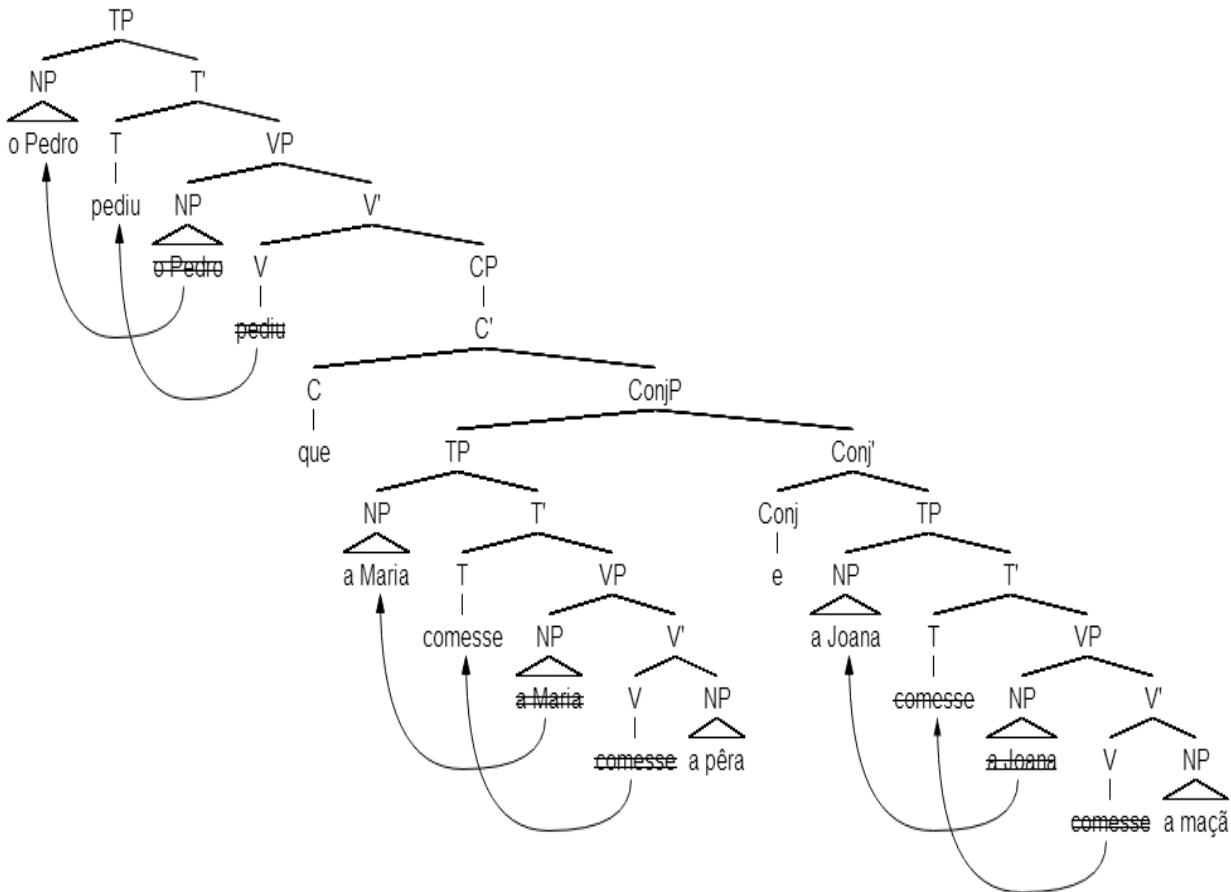
- (13) a. O João disse que convidava a Joana e o Pedro a Maria.  
 The John said that invited the Joana and the Pedro the Maria  
 'John said that he would invite Joan and Peter, Mary.'
- b. O João<sub>i</sub> disse que [pro<sub>i</sub> convidava a Joana e o Pedro ~~convidava~~ a Maria].  
 'John<sub>i</sub> said that [he<sub>i</sub> would invite Joan and Peter ~~would invite~~ Mary].'
- c. O João<sub>i</sub> disse que [pro<sub>i</sub> convidava a Joana] e o Pedro<sub>j</sub> ~~disse que~~ [pro<sub>j</sub> ~~convidava~~ a Maria].  
 'John<sub>i</sub> said that [he<sub>i</sub> would invite Joan] and Peter<sub>j</sub> ~~said that~~ [he<sub>j</sub> ~~would invite~~ Mary].'

If we accept the reading in (13c), there is clearly a CP, the subordinate compleutive clause 'that he would invite Joan/Mary', in each coordinate clause and the complex sentence is still completely grammatical in EP.

<sup>4</sup> Regardless of the given examples, Matos (2013) admits that Gapping can co-occur with subordinate compleutive infinitive clauses such as: 'Ana claims to go to the cinema and Paul claims to go to the theatre.'

In that case, what causes the ungrammaticality in a non-island embedded domain like the one illustrated in (14a)? Notice that the ungrammaticality of (14a) contrasts with the acceptability of the example (14b), which has the structure represented below.

- (14) a. \*O Pedro pediu que a Maria comesse a pêra e que a Joana ~~comesse~~ a maçã.  
     \*Peter asked that the Mary ate the pear and that the Joana ~~ate~~ the apple.  
     b. O Pedro pediu que a Maria comesse a pêra e a Joana ~~comesse~~ a maçã.  
         The Pedro asked that the Maria ate the pear and the Joana ~~ate~~ the apple.  
         ‘Peter asked that Mary ate the pear and Joan the apple.’



With this contrast and the previous examples in mind, I propose that Gapping is incompatible with CP(=ForceP) when this node is directly involved in the articulation of the two clauses. If the CP node is within the elliptic clause, such as in the (non-island) subordinate completive clause in (13), then there is no incompatibility whatsoever. Thus, the grammaticality contrast between (14a) and (14b) is due to the coordination level. On one hand, for the structure in (14a), the Conj head would coordinate the maximal projections of the C (Force), the CPs, which would cause the sentence to be ungrammatical because then one would be trying to gap constituents across distinct CP(=ForceP) phases. On the other hand, in (14b), as seen in the representation above, the maximal projection of Conj is the complement of a single C(=Force) node.

Furthermore, on the basis of the contrasts in (15)-(16a) vs. (16b), I also claim that the coordinate constituents in Gapping must be symmetrical even when they involve subordinate clauses. Consider the following example:

- (15) \*A Ana lê romances e penso que a Maria ~~leia~~ poemas (Matos 2003:902)  
 \*The Ana reads romances and think that the Maria ~~reads~~ poems.

In this example, it would seem clear that the ungrammaticality is due to the existence of CP(=ForceP) between the two coordinate terms. The following paradigm will illustrate this idea:

- (16) a.\*O João foi ao cinema e o Pedro disse que ~~foi~~ ao teatro.  
 The John said went to-the cinema and the Peter said that ~~went~~ to the theatre.  
 b. O João disse que foi ao cinema e o Pedro ~~disse que~~ ~~foi~~ ao teatro.  
 The John said that went to-the cinema and the Peter ~~said that~~ ~~went~~ to-the theatre.  
 ‘John said he went to the cinema and Peter ~~said he~~ ~~went~~ to the theatre.’

This pair of examples seems to show that Gapping may include subordinate compleative clauses as long as they occur inside both of the coordinate clauses, respecting parallelism. Additionally, we can coordinate sentence functional projections selected by a single embedded CP phase as in (14b).

### *5. Conclusion*

The study presented in this paper is a first analysis of Gapping in European Portuguese. I have contrasted the proposals made for English with EP and have presented empirical evidence against Gapping as Across the Board movement in EP. I have also attempted to give an initial explanation for the apparent incompatibility of the CP node with gapping in EP and have presented some proposals that can explain the examples given in previous literature.

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# **Split ergativity in subordination as a consequence of defectivity**

Daniela Thomas

In this paper I will argue, that due to empirical reasons, the existing analyses for split ergativity in subordination cannot be used to explain the data from Jacaltec, Sierra Popoluca and Päri. It can be observed that the phenomenon is accompanied by aspectlessness. My new approach towards deriving these data is based on a new principle for case assignment in intransitive contexts that makes further reference to aspectlessness. It applies to the pre-syntactic numeration and guides the distribution of case features, leading to the assignment of the correct case.

## *1. Introduction*

In this paper I shall be concerned with the phenomenon of split ergativity in subordination. I will present how to derive it within the framework of the Minimalist Program (Chomsky 1995, 2000). Therefore, this type of split ergativity will be treated as a purely syntactic phenomenon. But at first I want to characterize the topic of split ergativity.

Regarding argument encoding, languages always exhibit a basic system. The two most widely used encoding systems are the accusative and the ergative system. In the accusative system the external argument of the transitive verb and the single argument of the intransitive verb are encoded in the same way (nominative). The internal argument of the transitive verb on the other hand is encoded differently (accusative). In the ergative system the single argument of an intransitive verb and the internal argument of a transitive verb are encoded by the same set of markers (absolutive) whereas the external argument of a transitive verb is encoded differently (ergative).

However, the languages of the world do not always stick to their basic encoding system, rather they show variations in various contexts. There are several factors that may trigger a split in the encoding system. One of these factors can be the semantics of a verb, for instance. In some languages the single argument of an intransitive verb can be encoded either like the external argument of a transitive verb or like the internal argument, depending on whether the single argument takes control in the event denoted by the verb or not (cf. Dixon 1994: 71f.). This is called a ‘Split-S-System’. In the ‘Fluid-S-System’ on the other hand, an intransitive verb basically allows for both encoding variants for its single argument (like the internal or like the external argument of a transitive verb). Which markers are chosen depend on the

semantics of the very situation in which the combination of verb and argument is used (cf. Dixon 1994:78f.). Another factor can be the semantic nature of the argument itself. Silverstein (1976) introduced a nominal hierarchy ordering the various types of nominals from those that most likely take control (left end) to those that probably are not the controller of the situation (right end). Split-systems can also arise along these lines (cf. Dixon 1994:85).

In addition, tense, aspect and mood might be triggers for a split system. Dixon (1994:99) generalizes that if there is split triggered by tense or aspect, then the past or perfect aspect is associated with the ergative system and the non-past or imperfect aspect with the accusative system. Regarding mood, the imperative might lead to an accusative system whereas all others occur with the ergative system.

Finally, there are also clause-type-based splits in which the argument encoding in matrix clauses differs from the argument encoding in subordinate clauses. This is the type of split system I will focus on.

Another important aspect of split systems is the type of system that is produced by the encoding irregularities. There are several variants but the one I will approach is called ‘extended ergative’. This means that underlyingly an ergative system is present but in split contexts the ergative extends its domain. In intransitive contexts the ergative instead of the absolute shows up while the combination of ergative and absolute remains in transitive contexts.

With this background in place we can now turn to the main part of this paper. It will be structured as follows: section 2 presents language data that illustrate the phenomenon of split ergativity in subordination and it ends with generalisations about them. The following section is dedicated to previously proposed analyses of the ‘extended ergative’ pattern and why they cannot cope with the data I present. Section 4 comprises a new approach to the derivation of split ergativity and variations of the analysis. The following section deals with predictions of the analysis. Finally, in section 6 I draw some conclusions and point out directions for further research.

## *2. Language data*

In this section data from the three unrelated languages Sierra Popoluca, Jacalteco and Päri are presented. The examples will illustrate the phenomenon of split ergativity in subordination.

### *2.1 Sierra Popoluca*

Sierra Popoluca, a Mixe-Zoquean language spoken in Veracruz, Mexico, exhibits argument encoding via verbal agreement that is driven by a hierarchical system. The hierarchy ranks speech act participants (first and second person) above third person. This means that in transitive cases only the argument ranked higher on the hierarchy is marked on the verb. If a relation between two speech act participants is expressed, a special set of markers, the so-called local set, is used. The encoding system is an ergative one, marking the single argument of an intransitive verb and the internal argument of a transitive verb in the same way and the external argument of a transitive verb with a different set of markers. This can be seen in (1):

(1) Ergative encoding system in Sierra Popoluca<sup>1</sup>

a. ?a=seet-pa

1.EXCL.ABS=return-INC

'I return.'

b. ?ich ?an=ku?t-pa je?m saapnyi

1PRO 1.EXCL.ERG=eat-INC that banana

'I ate this banana.'

c. je?m ?a=pak-ka?-W

that 1.EXCL.ABS=knock.down-CMP

'That one knocked me down.'

(de Jong Boudreault 2009: 592, 335, 216)

Example (1a) shows an intransitive verb with its single argument in first person exclusive. It is encoded by *?a*=. In (1c) *?a*= shows up again. This time it is the marker for the internal argument of the transitive verb. The argument is in the first person and outranks the third person external argument on the person hierarchy. Since Sierra Popoluca always realises only one argument, the higher ranked internal argument is encoded. Example (1b) shows another transitive clause but this time the external argument outranks the internal argument (1>3). Therefore the external argument is marked on the verb with *?an*=. The full paradigm of agreement markers is shown in (2) (de Jong Boudreault 2009: 396 & Elson 1960: 207):<sup>2</sup>

## (2) Agreement markers in Sierra Popoluca

	Set A / Ergative	Set B / Absolutive	Set C / Local
1.excl	?an=	?a=	
1.incl	tan=	ta=	
2	?in=	mi=	
3	?i=	Ø=	
2:1			?an=
1:2			man=

Turning now to the subordinate clause (in brackets) in (3a) with an intransitive verb, one can observe that instead of the expected absolutive marker the ergative marker *?an*= emerges. In the following two examples a transitive verb is embedded. In these cases we find the anticipated markings: ergative *?in*= for the external argument in (3b) and absolutive *?a*= for the internal argument in (3c). This yields an accusative pattern in embedded clauses since

<sup>1</sup> I use the following abbreviations in glosses: 1 - 1<sup>st</sup> person, 2 - 2<sup>nd</sup> person, 3 - 3<sup>rd</sup> person, ABS – absolutive, ACC – accusative, ALR – already, AP – antipassive, AUX – auxiliary, ASP – aspect, CF – centrifugal, CMP – completive, CONJ – conjunction, DEP – dependent, DIR – directional, ERG – ergative, EXCL – exclusive, FACT – factual, FUT – futur, INC – inchoative, INTR – intransitivizer, IV – intransitive verb, LOC – locative, M – medial, NEG – negation, NMLZ – nominalizer, NOM – nominative, PERF – perfective, PL – plural, PLU – plural marker, PRO – pronoun, PSR – possessor, SAP – speech act participant , SG – singular, SUFF – suffix

<sup>2</sup> The notation 'x:y' means subject person x acts on object person y.

here the single argument of the intransitive verb and the external argument of the transitive verb are treated in the same way (ergative marking) while the internal argument of the transitive verb receives a different treatment (absolutive marking):

(3) *Split ergativity in subordination in Sierra Popoluca*

- a. dya ?a=jo?y-ne?-W=?am [?an=put-W<sub>3</sub>]  
NEG 1.EXCL.ABS=be.angry-PERF-CMP=ALR [1.EXCL.ERG=exit-DEP]  
'I wasn't angry when I left.'
- b. mich dya=?am mi=?oy-W [?in=?a?m-W<sub>2</sub> ?in=choomo]  
2PRO NEG=ALR 2ABS=go-CMP [2ERG=see-DEP 2PSR=grandmother]  
'You didn't go see your grandmother.'
- c. ?oy=tyi=?am [?a=?a?m-ta?m-W<sub>2</sub>]  
go<sub>aux</sub>=just=ALR [1.EXCL.ABS=see-PLU<sub>sap</sub>-DEP]  
'They just went to see me.' (de Jong Boudreault 2009: 419, 726, 727)

The split system is triggered in certain multi-verb constructions (de Jong Boudreault 2009, Marlett 1986, Elson 1960):

(4) *Split ergativity triggering constructions in Sierra Popoluca:*

- (i) temporal adverbial clauses, which are not introduced by a Spanish adverbial
- (ii) embedded clauses with the subordinators *Ø*, *mo*, *=mu*
- (iii) multi-verb constructions with the progressive auxiliary *si?*
- (iv) multi-verb constructions with Type II auxiliaries<sup>3</sup>
- (v) multi-verb constructions with Type I auxiliaries where the embedded verb is in passive voice

Interestingly, the embedded verbs in the constructions mentioned above display further special characteristics: the verbs lack any kind of mood or aspect marking but receive dependent morphology instead. In (5) I contrast the matrix verb and the embedded verb of (3a) in order to illustrate this (de Jong Boudreault 2009: 419): The matrix verb in (5a) bears the marker *-W* for completive aspect (CMP) whereas the embedded verb in (5b) only consists of the verb root *put*, the agreement marker *?an-*, and the dependent marker *-W<sub>3</sub>*.

(5) *Matrix and embedded verb contrasted:*

- a. ?a=jo?y-ne?-W=?am  
1EXCL.ABS=be.angry-PERF-CMP=ALR
- b. ?an=put-W<sub>3</sub>  
1.EXCL.ERG=exit-DEP

---

<sup>3</sup> The distinction between Type I and Type II auxiliaries is based on the pattern that emerges when an auxiliary combines with a verb. With Type II auxiliaries an accusative pattern emerges. With Type I auxiliaries an accusative pattern emerges only if the dependent verb is in the passive (cf. de Jong Boudreault 2009).

In Sierra Popoluca a (matrix) verb consists at least of the verbal root, a person proclitic and markings for aspect and/or mood. But as we have seen, this is not the case with the embedded verbs of multi-verb constructions, in which split ergativity is triggered. This view is in line with de Jong Boudreault saying that these verbs are best described as aspectless. The dependent marking consists of an inaudible consonant represented in the transcription by  $-W$ .<sup>4,5</sup> Despite its inaudibility this consonant has effects on the assignment of stress (cf. De Jong Boudreault 2009).

## 2.2 Jacaltec

Jacaltec, a Mayan language spoken in Guatemala, also basically instantiates an ergative system of agreement:

(6) *Ergative encoding system in Jacaltec*

- a. ch-ach hin-mak-a'  
ASP-2ABS 1ERG-hit-FUT  
'I will hit you.'
- b. xc-ach toyi  
ASP-2ABS go  
'You went.'

(Craig 1977: 119, 333)

In contrast to Sierra Popoluca, Jacaltec realises both arguments of a transitive verb via person marking on the verb or aspect word. This can be seen in (6a): ergative *hin-* for the first person external argument and absolute -*ach* for the second person internal argument. On the aspect word in (6b) we find the same marker encoding the second person single argument as with the internal argument of the transitive verb in (6a).

Absolute markers can either be unbound or clitics on the aspect words. Ergative markers always precede the verbal stem. A full paradigm of agreement markers is given in (7) (cf. Craig 1977).

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<sup>4</sup> According to Boudreault, intransitive verbs embedded under Type I auxiliaries that are not in passive voice also receive dependent marking, which simply differs from the marking used in the other constructions (*-i* instead of  $-W$ ). My impression is that these embedded clauses are actually nominalisations, since *-i* is also a nominaliser and those verbs are inflected for plural with the nominal plural marker. This also explains why in auxiliary I constructions with the dependent marker *-i* no split ergativity arises.

<sup>5</sup> The marker  $-W$  is further differentiated in  $-W_2$  for transitive verbs and  $-W_3$  for intransitive verbs.

(7) *Agreement markers in Jacalteco*

Person / Number	Absolutive	Ergative	
		C-initial verbal root	V-initial verbal root
1sg	hin	hin-	w-
2sg	hach	ha-	haw-
3sg	Ø + CL	s- + CL	y- + CL
1pl	hoñ	cu- / co-	y-
2pl	hex	he-	hey-
3pl	Ø + PL + CL	s- + PL + CL	y- + PL + CL

Jacalteco shares with Sierra Popoluca the property that in some subordinate clauses split ergativity arises. (8) is an example of subordination without an overt complementiser. In (8a) a transitive and in (8b) an intransitive verb is embedded.

(8) *Split ergativity in subordination*

- a. x-Ø-w-ilwe [hach hin-col-ni]  
ASP-3ABS-1ERG-try [2.ABS.PRO 1ERG-help-SUFF]  
'I tried to help you.'
- b. x-Ø-w-il [ha-cañalwi]  
ASP-3ABS-1ERG-see 2ERG-dance  
'I saw you dance.' (Craig 1977: 115f.)

The transitive context shows no deviations. Both arguments are encoded as in matrix clauses: the external argument receives ergative marking and the internal argument is realised by an absolute marker. However, in the intransitive case the absolute marker is expected to encode the sole argument but the ergative marker emerges. Again, this yields an accusative pattern: the ergative marking shows the typical nominative distribution by encoding the sole argument of an intransitive verb and the external argument of a transitive verb, while the internal argument is realised by absolute marking. In Jacalteco this phenomenon is triggered in the following constructions (cf. Craig 1977):

(9) *Split ergativity triggering constructions*

- (i) aspectless complement clauses
- (ii) aspectless temporal adverbial clauses

It is obvious that the factor of aspectless verbs plays an important role here. Other subordinate clauses with embedded verbs bearing aspectual marking do not show split ergativity: (10) is an example of subordination with the complementiser *tato*, in which the embedded intransitive verb exhibits the expected absolute marker for the sole argument.

(10) *Embedded clause without split ergativity*

- x-Ø-aw-abe [tato ch-in to-j hecal]  
 ASP-3ABS-2ERG-hear [that ASP-1ABS go-FUT tomorrow]
- 'You heard that I will go tomorrow.'

(Craig 1977: 232)

2.3 *Päri*

Päri, a Nilotc language spoken in Sudan, also basically features an ergative system.

(11) *Ergative system in Päri*

- a. úbùr-Ø á-túuk'  
 Ubur-ABS CMP-play  
 'Ubur played.'
- b. dháagò-Ø á-yàaj úbùrr-i  
 woman-ABS CMP-insult Ubur-ERG  
 'Ubur insulted the woman.'
- c. dháagò-Ø á-cówl'-à  
 woman-ABS CMP-call-1SG.ERG  
 'I called the woman.'

(Andersen 1988: 292,295)

(11-a) shows an intransitive verb whose single argument is encoded with null marking for absolute. In (11-b) a transitive context is present and the null marking is used for the internal argument this time. The external argument receives the ergative marker *-i*. Pronominals are encoded differently. This can be seen in (11-c). A transitive context is present and the pronominal external arguments is realized with the affix *-à* for 1<sup>st</sup> person ergative on the verb. The non-pronominal internal argument again receives null marking. The complete paradigm of Päri's pronouns and corresponding verbal markers can be seen below (cf. Andersen 1988: 297):

(12) *Pronouns and verbal markers in Päri*

	Absolutive		Ergative	
	Pronoun	Prefix / Proclitic	Pronoun	Suffix / Enclitic
1SG	?áan(i)	á-	?áan'-ì	-a
2SG	?íin(i)	í-	?íin'-ì	-i / -í
3SG	yín(i)	yi-	yín'-ì	-ε / -e
1PL.EXCL	wán(i)	wá-	wàn'-ì	-a // -ώ-wà' / -ù-wà'
1PL.INCL	?òon(i')	(?òon(i'))	?òoni'	-ɔ' / -ó'
2PL	?úun(ú)	ú- / ó-	?úun'-ù	-ω / -u
3PL	gín(i)	gí-	gìn'-ì	-ε / -e // -i-gí'

Taking a closer look at subordinate clauses without aspect markers, it can be observed that Päri also features split ergativity. Examples are given in (13).

(13) *Split ergativity in Päri*

- a. ʔáan            á-ci'            [kù       kwàl-á            dhòk-Ø]  
1.SG.PRO.ABS    CMP-go.LOC    [CONJ    steal-1SG.ERG    cows-ABS]  
'I went to steal the cows.'
- b. ʔáan            á-ci'            [kù       kwàt-á]  
1.SG.PRO.ABS    CMP-go.LOC    [CONJ    steal.CF.AP-1SG.ERG]  
'I went to steal.'
- c. ʔáan            á-màdh'-ò  
1.SG.PRO.ABS    CMP-drink.M.AP-SUFF  
'I drank.'

(Andersen 1988: 318, 300)

In (13-a) a transitive verb is present in the embedded clause. As in the data of the two languages before there are no unexpected markers for the two arguments. The internal argument *dhòk* 'cows' receives null marking for the absolute and the external argument is realized by the ergative suffix *-á* for first person ergative on the verb. But (13-b) is an example with an intransitive embedded verb (the originally transitive verb *kwàl* 'to steal' is in the antipassive and therefore intransitive) and also bears the ergative suffix *-á* for first person ergative to encode its single argument. Evidence that this ergative marker is not due to the antipassive can be seen in (13-c) which shows a matrix clause with the originally transitive verb 'to drink' in antipassive. In that case the single argument is encoded with the help of an absolute pronoun.

#### 2.4 Generalisations

Three unrelated languages which all exhibit an ergative encoding system and split ergativity in certain subordinate clauses have been presented. What can be observed is that compared to the encoding system in matrix clause the only change that is happening is in intransitive contexts: Instead of the expected absolute the ergative occurs. The argument encoding in transitive contexts remains untouched.

Moreover, the split ergativity in subordination is never triggered by the subordination itself but is influenced by other factors. This has already been observed by Dixon (1994). In Sierra Popoluca, Jacalteco and Päri this factor is aspectlessness. Embedded sentences with aspect markings do not show any deviations from the basic encoding system.

Crucially, there is no genuine change from an ergative to an accusative encoding system in these embedded clauses; rather, the domain of the ergative marker is extended. The only difference between the split and the normal ergative system occurs in intransitive contexts: instead of the expected absolute we find ergative marking. This leads to a pseudo-accusative system in which the ergative marker has a distribution like the nominative marker in accusative systems. I will come back to this in section 7.

### *3. Existing analyses*

Several derivations for different types of split ergativity giving rise to the ‘extended ergative’ pattern have been proposed in the literature. I will go into two of them and explain why they are not able to cope with the data presented.

I will start with the analysis proposed by Coon (2010). She suggests that the encoding irregularities arise because the embedded clauses are actually nominalisations. What seems to be the external argument would then rather be the possessor of this nominalisation. In Mayan languages the ergative is also used for encoding possessors. Hence, the unexpected occurrence of the ergative would not be an irregularity of the encoding system but just the regular case assignment of the ergative to a possessor of a nominalised sentence.

But this cannot hold true for Sierra Popoluca. If the presented data really were instances of nominalisations the following would be expected:

- (i) the typical nominaliser for these cases would be *-i*
  - (ii) the plural markers for nouns are *=tam* (for speech act participants, henceforth SAP) and *=yaj* (for non-SAP) whereas for plural agreement on verbs it is *-ta?m* and *-yaj*.<sup>6</sup>

(14) Examples of nominaliser and plural markers

- a. kaʔ-i  
die-NMLZ  
'dead person'
  - b. yoomo=tam  
woman=PLU  
'women'
  - c. ta=ʔoy-taʔm-W              yiʔp    kootzik  
1INCL.ABS=go-PLU-CMP    this    mountain  
'We went to the mountain.'              (de Jong Boudreault 2009: 174,190,428)

In (14-a) we can see an example of the nominaliser *-i* turning the verb *ka?* ‘to die’ into the nominal ‘dead person’. (14-b) shows the clitic *=tam* as plural marker for nominals. In this case it is used to produce the plural ‘women’ from the singular noun ‘woman’. The example (14-c) illustrates the use of the suffix *-ta?m* as a plural marker on the verb.

Taking a look at the subordinate clauses with split ergativity, it can be observed that the plural marker is a suffix and no nominaliser is present as (15) for instance shows: No *-i* can be found but the plural suffix *-yaj* which indicates that we are dealing with a verb and not a nominalisation. Hence, the sole argument is not a possessor and it is not automatically clear why it bears the ergative marker. Thus, the nominalisation approach cannot account for these cases.

<sup>6</sup> Clitics and suffixes can be differentiated because suffixes participate in stress assignment and clitics do not (cf. de Jong Boudreault 2009:750).

(15) *Split ergativity in subordination in Sierra Popoluca*

dya	WiH.?	aH-pa	[?i=nu?k-yaj-W]
NEG	be.able-INC		[3ERG=arrive-PLU-DEP]

'They can't arrive.'

(de Jong Boudreault 2009: 750)

Another proposal for the analysis of the 'extended ergative' pattern is developed in Bobaljik (1993). He suggests among others that the embedded intransitive verbs are actually hidden transitives (see also Levin 1983; Laka 1993; Hale & Kayser 1993). This means that what seems to be an intransitive verb actually is a transitive verb with a covert coargument. The reason why the only overt argument receives the ergative case would therefore be because it actually is the external argument of a transitive verb which is regularly marked by ergative case.

But arguments against this analysis come from Jacalteco. The embedded verb *cañalwi* 'to dance' in example (9b) (repeated below as (16)) consists of 3 morphemes:

- (i) the stem *cañal*, which is the noun 'dance'
- (ii) the intransitiviser *-w*, which derives intransitive verbs from transitive verbs and nouns
- (iii) the stemformative for intransitive verbs *-i*

(Day 1973: 28, 42)

(16) *Split ergativity in subordination in Jacalteco*

x-Ø-w-il	[ha-cañal-w-i]
ASP-3SG.ABS-1SG.ERG-see	2SG.ERG-dance-INTR-IV

'I saw you dance.'

(Craig 1977: 116)

So the morphology clearly marks the verb as intransitive; nevertheless, the ergative shows up on the sole argument.

There is another argument, also from Jacalteco, against the hidden-transitives-analysis. Examples of intransitive verbs can be found which occur in matrix clauses and their single argument is marked with the absolute whereas when they occur in aspectless subordinate clauses their single argument is marked with the ergative. An example is shown below:

(17) *Intransitive verb *tzoteli* as matrix verb and as embedded verb*

- a. c'ul x-(y)-u [ha-tzotel-i]  
good ASP-3SG.ERG-AUX [2SG.ERG-talk-IV]  
'You talked well.'
- b. ch-oñ tzotel-i  
ASP-1PL.ABS talk-IV  
'We talk.'

(Craig 1977: 90,335)

In (17-a) the verb occurs in the aspectless embedded clause. Its single argument is encoded with the ergative marker *ha-*. (17-b) on the other hand shows the verb in a matrix clause. This time the single argument is realised by the absolute suffix *-oñ* on the aspect word. If we want to follow Bobaljik's idea that the unexpected ergative marking is due to a different transitivity status of the verb than what it seems to be, we would be forced to say in this case

that the transitivity of the verb *tzoteli* is dependent on the clause-type, i.e. it is intransitive in matrix clauses and transitive in subordinate clauses (without an overt internal object). Additionally, we would have to call into question if the morpheme *-i* really is an intransitiviser. These two statements are implausible.

Since to the best of my knowledge no analysis can account for the data I collected yet, a new approach must be taken.

#### 4. Analysis

As a background theory on ergativity I will adopt the reconstruction of Murasugi's (1992) analysis of ergative encoding systems by Müller (2009). After introducing this theory, I will come to the details of my analysis of split ergativity which is an extension of the base theory that is flexible enough to derive the encoding irregularities of the 'extended ergative' pattern.

##### 4.1 Background theory

Müller (2009) develops a reconstruction of Murasugi's system in Minimalism. The background assumptions are that syntactic structure is built bottom-up, incrementally, by the elementary operations Merge and Agree. Müller defines Merge and Agree as follows (cf. Müller 2009: 273):

(18) *Merge*

$\alpha$  can be merged with  $\beta$ , forming a projection of  $\alpha$ , if  $\alpha$  bears a subcategorisation feature [+F+] and F is the label of  $\beta$ .

(19) *Agree*

$\alpha$  can agree with  $\beta$  with respect to a feature bundle  $\Gamma$ , if (a), (b), and (c) hold:

- a.  $\alpha$  bears a probe feature [\*F\*] in  $\Gamma$ ,  $\beta$  bears a matching goal feature [F] in  $\Gamma$ .
- b.  $\alpha$  m-commands  $\beta$
- c. There is no  $\gamma$ , such that (i) and (ii) hold:
  - (i)  $\gamma$  is closer to  $\alpha$  than  $\beta$ .
  - (ii)  $\gamma$  bears a feature [F] that has not yet participated in Agree.

Especially (19-c-i) is important in this argument. It refers to the definition of Closeness from which it follows that '[...]the specifier of a head is closer to the head than a category that is further embedded in the complement of the head' (Heck & Müller 2007: 174).

The basic sentence structure consists of CP, TP, vP and VP. The v head also introduces the external argument. Furthermore this system also includes the numeration - a pre-syntactic assembly of all lexical items that are to be used in the derivation.

In Müller's (2009) system, Agree is responsible for case assignment by checking the case features of the functional head and the DP under identity. The operation is triggered by features on T and v which act as probes.<sup>7</sup> This point needs some further explanation. Müller

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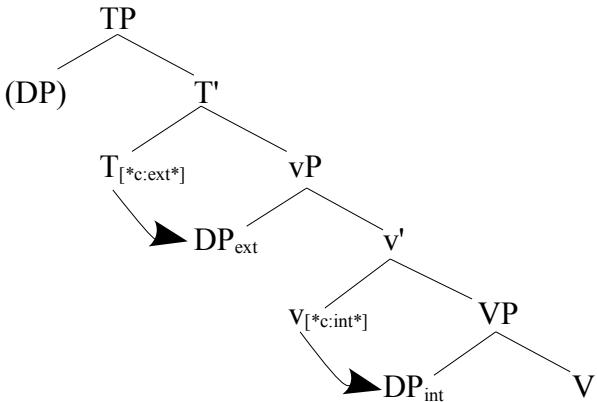
<sup>7</sup> Müller argues that case and agreement are basically the same. The only difference between case and agreement is the locus of the morphological reflex of the Agree relation in [CASE] (head marking vs. dependent marking): If this feature is spelled out on the functional head, it results in agreement; if, however, it is realised on

assumes that there is merely one case feature that can take on two values: [CASE:ext] or [CASE:int]. The corresponding probe features are localised on T (external case) and v (internal case). Agree can proceed independently of the feature values of the functional heads and the arguments. But the derivation will crash if the feature values of the functional heads and the DPs do not coincide.

The central role, however, is played by v. It takes a special position since it does not just assign case but also introduces the external argument. Hence, it participates in both elementary operations (Merge and Agree). Crucially, when v is merged, the context for the application of both operations is created. It is assumed that they cannot proceed simultaneously: one needs to be carried out before the other. The idea is that this conflict is resolved differently by various languages. It is a language specific choice whether Agree takes priority over Merge or vice versa. This ordering of the elementary operations is responsible for the emergence of the accusative vs. ergative system in transitive contexts.

If Agree has priority over Merge, the internal argument will be assigned the internal case from v since the internal argument is the only potential goal at this stage of the derivation. Subsequently, the external argument will be introduced, which then receives the external case from T. Together with the intransitive context, which will be explained below, this yields the accusative system:

(20) *Agree before Merge: accusative system*

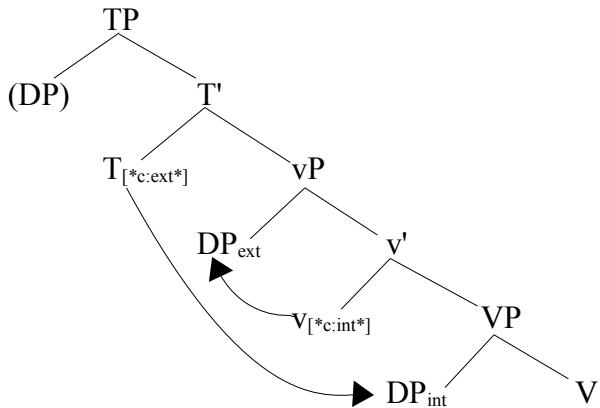


The second possibility is that Merge applies prior to Agree. In that case, the external argument is introduced before v enters Agree. Therefore, it is closer to v than the internal argument, according to the definition of Closeness (see (19-c-i)). Hence, Agree takes place between v and the external argument which therefore receives the internal case. When T is merged, it assigns the external case to DP<sub>int</sub>. It cannot assign case to DP<sub>ext</sub> again since this DP has already participated in Agree and does not have an active feature any more. This means that by the time T searches for a Goal to assign case to, DP<sub>ext</sub> (more specifically, its goal feature) is not visible to T anymore. This derivation in combination with the intransitive context (explained below) results in the ergative system.

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the DP, it results in case marking. I adopt this view.

## (21) Merge before agree: ergative system



All of this holds in transitive contexts. For intransitive ones more needs to be said. First of all it must be stated that there are only as many case features on functional heads as arguments. Otherwise, the derivation would crash because of unchecked features. This is accomplished by Müller's Feature Balance criterion, which applies to the numeration:

## (22) Feature Balance

For every feature specification  $[*F:\alpha]$ , there must be a matching feature specification  $[F:\alpha]$ .  
 (Mueller 2009: 279)

As a consequence of this criterion, either T or v has to lose its case feature in an intransitive context and with that the ability to assign case. But how is it determined which functional head maintains its case feature in the numeration? Müller suggests that this is decided by means of unmarkedness. He therefore invokes that the external case is the syntactically as well as morphologically unmarked case. Hence, the unmarked  $[*CASE:ext*]$  on T remains and  $[*CASE:int*]$  will not appear on v. The result is that the sole argument of an intransitive verb bears external case, just like the external argument of a transitive verb, if Agree takes priority over Merge (=accusative system, see 18), or the internal argument of a transitive verb, if Merge takes priority over Agree (=ergative system, see 20).

With this background on ergativity we can now have a closer look at split ergativity.

#### 4.2 Minimalist analysis of split ergativity

What now needs to be done is to extend the existing analysis, such that it can cope with split ergativity in intransitive contexts. In Müller's (2009) analysis there is no flexibility in intransitive clauses which leads to the invariable assignment of the absolute case. But the data show that this is not always the case. This means that a mechanism has to be created which leads to the assignment of the ergative case instead of the absolute case in aspectless intransitive subordinate clauses. At the same time the absolute case has to be preserved in transitive aspectless subordinate clauses. This will be achieved with a new constraint referring to the numeration. It guides the distribution of case features making reference to the presence or absence of features such as aspect and yields the desired result of flexibility in case assignment in intransitive contexts.

I adopt Müller's approach almost completely. I agree with him regarding transitive contexts, but concerning intransitive contexts I will only take over the Feature Balance criterion, since this is the critical point for split ergativity in subordination.

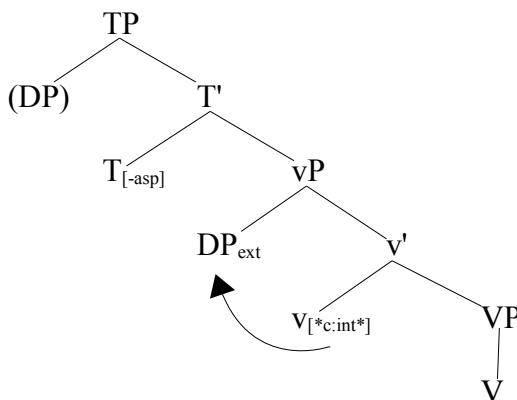
Furthermore, I assume that case features are lexical properties of the functional heads v and T that can be deleted in the numeration. As I have already pointed out in section 2.4, the only difference between split ergativity and the ordinary ergative system is that the ergative (internal case, assigned by v) instead of the expected absolutive (external case, assigned by T) shows up in intransitive contexts. Therefore, I suggest a new principle that determines which functional head keeps its case feature in an intransitive context:

(23) *Constraint on case assignment in intransitive contexts*

In intransitive contexts the case feature of the structurally highest, non-defective functional head remains.

First of all this is a principle that just like Feature Balance applies to the numeration. As a consequence, the number of possible numerations is reduced and derivations which would crash anyway are prevented from the very beginning. Admittedly, the numeration is pre-syntactic and therefore contains no structure. But because of the selection feature (represented as [+F+]) it is already foreseeable that T (bearing [+v+]) will be merged above v. Hence, T will be the highest functional head in the structure. But there is a second requirement in the principle that demands that the highest head must not be defective. Recall from the generalisations that no split ergativity in subordination is triggered by subordination itself; rather, it is subject to other factors. For Sierra Popoluca, Päri and Jacalteco this feature is aspectlessness. The assumption is that aspect is assigned by T to v and the embedded Ts obviously lack this aspect features, for no aspect is assigned. Usually T has to bear this feature in these languages. De Jong Boudreault (2009) states that a (matrix) verb in Sierra Popoluca consists at least of a verbal root with person marking as well as aspect (or mood) marking. This seems to hold for Jacalteco and Päri, too, and hence appears to be a condition for Ts. The embedded aspectless Ts thus violate this condition. They are thus defective and because of the principle in (23) the case feature on T cannot remain. v now becomes the highest non-defective functional head. Consequently, [\*CASE:int\*] remains on v and the sole argument of the intransitive verb is assigned the external case (=ergative) by v.

(24) *Intransitive context with aspectless T*



From this analysis it follows why there is no change in encoding systems in split ergativity: the unexpected ergative case in intransitive contexts is assigned by v (=internal case), while in the accusative system nominative (=external case) is assigned in intransitive contexts. All that happens is a change to an accusative pattern. To carry out a complete change of system, cases must be swapped in transitive contexts.

Moreover, there seems to be no way for v to be defective in a converging derivation, for the single feature it necessarily has to possess is [+V+]. If v doesn't bear this feature, no Merge of v and VP is possible and the derivation crashes anyway. Hence, v will never be defective and remains as alternative for assigning case.

Note that the *Constraint on case assignment in intransitive contexts* merely expresses a preference for non-defective heads over defective ones. This does not mean that defective heads generally cannot bear case features. In transitive contexts, when no choice is to be made between the two heads, T does assign the external case, although it might be aspectless. In transitive contexts case assignment works as depicted in (21).

A problem that poses itself is that a structure without aspectual information cannot survive. This issue is solved by subordination. The appropriate complementizer of the embedded CPs is a reflex of the defective T. It must necessarily be subordinating in order to ensure that the missing aspectual information can be obtained from the matrix verb. It could either be assumed that this complementizer bears a special selection feature [+T<sub>-asp</sub>+] or that a defective T receives a diacritic ‘\_’ and that the selection feature is thus [+T<sub>\_+</sub>].

In languages which do not exhibit split ergativity in subordination conducted by the lack of aspectual features, I assume that these features do not belong to the inventory of necessary features. Their absence is of no importance and thus does not create defectiveness. T therefore remains the highest non-defective functional head and is allowed to assign the unmarked case.

### 4.3 Variation of the analysis

In this section I will present language data which show a minimally differing split system and how these encoding irregularities can be derived as a variation of the present analysis.

#### 4.3.1 Mam

Mam, a Mayan language spoken in Guatemala, basically instantiates an ergative system which can be seen in the following example.

(25) *Ergative encoding system in Mam*

- a. ma    Ø-n-tzeeq'a-ya  
ASP    3SG.ABS-1SG.ERG-hit-1.ERG  
‘I hit it.’
- b. ma    Ø-b'eet  
ASP    3SG.ABS-walk  
‘He walked.’
- c. ma    chin    b'eet-a  
ASP    1SG.ABS walk-1.ABS  
‘I walked.’

(England 1983: 58)

In (25-a) a transitive context is present. The external argument is encoded by the combination of *n-* and *-ya* for first person ergative and the internal argument by a null marker for third person absolute. The same null marker can be found in (25-b) where it is used to encode the single argument. (25-c) shows that a single argument of an intransitive verb in first person is encoded differently than the first person external argument of a transitive verb.

Interestingly, Mam also features embedded clauses without aspect marking leading to encoding irregularities. But in these cases we do not find the split system presented above but suddenly all arguments invariably are encoded with the help of ergative markers.

(26) *Split system in aspectless subordinate clauses in Mam*

- a. n-chi                ooq' [t-poon                ky-txuu7]  
PROG-3PL.ABS cry [3SG.ERG-arrive 3PL.PSR-mother]  
'They were crying, when their mother arrived.'
- b. [ok                t-ku7-x                ky-awa-7n                xjaal                kjo7n]  
[when                3SG.ERG-DIR-DIR 3PL.ERG-plant-DIR person                cornfield]  
b'i7x                n-Ø-xi7                cheenaq                t-i7j  
all.at.once PROG-3SG.ABS-go bean                3.PSR-RELN/PAT  
'When the people plant the cornfield at the same time the beans go in.'

(England 1983: 259)

(26-a) includes an intransitive embedded verb. Its single argument is in third person. But this argument is not realized by the null marker for third person absolute on the verb but by the marker *t-* for third person ergative. (26-b) on the other hand features a transitive embedded verb. Both its arguments ('the people' and 'the cornfield') are encoded by ergative markers on the verb and the directional: the verb bears *ky-* as third person plural ergative representing the external argument (i.e. the people) and the directionals bear the marker *t-* for third person singular ergative representing the internal argument (i.e. the cornfield).

This split system can be derived as a simple variation of the split ergativity we have seen so far: The T heads of the subordinate clauses become defective because they don't bear an aspect feature. What is different from the analysis of split ergativity now is that Mam does not just have a preference for non-defective heads but generally prohibits defective heads from bearing case features and consequently from assigning case. This is not a problem in intransitive contexts in which v simply takes over T's function as case assigner. But since two arguments are present in a transitive context, case has to be assigned twice. In order to achieve this, there are two possibilities at hand: First, as a result of T's inability to bear a case feature, v must bear two case features so that every argument has a partner to agree with. In order to avoid a violation of the Inclusiveness condition, it has to be assumed that a second v bearing two identical case features beside the standard little v is available. This special v is chosen in the presence of a defective T head in the numeration. In the course of the derivation v agrees with both arguments and assigns the ergative case twice.

The second option is that T still is not able to bear a case feature due to its defectivity but there is only the standard v bearing one case feature which is allowed to undergo multiple agree (Hiraiwa 2001). That means the case feature on v does not become inactive after entering the first agreement relationship and v is able to agree with both arguments, although it only bears one case feature.

Either way, the mechanism that one chooses from the two is a last resort, i.e. not a normal behaviour of v. It is not freely available but triggered under the special circumstance that T is defective and supposed to avoid a crash of the derivation. Both proposed solutions entail several questions which I will not be concerned with here.

#### 4.3.2 Jacaltec

Jacaltec has already been introduced as a language that features split ergativity in aspectless subordinate clauses. But this is not the only context in which the split system is triggered. It also emerges in matrix clause constructions with an intransitive auxiliary (-u) that takes aspect marking but can only be marked for third person ergative.

(27) *Split ergativity in auxiliary-construction in Jacaltec*

- a. c'ul      x-(y)-u                [ha-tzoteli]  
good    ASP-3SG.ERG-AUX    [2SG.ERG-talk]  
'You talked well.'
- b. \*c'ul      x-aw-u                [ha-tzoteli]  
good    ASP-2SG.ERG-AUX    [2SG.ERG-talk]  
'You talked well.'

(Craig 1977:335)

(27-a) shows a grammatical instance of the construction in question. The matrix predicate is a combination of the adjective *c'ul* 'good' and the auxiliary *-u*. The single argument is encoded by a marker for third person ergative although the translation reveals that the actual agent is an entity in second person (which is subject of the embedded clause). (27-b) shows that it is not possible to use the marker for second person ergative in the matrix clause.

This phenomenon can also be subsumed under the present analysis. The idea is that the matrix T is defective again. But here the reason for the defectivity is the lack of  $\phi$ -features. This also explains why this auxiliary can only be used impersonally. The same mechanism as in split ergativity in subordination sets in leading to the assignment of the ergative instead of the absolutive. But in this case no subordination is triggered because the third person marker is simply inserted via default. Hence, no information needs to be obtained from a superordinate clause.

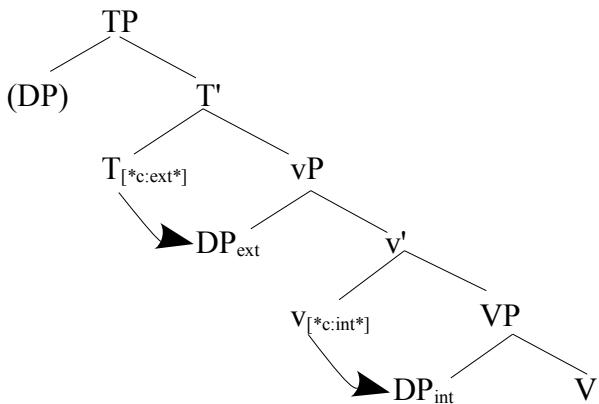
So this split system also follows from the analysis proposed for split ergativity in subordination. The only difference is that the defectivity in this case is due to a different feature(set): absent  $\phi$ -features instead of an absent aspect feature. Since T is defective it cannot assign case due to the constraint stated in (23). This results in v assigning ergative case and the marker for 3<sup>rd</sup> person singular is chosen because it is the default marker.

This also shows that there are two ways to compensate the absence of a feature: either subordination is triggered which gives the opportunity to obtain the missing information from a superordinate clause or a default value is inserted in which case no subordination is necessary. Consequently, the analysis I propose is completely independent from subordination and that is why the *Constraint on case assignment in intransitive contexts* does not make reference to it.

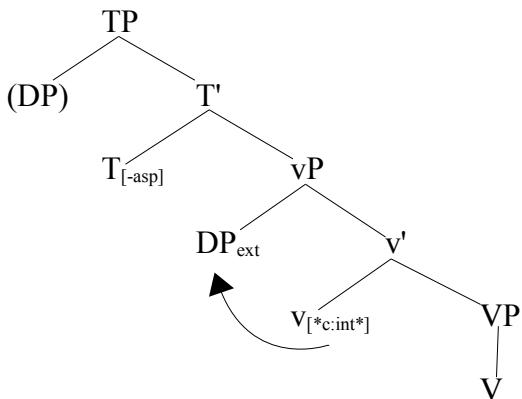
### 5. Prediction of the analysis

Interestingly enough, the present analysis does not only derive split ergativity. Since the basis of this analysis is a system that derives accusativity and ergativity within one structure and the new condition does not explicitly refer to the ergative system, a split accusativity analogous to split ergativity is predicted. This means that there should be languages which basically exhibit an accusative system but show accusative marking instead of nominative marking in certain intransitive (subordination) contexts. This arises if T is defective in an accusative system: in transitive contexts no change in the encoding system is triggered (for case assignment in transitive cases see (20), repeated in (28)) but in intransitive contexts the defective head is not allowed to assign case. Therefore, v does so (see (29)) and v assigns the marked case which is accusative in an accusative encoding system. So the sole argument of an intransitive verb in a defective context bears the same case as the internal argument of a transitive verb in defective contexts (accusative). Hence, the accusative would receive the typical absolutive distribution and create an ergative pattern.

(28) Accusative system: transitive context



(29) Accusative system: intransitive context with defective T



This prediction is borne out. Evidence for this phenomenon comes from Kĩsêdjê, a Brasilian language of the Jê family. This language basically exhibits an accusative system with a marked nominative. The arguments are encoded by case clitics.

(30) Accusative encoding system in *Kîsêdjê*

- a. Ø Pasi=ra thẽ  
 FACT.NF Pasi=NOM go  
 ‘Pasi is gone/going.’
- b. hẽn Ø i-nã=Ø mu  
 FACT 3PRO.NOM 1.PSR-mother=ACC see  
 ‘He saw my mother.’
- c. Ø i-nã=ra khu-ku  
 FACT 1.PSR-mother=NOM 3ACC-eat  
 ‘My mother ate it.’

(Nonato 2013a: 2,4)

In (30-a) an intransitive context is present. The single argument receives the nominative clitic =*ra*. The same clitic is used for the external argument of the transitive verb in (30-c). (30-b) on the other hand also features a transitive verb but this time the external argument is a 3<sup>rd</sup> person pronoun which is realised by a null marker. The internal argument bears the accusative marker =Ø. Example (30-c) also shows that pronominal arguments can be realized by a verbal marker. In this case it is the prefix *khu-* for an internal argument in third person accusative.

Another important point is that in *Kîsêdjê* tense is not morphologically encoded. But matrix clauses have to have a modal particle. These can be missing in subordinate clauses. In that case split accusativity appears, i.e. the accusative is used to encode the single argument of an embedded intransitive verb. Argument encoding in transitive embedded verbs remains untouched. This can be seen in the following set of data:

(31) Split accusativity in *Kîsêdjê*

- a. hẽn Ø [i-nã=Ø thẽ] mu  
 FACT 3PRO.NOM [1.PSR-mother=ACC go] see  
 ‘He saw my mother.’
- b. hẽn Ø [i-nã=re/ra khwârâ=Ø khuru] mu  
 FACT 3PRO.NOM [1.PSR-mother=NOM manioc=acc eat] see  
 ‘He saw my mother eating manioc.’

(Nonato 2013a: 4 &amp; Nonato 2013b: 4)

In (31-a) it can be observed that the single argument in the embedded clause is null marked, i.e. receives the accusative. (31-b) contains a transitive embedded verb. Its internal argument is also null marked and the external argument bears the nominative clitic =*ra* (or the stylistic variant =*re*). This means that the accusative marker shows the typical distribution of the absolutive which creates an ergative encoding pattern. This exactly confirms the predicted accusative counterpart of split ergativity.

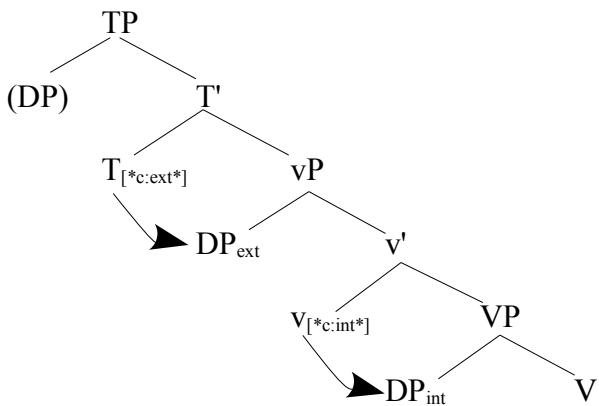
### 6. Alternative background theory: Bobaljik (1993)

In what follows I would briefly like to go into the analysis of ergativity and accusativity by Bobaljik (1993) and show why this theory has difficulties once we try to capture the data presented above. To facilitate the comparison with Müller's (2009) theory I will use the same clause structure.

Bobaljik (1993) assumes that the difference between ergative and accusative encoding system lies in intransitive contexts (as opposed to Müller): he takes nominative and ergative to be basically the same case just as accusative and absolute.

Regarding the clause structure, Bobaljik assumes additional AgrPs above VP and TP (v is non-existent) and movement of the NPs to their specifiers. The case assignment then takes place in a specifier-head-configuration. I replace this concept by an Agree operation between the functional heads T and v and the arguments. The term 'external case' subsumes now nominative and ergative (assigned by T), while 'internal case' stands for absolute and accusative (assigned by v). So the structure for a transitive context looks identical for both encoding systems.

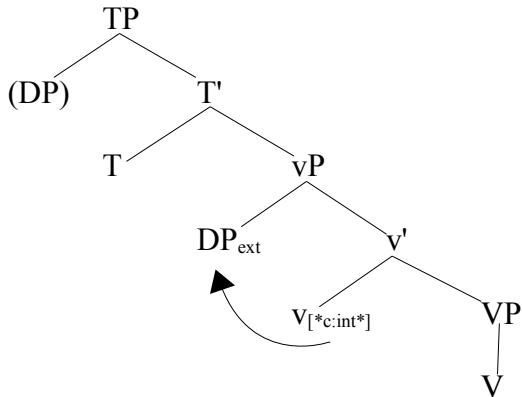
#### (32) Transitive contexts in both systems



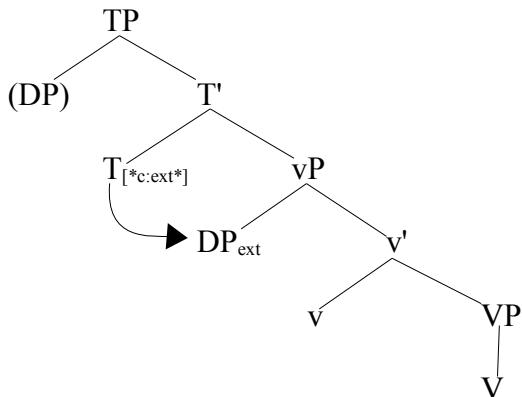
In order to decide which case appears in intransitive contexts, Bobaljik proposes the 'Obligatory case parameter' (OCP, cf. Bobaljik 1993: 50) which basically states that in intransitive contexts in an accusative system the nominative (=external case) must be assigned whereas in an ergative system the absolute (=internal case) must be assigned in intransitive contexts.

As a result, the difference between the two encoding systems arises in intransitive contexts because in these cases they work differently. The cases that show up are assigned from different functional heads. Absolute is assigned by v (see (33)) and nominative is assigned by T (see (34)).

## (33) Ergative system: intransitive context



## (34) Accusative system: intransitive context



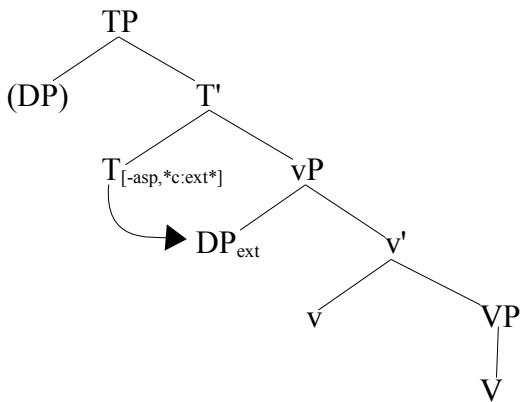
If one attempts to capture the irregularities in intransitive contexts of split ergativity now, the OCP causes problems because it is such a strict principle that leaves no room for flexibility. Because it demands the obligatory assignment of the absolute case in intransitive contexts in an ergative encoding system, it cannot explain why the ergative shows up in intransitive defective contexts.

Bobaljik tried to overcome these problems by proposing the 'hidden-transitive-analysis' which - as we have seen in section 3 - is not able to account for the data. Another possibility to capture the encoding irregularities is to change or to replace the OCP. The challenge that is faced here is that according to Bobaljik different functional heads are active in intransitive contexts in the different systems. Hence, a factor needs to be found that associates T and v but also ensures that the right functional head is chosen. This problem could again be solved with the help of unmarkedness: the case features of the unmarked case in each system (nominative and absolute) receive an additional indicator simply by virtue of being the feature of the unmarked case. The nominative is the external case and assigned by T, therefore the case feature for the external case receives the additional mark in the accusative system: T[CASE:ext #]. The absolute on the other hand is the internal case and assigned by v. Consequently, the case feature for the internal case must bear an additional indicator in the ergative system: v[CASE:int #]. As a general condition, one might now assume that the unmarked case has to be assigned. Consequently, the case feature with the additional indicator

must be preserved in the numeration. This leads to the assignment of the absolutive in the ergative system and the nominative in the accusative system in a usual intransitive context.

The next task is now to explain why v loses its case feature in aspectless intransitive contexts. The obvious answer would be that an aspectless, defective T attracts the case feature. This is in complete contrast with the *Constraint on case assignment in intransitive contexts*. But interestingly, this would lead to a genuine change of encoding system in the context of defectivity: both encoding systems work similarly in transitive contexts but differ in intransitive ones. In a normal derivation of an intransitive context, v assigns the absolutive to the sole argument in an ergative system and T assigns nominative in an accusative system. Exactly this point is neutralised in the context of split ergativity in subordination: in an intransitive context the defective T attracts the case feature which leads to T assigning ergative to the sole argument. This is the exact match of case assignment in normal intransitive contexts in an accusative system (compare (34) and (35)).

(35) *Ergative system: intransitive context with defective T*



Consequently, the ‘extended ergative’ pattern leads to a genuine change of encoding system under this account. This contrasts with Müller’s (2009) analysis.

### 7. Conclusion and outlook

In this paper I have argued that the existing analyses for the ‘extended ergative’ pattern cannot account for the data I have reviewed. Therefore, a new approach had to be taken and I have shown how the phenomenon of split ergativity in subordination can be derived in minimalist syntax. Based on the analysis of ergativity in Murasugi (1992) and its reconstruction by Müller (2009), I proposed the *Constraint on case assignment in intransitive contexts*. This constraint derives split ergativity in intransitive contexts in the presented languages Sierra Popoluca, Päri and Jacalteco. The fact that these three languages are unrelated but have their split ergativity governed by the same factor makes the aspectlessness seem very deeply rooted in this phenomenon. Moreover, the analysis is completely independent from subordination. It does not seem to be a trigger in any way; rather, the subordination is or can be a consequence of the actual trigger. Therefore, terms like ‘clause type-based split’ or ‘main/subordinate clause split’ that can be found in the literature seem to be somewhat misleading for the phenomenon I have presented.

Another result of this paper is that a strict distinction between encoding systems and encoding patterns has to be made. To change from an ergative to an accusative encoding pattern one has two possibilities at hand: either the cases in the transitive contexts are swapped or the case of the external argument of a transitive verb is used for the sole argument of an intransitive verb (ergative). Equally, the change from an accusative to an ergative system can be achieved. But that is different with encoding systems because in that case there is only one way to change from one to the other. In Müller (2009) both systems behave identically in intransitive contexts, but differ in transitive cases. So in order to change from one system to the other, case assignment in transitive contexts needs to be turned around. But this is not what happens in split ergativity in subordinate clauses. In these cases case assignment in intransitive contexts is affected. So in Müller's analysis the split ergativity merely leads to a change of encoding pattern, not encoding system. This is different if a different background theory is chosen, for example Bobaljik's (1993) theory. Bobaljik interprets the difference between ergative and accusative encoding systems differently. According to him, both systems work identically in transitive contexts but differ in intransitive contexts and exactly those are targeted in instances of split ergativity in subordination. Consequently, split ergativity leads to a change of encoding system in this theory.

Furthermore, it is very interesting to see that in all these split systems the marked case (accusative and ergative) is also used in possessive constructions. This is common for the ergative system but rare for accusative systems and might be an interesting issue for further research.

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# **Subjective adjectives as a cooperation problem**

Tamara Vardomskaya

I discuss the pragmatics of subjectivity, showing that the subjectivity of multidimensional predicates maps to how well (how poorly) speakers can communicate the component dimensions — evidence for the predicate's truth — *to one another*. The communicability of evidence for the truth of the predicate is what separates subjective predicates from objective predicates, and allows for the fluidity of the divide in certain contexts. This also connects the subfield of PPT research to the subfield of evidentiality, as the two seemingly disparate areas are both concerned with the interface between semantics and pragmatics, establishing the relationship between content, context, communication and truth.

## *1. Introduction*

Much research in natural-language semantics is concerned with the conditions under which statements are true. However, there is an intuitively natural class of words such as *tasty*, *fun*, *beautiful*, *good*, *smart*, *lazy*, *an expert*, *superior*, *vile*, *ugly*, *boring*, *a fool*, *respectful*, *conservative* which, when inserted in the statement “*X is \_\_*” seem to make the truth of it a matter of “who decides?” Different speakers may argue over the application of these predicates without anyone being able to decide easily that one of them is wrong, unlike for predicates like *closed*, *transparent*, *an artificial flower*, *a four-year-old child* or *wooden*. Thus, the former class is referred to as *subjective* while the latter is *objective*. Recent research by Bylinina (2013) has shown that it is necessary to divide the subjective class further, into predicates of personal taste (PPTs) such as *tasty* and *fun*, and evaluative adjectives such as *smart* and *lazy*, as the semantics of the two classes has very different properties.

The problem of how to model a subjective predicate, and whether a “judge” parameter is necessary for its truth evaluation, has seen a great deal of research in recent years (Lasersohn 2005; Stephenson 2007; Stojanovic 2007; Moltmann 2010; Pearson 2012; Bylinina 2013).

In this paper, I challenge previous analyses and ask the question: why aren't *all* predicates subjective? Why can we firmly agree on *This table is wooden* being true, while arguing for

hours on whether *John is smart* is true, and acknowledging that argument over *Cilantro is tasty* is futile?

This paper is organized as follows: in Section 1, I will discuss previous research on the qualities and diagnostics of a subjective predicate, including the analysis of the Experiencer and multidimensionality requirements. In Section 2, I will argue that this analysis over-predicts, and to constrain it we need the additional pragmatic criteria of consensus and cooperation, and I will follow through on consequences of this, connecting it to evidentiality. Section 4 concludes.

## 2. What makes a subjective predicate?

Let us first turn to my question as to why not all predicates are subjective, and how we can tell when one of them is. We certainly have intuitions about whether something is subjective, but from a linguist's perspective, they can only take us so far. There are four commonly accepted diagnostics for the subjectivity of a predicate. The best known is *faultless disagreement in the positive form* (Lasersohn 2005; Kolbel 2002; Richard 2004; Stephenson 2007; Stojanovic 2007; Glanzberg 2007) — in essence, one speaker can say X, the other can counter with not-X, and an external observer cannot confirm that one of them said something false while the other said something true (1).

- (1)    a. Yuri: The wine is tasty.  
          Zelda: No, it's not.
- b. Zelda: Carla is smart/boring/lazy/a fool.  
          Yuri: No, she's not.

A notable counterargument to this diagnostic, however, is that it is also acceptable for such predicates as *tall*, even though intuitively, *tall* does not seem like a subjective predicate in the same sense that *tasty* is (2).

- (2)    Yuri: Svetlana Khorkina is tall.  
          Zelda: No, she's not, she is only 5'5" (162cm)!  
          Yuri: And that is tall for a gymnast!

This led Kennedy (2013) to point out a stronger diagnostic: only typically-subjective predicates allow *faultless disagreement in the comparative form* (3).

- (3)    a. Zelda: Skiing is the most fun.  
          Yuri: No, knitting is!
- b. Zelda: Mary is smarter/taller than John.  
          Yuri: No, John is smarter/#taller than Mary.

Although one may have subjective disagreement over the positive form of *tall*, *taller* allows only objective disagreement — John's and Mary's heights may be easily measured and compared, even by such a simple test as standing the two of them next to each other.

In a cross-linguistic analysis, Saebo (2009) found a third diagnostic: only subjective predicates are *embeddable under "find X Adj"* (or under equivalent verbs in other languages, such as

French *trouver* German *finden* and Swedish *tycka*; <sup>1</sup>).

- (4)    a. Yuri finds the wine tasty.
- b. ?Yuri finds the wine to be merlot.
- c. Zelda finds roller coasters fun.
- d. Zelda finds Yuri lazy.
- e. ?Zelda finds John tall/to be tall.
- f. ?Yuri finds the theater empty.

The usage in (f) should not be confused with the English meaning of *find* meaning ‘discover,’ which is perfectly acceptable in this context. In uses like (4), the subject of *find* appears to be the same agent doing the opining or the perceiving, and cannot be another:

- (5)    a. ??Yuri finds the wine tasty to Zelda.
- b. ?Anna finds the cat food tasty (because the cat ate it up). (Stephenson 2007)

This leads us to the fourth (and least consistent) diagnostic, that of ‘judge PP’ (Lasersohn 2005; Stephenson 2007), whereby certain subjective predicates allow a prepositional phrase (PP) to specify to whom should the truth of the predicate be ‘relativized’:

- (6)    a. Wine is tasty to Yuri, while roller coasters are fun for Zelda.

Once that PP is overt, faultless disagreement is no longer felicitous (7).

- (7)    Yuri: The wine is tasty to me.
- Zelda: #No, it’s not!
- Zelda: Well, it’s not tasty to *me*.

However, as has been pointed out by Stephenson (2007) and Bylinina (2013), this ‘judge PP’ is not available to all predicates that pass the other tests for subjectivity, and which preposition is used seems to be idiosyncratic (8).

- (8)    a. fun for Sue / \*fun to Sue
- b. \*tastes good for Sue / tastes good to Sue
- c. \*smart for Sue / \*smart to Sue
- d. ?beautiful for Sue / ?beautiful to Sue

## 2.1. Contextualism, relativism, and the journey towards a judge-free semantics

Despite the restrictions on the ‘judge PPs’, the source of the ‘judge’ has been the topic of some extensive and controversial literature since Lasersohn’s (2005) paper. There appeared to be two camps on the matter, relativists (Lasersohn 2005; Stephenson 2007), believing that the source of the judge is in the context and extension of the expression, and contextualists (Glanzberg 2007; Stojanovic 2007), believing that the source of the judge is in the content.

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<sup>1</sup>A SOLE reviewer confirms that Portuguese *achar* also has the same property

The contextualists affirmed that the difference between Yuri and Zelda on the application of ‘tasty’ meant that the two of them had different meanings for ‘tasty’ itself (in essence, [[*tasty*]] contains a silent PRO referring to the speaker. The relativists claimed that it meant that Yuri and Zelda agreed on the meaning of the term, but disagreed on whether it applied to the wine in question. Thus, according to Lasersohn, only the truth value is relativized, rather than, as the contextualists affirm, the content of the affirmation itself. In essence, the contextualists deny that the disagreement is faultless, since Zelda is making a claim that is false about the wine being tasty to Yuri, so as Stojanovic (2007) points out, it’s all misunderstanding; the relativists deny that it is a disagreement, since Yuri and Zelda are making claims about differently-indexed truths.

In more recent work, Pearson (2012) has proposed a ‘judge-free’ semantics for predicates of personal taste. Her model removes the need for a judge by interpreting the meaning of ‘tasty’ as involving first-person-oriented genericity (first proposed by Moltmann (2010)): in all worlds *w* and all individuals *x* such that I, the speaker, identifies with *x*, the wine is tasty to *x*.

A judge-free model is also affirmed by Bylinina (2013); using a cross-linguistic account, she argues that the prepositional phrase reflects not the ‘judge’ but the Experiencer. She uses evidence from Japanese, which has a first-person constraint on subjective predicates, which is lifted if the speaker incorporates an evidential (9).

- (9)    a. watasi-ni-(totte)-wa / \*John-ni-(totte)-wa kono keikii-wa oisii  
I-DAT-TOTTE-TOP / J.-DAT-TOTTE-TOP this cake-TOP tasty  
“This cake is tasty to me / \*to John.”
- b. John-ni-(totte)-wa kono keikii-wa oisii noda / ni tiganai  
J.-DAT-TOTTE-TOP this cake-TOP tasty EVID / there’s.no.mistake  
“The cake must be tasty to John.” (Bylinina (2013), p. 27, ex. 34.)

Bylinina (2013) points out that there are three classes of adjectives that show different subjectivity patterns: (a) Predicates of Personal Taste (PPTs), e.g. *tasty*, *fun*, allow faultless disagreement both in the positive and in the comparative form, and take ‘judge PPs’; (b) Evaluative Adjectives (Bierwisch 1989), e.g. *smart*, *lazy*, allow faultless disagreement both in the positive and in the comparative form, but do not take ‘judge PPs’; (c) POS-Dimensional Adjectives, e.g. *tall*, *deep*, allow faultless disagreement in the positive form only, and do not take ‘judge PPs.’ She concludes that the sources of subjectivity in all three of these classes are different.

POS-dimensional adjectives are subjective due to the subjectivity of the silent POS (for *positive*) morpheme indicating the degree standard (Kennedy 1999; Kennedy & McNally 2005) a.o.). Thus, the subjectivity lies in two people disagreeing as to what the standard should be, e.g. how many centimetres of height are required to qualify as *tall*? This is induced by the well-known property of *vagueness*.

Predicates of personal taste, Bylinina argues, are subjective due to them having experiencer semantics. As Nouwen (2007) proposed, the reason that we find *tasty* to be subjective is that the speaker has privileged information — only she is the experiencer of pleasure at the taste of the item in question. Using a cross-linguistic analysis with data from Japanese, Russian, and Hungarian, Bylinina shows that the ‘judge PP’ is the overt manifestation of the Experiencer thematic argument, with a requirement that the ‘judge’ be the Experiencer. Therefore, there is

no need for a ‘judge’ index in itself.

Evaluative adjectives, on the other hand, are subjective for a different reason. They are multidimensional, in that they aggregate several different predicates in themselves; for example *smart* may encompass skill at mathematics, language, wilderness survival, etc. When they were first described, by Kamp (1975) and Klein (1980), they were referred to as *nonlinear adjectives* — nonlinear for the very reason that they allow faultless disagreement in the comparative form, because different speakers may prioritize different dimensions. More recently, Sassoon (2012) has extensively studied the properties of multidimensional adjectives, while van Rooij (2010), whom Bylinina follows, provides a model for how subjectivity may arise from their multidimensionality.

More specifically, subjectivity arises from a specific subclass of the multidimensional adjectives. Sassoon (2012) distinguishes the following subclasses of multidimensional adjectives (10).

- (10)    a. *Conjunctive*: Entities are required to reach the standard in *all* of the component dimensions. Exception phrases are permitted:
  - (i) John is healthy (in all respects) except for his blood pressure.
 These pattern in the same way as upper-closed adjectives such as *closed*, *straight* (Kennedy & McNally 2005; Rotstein & Winter 2004): they allow modification with *completely* but not *slightly*, for example.
- b. *Disjunctive*: Entities are required to reach the standard in *any one* of their component dimensions. Exception phrases are not permitted:
  - (i) John is sick #except for his blood pressure.
 These pattern in the same way as lower-closed adjectives, such as *open*, *bent* allowing modification with *slightly* but not *completely*.
- c. *Mixed*: Context determines how many dimension standards the entity must exceed in order to count; thus exception phrases may or may not be acceptable. *Smart* is an example. Neither *completely* nor *slightly* are acceptable; thus, they pattern with relative-standard adjectives such as *tall*, *deep*.

Van Rooij points out that in a multidimensional predicate (Sassoon (2012) would specify that this is in the ‘mixed’ class of multidimensional predicates), some dimensions may ‘count’ for more than others in certain contexts. For example, taking the classic multidimensional adjective *healthy* (comprising the different predicates of, say, blood pressure, cholesterol level, pain, presence of cancer, etc.), we observe that ‘having a mild cough’ may still qualify someone as *healthy* for coming in to office work or school — but not for going into space or performing surgery. In certain contexts, ‘mathematical proficiency’ would count for a great deal towards being counted as *smart*, while ‘Classical Greek proficiency’ might be mildly impressive, but not counterbalance a shortage of math skills. He thus proposes a weighting function that a speaker may apply to the component dimensions of a multidimensional adjective in a given context, in the form of an ordered vector: if a dimension should not count for that much, its weighting would be low, and if it should not count in the context, its weighting would be zero.

Thus, Bylinina (2013) argues, evaluative adjectives are precisely the ‘mixed’ multidimensional adjective class, and subjectivity in evaluative adjectives can be explained merely by dif-

ferent speakers (in different contexts) having different weighings (11).

- (11)    Yuri: John is smarter than Mary: he is a mathematical genius.  
        Zelda: No, Mary is smarter than John: she is an expert wilderness guide, and John won't last a second in the wilderness.

In this case, Yuri is weighting *good at math* heavily in his assessment of *smart*, while Zelda weights *good at wilderness survival skills* much heavier than mathematical proficiency in her own assessment.

Bylinina's analysis, I think, represents a significant step forward in studies of subjective phenomena. However, the problem is that it overgenerates. If solely multidimensionality were the basis for subjectivity in evaluative adjectives, then we would expect that such well-known multidimensional predicates as *big* (van Rooij 2010) to also be subjective, yet most of the time, they are not. On the other hand, *healthy*, being an example of a conjunctive multidimensional adjective, should never be subjective, and some of the time, it is. Since the number of contexts, and the number of speakers are endlessly varied, and, as Kamp (1975) observed, multidimensional adjectives form the majority of adjectives, how do we understand each other at all? Why doesn't every dialogue collapse in faultless disagreement?

### 3. *Constraining Subjectivity*

In this section, I offer analyses of two ways in which speakers avoid faultless disagreement and constrain subjectivity. The first is dictatorship, or appealing to an authority, such as a scientific organization or a dictionary. The second is consensus and cooperation, or coming to a mutual agreement as to the values of certain potentially-subjective predicates, so as to avoid subjectivity locally for the purpose of the conversation.

#### 3.1. *Vagueness and Dictatorship*

Let us look at *healthy*, which is used as an example of a conjunctive multidimensional predicate, and generally does not appear in lists of evaluative predicates (much less predicates of personal taste). However, one can imagine a context in which there does seem to be faultless disagreement, and in the comparative form too, with *healthy* (12).

- (12)    Yuri: Chantal Petitclerc, five-time Paralympic champion and record-setter, is healthier than me.  
        Zelda: No, she's not. You can walk, and she can't.

Notably, this seems like a normal example of faultless disagreement if Yuri and Zelda are shooting the breeze at a bar, talking about their health or their sports heroes. However, once we have clearly written out standards of *healthy*, such as the Army, the faultless disagreement disappears (13).

- (13) Army Regulation: To be confirmed healthy, all applicants must...be able to independently walk X metres in Y seconds.  
 Yuri would pass. Chantal Petitclerc, a paraplegic, would fail, despite her blood pressure, heart rate, etc. all being closer to the maximum healthy range than Yuri's. Thus,  
 a. Chantal Petitclerc is healthier than Yuri — FALSE

Similarly, Pedersen (2012) has observed cases where, he argues, the subjectivity is *all* in the context, and not tied to a particular word (14).

- (14) A: Ryan won the marathon.  
 B: No, he didn't. Ryan didn't win the marathon. A Kenyan won the marathon.  
 (15) (In the leadup to the 2012 U.S. presidential election):  
 A: Obama won the debate.  
 B: No he didn't. Obama didn't win the debate. Romney won the debate.

Pedersen notes that the first example has objective disagreement, while the second has faultless disagreement. He points out that this hinges on the context: in American presidential debates, there is no official standard as to what it takes to win or lose one (unlike the world of competitive university debating); if we modify the context, the faultlessness of the example disappears (16).

- (16) Context: After the presidential debate, a panel of special judges votes on who they think performed better and awards the candidate who garnered the most votes a replica Abe Lincoln hat.

The context allows for clear rules for the interpretation of *win* handed down from an authority — or, to give a more formal term from economics, a *dictator*.

Grinsell (2012) has a very interesting analysis as to why multidimensional adjectives such as *healthy* lead to faultless disagreement and vagueness effects; he brings in economics, specifically social choice theory, as the reason. Vagueness in multidimensional adjectives, he argues, is the result of multi-criterial decision making: speakers are forced to evaluate multiple criteria, the same way voters in a political election have to evaluate a number of different candidates who have differing platforms concerning foreign policy, health care, policing, etc. There is an economic result, known as *Arrow's Theorem* after economist Kenneth Arrow (1951): there is no collective decision procedure that respects certain rational assumptions and avoids circularity, or cycling. (Grinsell 2012)

That is, assume that there are candidates Alice, Bob, and Chris. On criterion X, Alice is better than Bob, who is better than Chris. On criterion Y, Bob is better than Chris, who is better than Alice. On criterion Z, Chris is better than Alice, who is better than Bob. Thus, how do we choose the optimal candidate for all three criteria? We end up in a circle, with the logical reasoning to the absurd conclusion that if Alice is better than Bob, and Bob is better than Chris, and Chris is better than Alice, then Alice is better than herself.

Grinsell proposes that this is what happens to create vagueness in such multidimensional adjectives as *healthy*. He uses vagueness in the sense of Kennedy (2007), as involving three criteria (17).

- (17) a. Vague predicates are susceptible to the sorites paradox, for example:
- (i) A person 2 m tall is tall.
  - (ii) A person 1 mm shorter than a tall person is tall.
  - (iii) A person 1 mm tall is therefore tall.
- b. Vague predicates are susceptible to borderline cases: even if we know someone is 180 cm in height, we may be unsure as to whether that counts as *tall*.
- c. Vague predicates have contextual variability: to use Kennedy's (2007) famous example, the statement *The coffee in Rome is expensive* is true if the comparison class is other Italian cities, but false when comparing Rome to Chicago.

Grinsell (2012) argues that these vagueness effects in multidimensional predicates arise due to the issues of cycling: because speakers are trying to aggregate multiple choice functions, they find that their evaluation varies by context (including by speaker), that there are borderline cases (should Candidate Bob above be considered *good* if he is better than Chris, but worse than Alice?), and that we can form a sorites series (18,19).

- (18) (Grinsell 2012): A person with low blood pressure, low cholesterol, and a low heart rate is healthy. A person with high blood pressure, high cholesterol, and a high heart rate is not healthy. Is a person with low blood pressure, low cholesterol, and a high heart rate healthy? A person with mid-values for all the measures?
- (19) (Grinsell 2012): A person whose systolic blood pressure is one unit higher than a healthy person's is healthy.

We recognize that our issue of subjective predicates also has the two features of strong context-sensitivity, and borderline cases as to whether someone should count as *smart* or a meal as tasty. Grinsell (p.c.) admits that it is difficult to form a sorites series with subjective predicates. However, in cases of evaluative predicates that contexts may assign a numerical value, I claim one may indeed construct a sorites series (20).

- (20) a. Many wine critics rate the wines they review out of 100. So a wine that is rated a 98, this critic definitely found very tasty. A wine that is 97, likewise...A wine that is a 10/100 is definitely undrinkable pig slop. But where is the line actually drawn between wines fit for the Queen, and pig slop?
- b. A figure skater who scores 295 points (the current world record under the modern ISU judging system) is obviously a good figure skater. One who scores 294 points, likewise...so does it lead that a skater who scored zero points is a good figure skater?<sup>2</sup>

The vagueness effects are due, in essence, to the aggregation function being unclear. Unlike van Rooij (2010) and Bylinina (2013), Grinsell (2012) assumes for his analysis that all of the dimensions are equally weighted. For my analysis, I assume that different speakers have different weightings. This clarifies the aggregation function for one speaker taken individually, and therefore simplifies the decision problem, as the preference orderings along the higher-

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<sup>2</sup>We will ignore the issue that someone who skates well enough to participate in international ISU-sanctioned events already surpasses some minimal standard of good figure skating.

weighted scale take priority. However, if we consider multiple speakers, the different weighing scales would ‘cancel each other out’ — it becomes a choice of speaker rather than a choice of scale.

Thus, one way to break the cycling and to restore precision (an analysis based on Arrow’s theorem says) is through allowing a dictator, one participant whose preference function overrides every other. We note that this is precisely what the Army regulations in my example concerning health, or Pedersen’s Lincoln-hat-awarding judges, are doing. The dictator settles subjectivity; speakers cannot have faultless disagreement, since with respect to the dictator, one or the other of them is at fault.

The risk of Arrow’s theorem leading to deadlock explains at least part of the question as to why not every predicate is subjective. We follow dictators for much of our vocabulary, when it comes to faultless disagreements about the dimension valuation of words. Codes of points for figure skating and gymnastics, indicating what counts as ‘good’ and what should be prioritized, evaluation rubrics for essays and performances, legal contract definitions, dictionaries.

If we consider a restricted context, without a dictionary, a disagreement about the meaning of a word does look a lot like a faultless disagreement. If Yuri and Zelda, say, were stuck on a long car trip, without dictionaries or the Internet, and they disputed the application of a word or phrase, then from their perspective that would be a faultless disagreement — neither could prove the other wrong and there is no external verification. If they agree to disagree about what *pulchritudinous* means, they are acting in the same way as Stojanovic (2007)’s protagonists do when settling how to live with their disagreement on the application of *tasty* to soybean ice cream (21, 22).

- (21) Tarek: OK. To my taste, this ice-cream is delicious; that’s all I’m saying.  
Inma: OK, and to my taste, it isn’t delicious at all; that’s all I’m saying. (Stojanovic (2007), p. 693, ex. 3-4.)
- (22) Yuri: OK, to me *pulchritudinous* means ‘beautiful,’ that’s all I’m saying, and we’ll have to wait till we get to Portage la Prairie to get on the Internet and check if I’m right.  
Zelda: OK, I say that to me, *pulchritudinous* means ‘successful’, that’s all I’m saying, and that’s all we can decide on until we get to Portage la Prairie.

Yuri will turn out to be correct when they get to Portage la Prairie, proving this to be an objective disagreement after all. However, in the restricted context, to someone sitting in the same car with them who doesn’t know either, Yuri and Zelda’s disagreement looks just like Inma’s and Tarek’s — the only language involved is the micro-language that the two of them are speaking, alone in the car, and there is no way in that language that one could be right and the other wrong, as long as we restrict it to just the two of them. And it is conceivable that they reach a consensus that *pulchritudinous* means ‘successful’ and perhaps use for years a meaning that with respect to standard dictionaries is wrong, with no disruption to their communication.

### 3.2. *Consensus and Cooperation*

This leads us to the other issue of this section: the vast majority of words we use, including multidimensional predicates, we do not look up in dictionaries. We hear someone using a word new to us, make a reasonable guess as to what it means from the context, and add it to our own vocabulary, without starting a faultless disagreement as to its application.<sup>3</sup> We may inquire as to what it means, and then accept the other speaker's explanation at face value. We are social beings, who generally follow Grice's (1975) maxims of being cooperative speakers. Thus, we arrive at the interpretation of predicates by consensus, only referring to dictators when we really need it to. Through a process of mutual negotiation, we develop our micro-languages to avoid subjectivity (Barker 2012; Ludlow 2008).

Thus, we have two conditions for subjectivity. One is either multidimensionality, or Experiencer semantics; the other is the lack of either a dictator or a consensus. Can we deduce from that what *makes* a predicate of personal taste, versus an evaluative adjective, versus a plain run-of-the-mill uncontroversial objective adjective? Yes, we can, I argue. As Nouwen (2007) and later Bylinina (2013) note, a predicate of personal taste encodes privileged information — the experiential component. Thus, it is impossible for two people to *objectively* disagree on it, as there is no objective source, or for a dictator to override your experience with hers. People would want to defend their privileged experience, rather than conceding to a common good (23).

- (23)    Zelda: The carrot cake is tasty. Indeed, it is delicious, soft and full of flavour.
- Yuri: Well, my experience of eating it wasn't pleasant at all, but I guess I agree it's tasty if you say so.
- Zelda: Wonderful! Have some more, and we can have it tomorrow, and the day after!

Poor Yuri would be doomed in this scenario, so it makes sense that he would instead affirm, despite this causing faultless conflict with Zelda, that his experience takes priority, and to him the carrot cake is not tasty but disgusting, so he will not be swayed.

Evaluative adjectives get more complicated. As Bylinina (2013) showed, they lack experiential semantics. As we have concluded above, they thus rely on their multidimensionality and the unavailability of consensus, or a dictator, to be subjective. However, there can easily be contexts in which an evaluative adjective can be objective: for example, a school or organization (the dictator) can define *smart* as merely exceeding a minimal IQ score, or a score on a standardized test such as the SAT or GRE. Thus, faultless disagreement would disappear in both the positive and the comparative forms: to determine whether John is smarter than Mary, we need only to compare their test scores.

They can also become objective through reaching a consensus by persuasion. If Yuri and Zelda disagree as to whether John is smart, each can marshal their arguments, communicate the dimensions of intelligence that have the greatest weight, and try to persuade the other. Suppose

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<sup>3</sup>A particularly vivid example of acquiring a word is a famous scene in the 1987 film *The Princess Bride* where a character consistently misuses the word "inconceivable" until Inigo Montoya observes, "You keep using that word. I don't think it means what you think it means." Thanks to a SOLE reviewer for reminding me of that example.

that John is a brilliant mathematician savant who has difficulty with life skills and mundane subjects, and always says the wrong thing in conversations. Yuri may have seen him in the mathematics classroom and been quite impressed with his performance, while Zelda had a frustrating conversation with John just outside about some mundane topic. Thus, they would be justified in having the conversation in (24).

- (24) Yuri: John is smart.  
 Zelda: No, he's not!  
 Yuri: How can you say that? His theorems are absolute genius!  
 Zelda: He's ignorant of the most basic things! I was facepalming all through our conversation!

Or to return to a previous example (12, repeated as 25)

- (25) Yuri: Chantal Petitclerc is healthier than me.  
 Zelda: No, she isn't.  
 Yuri: Yes, she is! She has the strength and endurance to be the fastest wheelchair racer in the world, which requires being in superb health.  
 Zelda: But you can walk, and she can't.

The key difference between the evaluative adjectives and the PPTs is that the former have dimensions that are communicable — they can be shared in a way that the PPTs cannot be. However, being multidimensional and context-dependent in their weighings, these dimensions are not as communicable as those of objective adjectives. *Big* is multidimensional and we can easily and mutually verify that the dimensions are length, width and height. The dimensions of *healthy* can also mostly be communicated to others, although one can easily imagine that in former days of low technology, when vital signs could not be easily measured, two doctors may well be in ‘faultless’ disagreement as to whether a patient was healthy, or healthier than another. Currently, the dimensions of *healthy* are more communicable than the dimensions of *intelligent*, and thus *healthy* is less subjective.

To conclude this long subsection, I will recap: subjectivity in predicates is a reflection of the unavailability of consensus (or dictatorship). As such, subjective predicates, as my title promises, indeed reflect a cooperation problem. I should add that this does not affect only adjectives, although my paper has focused on these. There have also been ‘faultless’ disagreements due to lack of consensus or dictator about such nouns as *athlete* in whether or not it includes non-humans such as the racehorse Secretariat (Ludlow 2008); and *planet*, which had only a consensus definition until a dictator, the International Astronomical Union, provided a definition of *planet* that meant Pluto was excluded (it had insufficient mass). Both of these have provoked remarkably fierce arguments, which may be viewed as faultless — although as long as we recognize the IAU’s authority, we must accept that therefore the argument of whether or not Pluto is a planet is an objective argument: it just isn’t.

### 3.3. *The Consequences*

We saw in 2.2 that predicates of personal taste, evaluative adjectives, and objective adjectives form a hierarchy of how communicable their component dimensions are to the listener. The dimensions of PPTs such as *tasty* and *fun*, relying on internal experience, cannot be communicated at all. Evaluative adjectives such as *smart* or *beautiful* have dimensions that can at least partly be communicated and thus although every speaker can weight them for herself, one speaker may try to persuade another. Single-dimensional relative-standard adjectives like *tall* have their dimensions clear and agreed-upon, and the only factor that cannot be communicated to the listener (without further modification, as by a measure phrase) is the standard of comparison, the subjective POS morpheme. Absolute-standard (upper- or lower-closed) single-dimensional adjectives, also, have their standard clear and agreed-upon. There is no subjectivity. This is reflected in the progression of acceptability in (26).

- (26)    a. I find this ride fun / This ride is fun to me.
- b. I find John smart / ?John is smart to me.
- c. ?I find John tall / ??John is tall to me.
- d. ??I find this table wooden / ??This table is wooden to me.

(26d) is even more marked than (c), and gives the impression that the speaker is somehow delusional, or does not trust his own senses, as it implies that the speaker's experience of woodiness is privileged, while in almost all humans are in consensus about what the conditions of being wooden are, and so his experience should not be unique and uncommunicable. We may imagine a colour-blind person<sup>4</sup>, aware of his condition, who cannot distinguish between red and green, and therefore gives all occurrences of either hue the mental label 'green,' while knowing that some of them might actually be red. He thus would be justified in saying (27).

- (27)    What colour is this shirt? Well, it's green to me.

Colour is not a predicate of personal taste, although it does show vagueness effects: one may set up a sorites series of shades changing from pure yellow to pure green, and different viewers may judge differently at what point 'green' begins; their judgements will also be context-dependent, as they would be affected by what colours are nearby, the lighting conditions, etc.<sup>5</sup> However, by giving *green* experiential semantics, our colour-blind character acknowledges that his experience of colour is privileged to him (and to others with his condition) and is not shared with the wider world. If he were not yet aware of his condition, and sincerely believed that what he perceived as green was indeed close to the universal perception of green, he would find *green to me* as odd a statement to make as *wooden to me*.

On the other hand, we can also consider a person who had grown up in a very insular community where everyone likes the same foods. That person may well not classify *tasty* as subjective, and find *tasty to me* as strange as *wooden to me* or *green to me* — everyone knows that avocados/cilantro/bugs are delicious, and if you find that they are not delicious to you, you must have

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<sup>4</sup>Thanks to Rebecca Woods for this example.

<sup>5</sup>For more on the vagueness of colour terms, see (Kennedy & McNally 2010).

some kind of psychosis or disorder.<sup>6</sup>

This reflection of privileged versus communicable information for predicates reminds us of the hierarchy of knowledge sources, also marked linguistically — as evidentials. Davis et al. (2007) discuss a general hierarchy of evidentials, cross-linguistically, that prioritize information from personal experience, over information via direct sensory evidence, over inferential conclusions from indirect evidence, over hearsay. This conveys, basically, how strongly the speaker knows her claim. I argue that subjectivity is a different side of the same coin: it measures evidence sources, but it measures how well the speaker can communicate them to the hearer, inducing his cooperation. Bylinina (2013) has already pointed out, above, that in Japanese evidentials must co-occur with predicates of personal taste that take a third person argument. The inter-relationship between subjectivity and evidentials in different languages is potentially a very interesting topic for further research.

#### 4. Conclusion

Bylinina's (2013) work was a great step forward in the semantics of subjectivity. I intend this paper to add to the pragmatics of subjectivity — to identify what pragmatic factors make faultless disagreement available, or reject it. I find that subjectivity varies with the inability to reach consensus, either through shared experience, or through concession to a dictator, or through persuasion and negotiation. Speakers strive to reduce subjectivity so as not to waste time and energy in faultless disagreement conflicts, and would .

An interesting direction for further research would be even more cross-linguistic investigation, particularly in more languages that have obligatory evidential marking, as well as languages that may have more descriptive words for categories of taste, allowing descriptions of the dimensions of *tasty*. We also need further investigation of fuzzy boundaries to the privileged experience of predicates of personal taste: after all, food critics describe their experience persuading others that food is tasty, and people who sign up for wine-tasting courses expect their personal taste to be altered through persuasion.

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<sup>6</sup>Recent discoveries (Knaapila et al. 2012) have shown that genetic variance can indeed affect taste perception; people possessing a certain gene would find cilantro, for instance, soapy-tasting and unpleasant. These people find themselves in the same situation as the colour-blind, knowing that their experience is different from the majority.

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# The syntax of orientation shifting

## Evidence from English high adverbs

Rebecca Woods

This paper reviews new data supporting the inclusion of a Speech Act Phrase in the left periphery. Illocutionary and evidential adverbs in English shift orientation from speakers in declarative sentences to addressees in yes-no interrogative sentences. This orientation shift falls out of independently motivated principles: the adverbs contain a logophorically-sensitive PRO subject which is controlled by a syntactic representation of the discourse participants contained in a Speech Act Phrase high in the CP layer. It will be suggested that clause type modulates which discourse participants are available; only speakers are available in declaratives whereas addressees are also available in interrogatives.

### 1. Introduction

It has previously been noted that some ‘high’ adverbs in the sense of Cinque (1999) shift orientation in questions compared with declarative sentences. The orientation of an adverb refers to the individual whose attitudes, opinions or knowledge the adverb expresses. The individuals in question here are the discourse participants, that is the speaker and the addressee involved in the speech act. Illocutionary and evidential adverbs orient to the speaker of the sentence in declarative sentences but in questions orient to the addressee. However, the syntax and semantics of this phenomenon have not yet been fully analysed despite its consistency and systematicity.

This paper has two aims: first, to show empirically the contexts in which adverbs shift orientation. Second, to analyse how this shift occurs using independently motivated principles. It will be proposed that discourse participants are syntactically represented in a covert speech act verb phrase above matrix CP, and that the high adverb has a logophorically-sensitive PRO subject which is controlled by the appropriate discourse participant.<sup>1</sup>

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<sup>1</sup>It should not be taken at this point that the analysis of discourse participants as presented here accounts for the licensing of first- and second-person features, as Speas and Tenny (2003) try to do; if this were a claim, then it would fail at the first hurdle because there would be no licensor for second-person indexicals in declarative sentences, which is clearly not the case. I leave the question of how the representation of discourse participants

The paper is structured as follows: section 2 outlines previous work on adverb orientation and orientation shifting and section 3 presents the key data. Section 4 presents a syntactic analysis of the phenomenon, with further detail on the syntax and semantics of speech acts in section 5. Section 6 will bring together my conclusions with directions for further research.

## 2. Previous research

Two areas of research will be outlined in this section: firstly, work concerning the orientation of adverbs. This will include a brief overview of work on grammaticalised elements such as evidentiality markers which also shift in interrogatives. Secondly, key research on the representation of discourse participants in syntax will provide context for the analysis to follow.

Jackendoff (1972) first argued that adverbs are a part of speech in their own right rather than the product of a transformation rule applied to nominals. He identified three types of adverb based primarily on the surface syntactic position of these adverbs in sentences, but also based on their orientation. Jackendoff defines speaker orientation as “as relating the speaker’s attitude toward the event expressed by the sentence” (1972:56), illustrating his point using a variety of paraphrases (examples in (1) from Jackendoff 1972:56-58).

- (1) a. If I am being frank, John lied to Bill.  
b. Frankly speaking, John lied to Bill

He concludes that speaker-oriented adverbs predicate over sentences and speakers from sentence-initial position, whereas subject-oriented and VP adverbs are more deeply embedded within the sentence itself.

Building upon his work, Bellert (1977) notes that Jackendoff's 'speaker-oriented' adverbs do not constitute a homogeneous group but vary in their purpose and structure. In particular, she shows that syntactic position alone does not adequately characterise different adverb classes; instead, she divides adverbs into classes according to the number and type of semantic arguments they take. Of particular importance are those adverbs which she defines as taking two arguments, which she terms pragmatic and modal adverbs.<sup>2</sup>

Modal adverbs (corresponding to Cinque's (1999) evidential and epistemic adverbs) in Bellert's (1977) account take the truth of the proposition of the sentence as one argument. Examples include *probably*, *certainly* and *evidently*. Such adverbs do not have negative counterparts and cannot be negated independently of the sentence, as shown in (2).



shown here relates to the question of indexicals (if indeed it does) for future research.

<sup>2</sup>Bellert (1977) also includes evaluative adverbs in her analysis, but I leave these aside here as they do not exhibit orientation shifting.

They are also above sentential negation, as in (3).

- (3) a. John probably never ran so fast.  
 b. \*Never did John probably run so fast. Bellert 1977:346, examples (30) and (32)

Though they can occur in if-then clauses, Bellert notes that modal adverbs do not occur in questions because an evaluation of the truth cannot be made of a proposition while that proposition is being questioned. However, she concedes that some modal adverbs with “an additional meaning component”, such as *definitely* and *perhaps* can occur in questions, as in (4), as they imply a particular answer.

- (4) a. Has John perhaps been here before?  
 b. Has John definitely made up his mind? Bellert 1977:344, examples (22) and (24)

In contrast to modal adverbs, Bellert notes that only the class of pragmatic adverbs - Cinque’s illocutionary adverbs - are truly speaker-oriented in that they take the speaker as an argument. These adverbs include *frankly*, *sincerely*, *honestly*, amongst others. The other argument is the proposition, or content, of the sentence. As Bellert explains, “The speaker characterizes his attitude towards *what he is saying*” (1977:349, original emphasis). Correspondingly, these adverbs also do not have negative counterparts (that may be used as sentential adverbs) and are also above sentential negation. Furthermore, these adverbs are possible in non-asserted sentences such as performative sentences and questions.

Bellert refines Jackendoff’s criteria carefully using convincing semantic arguments. Her work is also important as an early example of analyses which consider adverbs to contain some kind of argument structure; she even entertains the idea of a kind of performative analysis in the style of Ross (Bellert 1977:349f). This is an important precedent for the account put forward in this paper, though it will be shown that the modal adverb category can be divided further and the behaviour of adverbs in questions requires further consideration.

Later investigations of apparently speaker-oriented elements have shown that they in fact orient to the addressee in questions, raising the question of point of view (PoV). Garrett (2001) analyses grammaticalised evidentiality particles in Tibetan, noting that they are speaker-oriented in declarative sentences but addressee-oriented in questions; in his words, “the origo [ego] of a question is always the person to whom the question is asked” (2001:230). He suggests that the origo shift between declaratives and interrogatives occurs because the hearer is ‘inside’ the question and opts for a partially semantic, partially pragmatic approach to explain this. Building on Hamblin (1973) and Karttunen’s (1977) analyses of questions as sets of possible or true answers, Garrett proposes that the answer-set consists not of propositions, but of asserted speech acts made from the hearer’s perspective. Moreover, he represents the hearer and speaker as free variables which form an ordered set of participants in the assertive speech act. Therefore, where Hamblin would give the denotation of “Can you play football?” as a set of { You can play football, You cannot play football}, Garrett proposes something like {“I tell you that I can play football”, “I tell you that I cannot play football”}.

However, this is the extent of Garrett’s semantic analysis. He suggests that these variables and their relationship with the evidential markers are determined through context alone, and that “the origo shift comes for free as long as assertions have authors and questions have answerers”

(2001:250). This reliance on pragmatics seems at odds with the fact that the origo shift is obligatory in Tibetan (cf. De Villiers et al. 2009) and yet it is not clear exactly how he conceptualises the discourse participants and their relationship with evidentiality in his semantics. However, he also notes structural parallels between orientation in matrix and embedded clauses (albeit with a data set which underdetermines the phenomenon), which will be shown to be important in the analysis to follow.

Clearly, a successful analysis of syntax-related shifting must also explain how the discourse participants are represented in syntax and the nature of any relationship between them. It was first noted by philosophers that there are parallels between typical declarative sentences and clauses embedded under performative verbs; Austin (1962:32) proposed that every illocutionary act contains a performative verb in some form. Following Austin's work, Ross (1970) suggested that speakers and addressees were covertly represented in syntax, at least in performative verb constructions. He proposed this to account for a range of phenomena, most notably cases of reflexive pronouns which are grammatical despite lacking an overt antecedent (examples in (5) from Ross 1970:228, 232).

- (5)     a. This paper was written by Ann and myself
- b. As for myself, I won't be invited

Ross also presents evidence from deleted arguments. He claims that in some dialects the following examples are acceptable and that the dropped arguments implicitly relate to a first-person discourse participant, as illustrated in (6) from Ross (1970:236, 238).

- (6)     a. Sid is coming with<sup>3</sup> me/us/\*you/\*him
- b. A friend of mine/of ours/\*of hers is going to drop by

Ross presents two possible solutions to this problem. His first solution, based on the behaviour of performative verbs, is that there is a phonologically null performative verb above all declarative sentences. The subject of this verb is first-person and the object second-person (Ross 1970:252). This is a purely syntactic solution which does not rely on semantic or pragmatic principles and which only extends to affirmative declarative clauses. His second solution, which he terms the 'pragmatic analysis', rests on an early interpretation of the syntax-discourse interface. Ross suggests that elements "in the air", i.e. in the discourse context, are available antecedents just like any element in the deep structure (Ross's terms) and, by extension, relations between the elements "in the air" and those in the syntax are constrained by the same kind of hierarchical rules which constrain syntactic relations. Ross suggests that the pragmatic analysis might be preferable to the syntactic analysis as the former does not have any of the 'tension' of the latter in terms of matrix clauses being technically embedded beneath the covert performative phrase.

However, Ross asserts that any elements called upon from the context would have to be "hierarchically grouped to form a structure which is exactly the same as that of a normal clause in deep structure" (1970:255). Although it would be possible to take elements from context as antecedents, it might not be possible to order them hierarchically as would be necessary to ensure the correct antecedent for a syntactic element. Therefore, an account of this kind could

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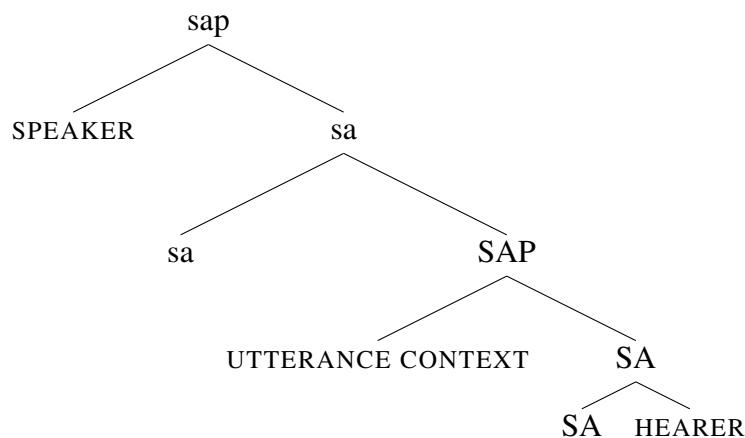
<sup>3</sup>The accent here represents prosodic emphasis which often occurs in this construction.

not be purely pragmatic but would have to call upon syntactic principles to form the necessary hierarchical structure.

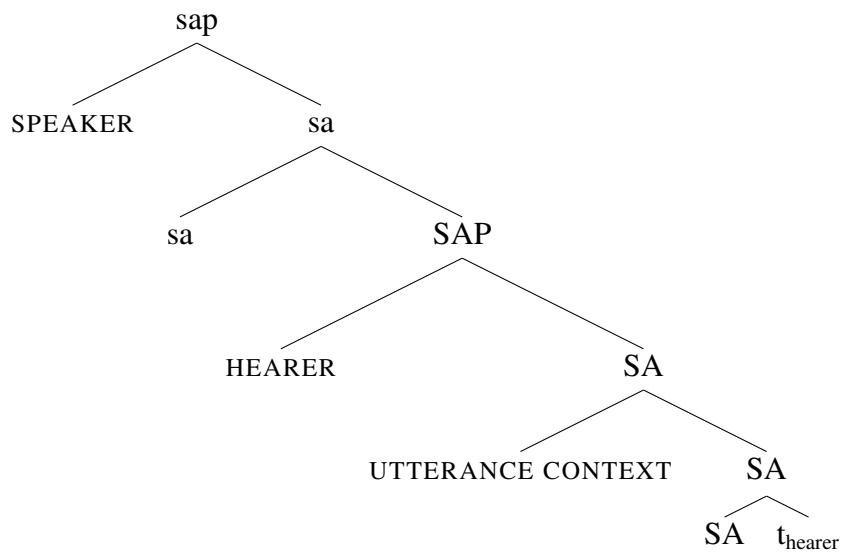
Ross's analyses were largely abandoned during the Government & Binding period in generative linguistics. However, with the advent of the Minimalist Program (Chomsky 1995), particularly phase-based iterations thereof, other scholars have proposed similar analyses. Speas & Tenny (2003) envisaged a syntactic representation of speaker and addressee operators which brings together the intuition of discourse participants in the syntax with established restrictions on the role of pragmatic forces within grammar. Speas and Tenny suggest, as did Ross, that syntactically-represented discourse participants are hierarchically organised. However, they refute the idea that certain speech acts are tied to certain clause types, as questions can be answered with questions and declarative sentences can encode implicit requests and so on. This casts doubt on whether Ross's analysis should be restricted to performative declarative sentences after all, as there are many different types of sentence which are subject to illocutionary force and which therefore have implications for speakers and hearers. As support for this view, Speas and Tenny observe that Cinque's (1999)  $Mood_{SpeechAct}$  projection, which encodes important aspects of discourse participants' involvement in the speech act, is overt in any language which contains elements such as interrogative morphemes and sentence particles, which of course are not limited to (or in some cases, ever permitted in) performative declarative clauses Speas & Tenny (2003:317).

Speas and Tenny propose that the speaker and the addressee are represented as arguments within the extended Speech Act Phrase along with an operator-like representation of the utterance context (UC), and that this Speech Act domain is above the sentence itself. The motivation for this is that these discourse roles are grammaticalised in some languages, such as in Basque allocutive agreement. They represent a declarative structure as in (7) and an interrogative one in (8). Note that the hearer is moved to a higher position in the tree in the interrogative case, which Speas and Tenny claim is analogous to dative movement of the indirect object.

(7)



(8)



Note that the difference between the two structures is that the hearer moves up to adjoin to SAP in interrogatives.<sup>4</sup> Speas and Tenny motivate the declarative configuration on the idea of the UC as the theme and the hearer as the goal of the utterance, though this would typically see the UC generated as the complement to SA (cf. Bruening (2010)). However, it is not clear why dative-like movement (of the hearer) should apply in this context or what motivates it. These criticisms do not undermine the theoretical advances made by Speas and Tenny on the previous literature, but this paper shall address these questions in later sections.

### 3. Adverb orientation: the phenomenon

#### 3.1. Key terms

Turning to the empirical data, adverbs which shift orientation constitute two of the four ‘high’ adverb categories identified by Cinque (1999), namely illocutionary and evidential adverbs. These terms will be used throughout. I will adopt Jackendoff’s (1972) definition of adverb orientation insofar as the adverb describes the attitude(s) or state of knowledge of an individual. However, these adverbs do not always describe the attitude(s) of the *speaker*. These adverbs will be examined in the context of yes-no interrogatives uttered as straightforward interrogative acts. Groenendijk & Stokhof (1994:1055) make the distinction between syntactic interrogative clauses, pragmatic interrogative acts, and semantic questions, and the focus here will be on syntactically interrogative non-rhetorical yes-no questions involving inversion. The data show that adverbs in this kind of interrogative clause describe the attitude/state of knowledge of the addressee as ascribed to him/her by the speaker, or the attitude with which the speaker expects the addressee to respond. These adverbs are therefore addressee-oriented in such contexts.

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<sup>4</sup>sap and SAP are both Speech Act projections, with sap as a shell to SAP.

### 3.2. Data

The orientation of illocutionary and evidential adverbs shifts consistently and systematically from SPEAKER in declaratives to ADDRESSEE in yes-no interrogatives, as shown in (9)-(11).

(9) Illocutionary adverbs

- a. Seriously<sub>speaker</sub>, Andy can play rugby.
- b. Seriously<sub>addressee</sub>, can Andy play rugby?

(10) Evidential adverbs

- a. Allegedly<sub>speaker</sub>, Ahmad is at the top of the list.
- b. Is Ahmad allegedly<sub>addressee</sub><sup>5</sup> at the top of the list?

(11) Epistemic adverbs

- a. Ewan has probably<sub>speaker</sub> gone to the dentist.
- b. ?\*Has Ewan probably gone to the dentist?
- c. Ella is definitely<sub>speaker</sub> at the top of the list.
- d. Is Ella definitely<sub>addressee</sub> at the top of the list?

As (11b) shows, most epistemic adverbs are ungrammatical in questions in English. They are not available for shifting and so may only take a speaker-oriented reading. However, the epistemic adverbs *definitely* and *perhaps* are different from other epistemic adverbs as they are available in questions and also shift. These facts even hold when the context would seem to favour the opposite interpretation as in (12).

(12) Illocutionary adverbs

Context: The manager of a rugby team is likely to lose his job soon as his team has been performing badly. This weekend's match will determine his future but he is a player short and asks a friend (who doesn't care about rugby) for help finding another player.

- a. Friend: I know you will lose your job if you lose the match this weekend - seriously, Andy can play rugby.  
Interpretation: I am being serious/?take me seriously - both express that the speaker is being serious
- b. Manager: If we lose the match at the weekend I will lose my job - seriously, can Andy play rugby?  
Interpretation: The speaker's question is serious/the answer from the addressee must be serious - addressee orientation remains despite context

Note that, as shown in (13), the shift is not related to the grammatical function of the arguments within the proposition.

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<sup>5</sup>Note that evidential adverbs and epistemic adverbs are not considered natural in sentence-initial position in English interrogatives. However, this does not impact on the proposed analysis.

- (13) a. It looks like it will rain tomorrow. (Speaker-orientation)  
       b. Does it look like it will rain tomorrow? (Addressee-orientation)

In (13), the evidential meaning of the matrix clause orients to the speaker in declaratives and the addressee in interrogatives. The phenomenon also seems to be robust cross-linguistically, as judgements in French and Greek mirror those in the English cases. Whether the phenomenon holds in embedded contexts is less clear, however. As noted by Banfield (1982) and Rooryck (2001), speech act markers such as parentheticals are not permitted in embedded contexts. Initially, it seems that illocutionary adverbs are permitted, as (14) illustrates.

- (14) a. Dima told Nathan that Jessica seriously wants to come to the party.  
       b. Dima told Nathan that Jessica honestly spoke to Paul.

However, in these contexts the adverbs are interpreted as VP adverbs which modify the verb and its arguments rather than the sentence as a whole; *seriously* is interpreted as a degree adverb in (14a) and *honestly* as a manner adverb in (14b). This is supported by data from French, in which (15) is ungrammatical because *sérieusement* cannot be interpreted as a VP adverb.

- (15) *?\*Guillaume dit à Jean que Marie voulait sérieusement aller à la Guillaume say.3SG to Jean that Marie want.3SG.IPFV seriously go.INF to the fête de Martine party of Martine*  
       ‘Guillaume says to Jean that Marie seriously wanted to go to Martine’s party.’

Note that in the above examples, *seriously* and *honestly* are not sentence-initial. They can precede embedded clauses when pronounced with comma intonation and retain their illocutionary meaning, but this appears to degrade the sentence, as in (16).

- (16) a. ?Dima told Nathan that, seriously, Jessica wants to come to the party.  
       b. ?Dima told Nathan that, honestly, Jessica spoke to Paul.

However, evidential adverbs like *allegedly* and the epistemic adverb *definitely* can occur in both matrix and embedded clauses, as (17) shows.

- (17) a. Marie allegedly gave her lottery winnings to charity.  
       b. John told Harry that Marie allegedly gave her lottery winnings to charity.  
       c. Marie definitely will be at the party  
       d. John told Harry that Marie definitely will be at the party

The adverb searches for the appropriate discourse participant in the clause directly above its own. The overt performative structure of the matrix CP in (17d) contains the speaker and addressee to which embedded adverbs orient. This is confirmed by informants in English, French and Greek. Furthermore, the adverb in the matrix clause orients to the discourse participants. (17c) and (17d) are repeated below with the adverb’s orientation indicated using subscript.

- (18) a. Marie definitely<sub>speaker</sub> will be at the party.  
      b. Will Marie definitely<sub>addressee</sub> be at the party?  
      c. John told Harry that Marie definitely<sub>John</sub> will be at the party.  
      d. John asked Harry whether Marie will definitely<sub>Harry</sub> be at the party.  
      e. Amy told Ben that Charlie told David that Emma told Flora that Marie will definitely<sub>Emma</sub> be at the party.  
      f. Amy asked Ben whether Charlie asked David whether Emma asked Flora whether Marie will definitely<sub>Flora</sub> be at the party.

The examples show that the adverb orients to the most minimally distant ‘speaker’ in declarative cases and the most minimally distant ‘addressee’ in interrogative cases. It is not influenced by the grammatical status of the arguments in its clause relative to the discourse participants, and the embedded subject does not act as an intervener. These intuitions are confirmed by the felicity of the continuation in (19).

- (19) a. John told Harry that Marie definitely<sub>John</sub> will be at the party, even though she’s not sure she’ll make it.  
      b. #John told Harry that Marie definitely<sub>speaker</sub> will be at the party, even though she’s not sure she’ll make it.  
      c. #John told Harry that Marie definitely<sub>Marie</sub> will be at the party, even though she’s not sure she’ll make it.

It will be proposed that, by analogy with the overt performative structure of the matrix clause, the discourse participants are represented as the arguments of a covert speech act head above matrix CP in section 4.2. In section 5 the question of why the matrix object is not a possible antecedent in (19a), despite being a valid speech act participant, will be addressed.

#### 4. A syntactic approach

I will now present a structural representation of adverbs which shift, showing that their syntax is key to their interpretation. The syntactic subject of the adverb will be shown to be coreferential with a syntactic representation of the discourse participants above matrix CP.<sup>6</sup> This will provide an elegant and minimal account for orientation shifting in adverbs, which falls out of independently motivated syntactic principles.

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<sup>6</sup> An anonymous reviewer notes that “the choice of a syntactic or a pragmatic approach to [adverb orientation] has to be made only on the basis of interpretation as there is no overt evidence to decide in favour of either option”. It is true that an examination of adverb orientation does not alone settle the syntax vs. pragmatics debate. However, in conjunction with work on other grammaticalised shifting phenomena and work on discourse markers such as Hill (2007) and Haegeman (2014), the current analysis of adverb orientation not only provides support for the syntactic analysis but also shows how the proposed Speech Act structure interacts with non-grammaticalised lexical items.

#### 4.1. The adverb's argument

It is uncontroversial, following Bellert (1977), to suggest that adverbs which interface with the discourse can take semantic arguments. Focusing on illocutionary adverbs, Bellert suggests that they take two arguments: the speaker and the content — specifically the proposition — of the sentence (1977:349). The adverbs in question here are outside of the proposition expressed in the sentence but they are dependent upon it; specifically, these adverbs relate a property (seriousness, frankness etc.) to an entity with respect to the proposition expressed in the main clause.

The entity and the property are represented in the syntax and are pronounced overtly in combination as the adverb itself. In order to satisfy the Projection Principle (Chomsky 1981), which requires that the properties of lexical items must be preserved during the derivation of a sentence, the entity should also be represented itself, as a nominal element in the subject position of (in this case) the adverbial projection. However, the adverb cannot assign case to this subject, so the subject is never realised overtly. It is the only syntactic argument that the adverb has, because the adverb does not take the sentence as an argument, but the adverbial projection modifies it. These characteristics suggest that the adverb's subject is therefore a PRO and is subject to the principles of control.

It is now important to examine the characteristics of the adverb's PRO, first taking contexts in which sentential PRO receives an arbitrary interpretation. If the adverb is sentence-initial, its PRO does not receive an arbitrary interpretation.<sup>7</sup> However, when evidential adverbs are sentence-internal, as in (20), their orientation is uncertain between speaker- and arbitrary-orientation.

- (20)    a. Apparently<sub>speaker</sub>, PRO<sub>arb</sub> to commit a crime is PRO<sub>arb</sub> to face censure.  
       b. PRO<sub>arb</sub> To reportedly<sub>speaker/arb</sub> have committed a crime is PRO<sub>arb</sub> to face censure.

If we take an approach to PRO<sub>arb</sub> along the lines of Epstein (1984), we assume that PRO<sub>arb</sub> is a variable bound by an unselective universal operator in the IP domain. This universal operator is therefore lower in the structure than the representations of the discourse participants which will be presented in section 4.2. As such, this operator will never be a valid antecedent for the sentence-initial adverb's PRO, which is in a position above IP. However, when the evidential adverb is sentence-internal, as in (20b), its PRO can either orient to the discourse participants or to the universal operator. I propose that speaker-orientation is still (marginally) available, even though the universal operator is closer, because the adverb's PRO is sensitive to the discourse participants and as such will try to orient to a discourse participant in every case. As a result, the orientation of the adverb's PRO is unclear in this case.

Turning to contexts of 'non-obligatory' control (cf. Roberts (1997)), the adverb's PRO, like

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<sup>7</sup>The adverb *definitely* also resists an arbitrary interpretation, despite not being able to front to a sentence-initial position, as (i) shows.

- (i)    a. PRO<sub>arb</sub> To definitely<sub>speaker/\*arb</sub> find a partner, use a dating service.  
       b. \*Definitely, PRO<sub>arb</sub> to find a partner, use a dating service.

For the moment I assume that this is related to the special property of *definitely* which allows it to shift in the first place (cf. Bellert 1977). The details of this will be left for future work.

other typical PROs, is sensitive to such contexts. In clauses containing wh-movement, such as (21), typical PRO does not require a controller.

- (21) John asked [how [PRO to shave oneself]] Roberts 1997:138, example (38)

In wh-questions, the adverb's PRO must take one of the discourse participants as a controller, but it is ambiguous between the SPEAKER and ADDRESSEE, as in (22).

- (22) Seriously<sub>speaker/addressee</sub>, who can play rugby?

It is clear then that the adverb's PRO subject is much like any other example of PRO, except that it is particularly sensitive to the discourse participants.

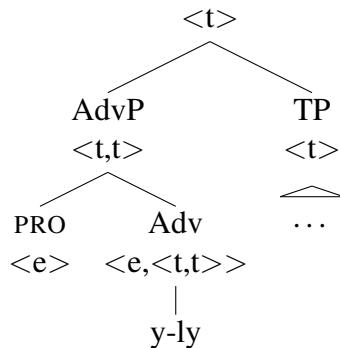
In terms of compositionality, the PRO merges with the adverb before the adverb merges with the larger structure. This is because the adverb does not actually modify the proposition, but expresses the discourse participant's attitude towards it. Semantically, the adverb is a function mapping individuals to propositional modifiers. The entire adverbial projection (i.e. the expression of the discourse participant's attitude) then modifies the sentence, because the proposition's meaning and truth values are the same regardless of the discourse participant's attitude. This is illustrated in (23).

- (23) If  $p$  is a proposition,  $x$  is an individual, and **y-ly** is an argument-taking adverb, then:

  - a. **y-ly-for**( $x$ ), ( $p$ )
  - b. #For ( $x$ ), **y-ly**( $p$ )

Assuming therefore that the adverbial projection is of type  $\langle t,t \rangle$  on the basis of its being a proposition that modifies a proposition, an analysis of the semantic types of the elements involved suggests that PRO must merge with the adverb within AdvP and not outside of it, as illustrated in (24).<sup>8</sup>

- (24)



<sup>8</sup>Thanks to George Tsoulas for this observation.

I have already described how the adverb's PRO argument must be controlled by an antecedent which is a discourse participant higher in the structure than PRO itself;<sup>9</sup> therefore, the discourse participants too must be represented above matrix CP.

This is similar to Ross (1970) and Speas and Tenny's (2003) proposals and will elegantly explain this shifting phenomenon. The key difference between Ross's proposal and mine concerns what constitutes the head of the covert structure. Ross claimed a direct correspondence between affirmative declarative sentences both with and without performative constructions, and that the latter were formed by the deletion of the performative construction from the former, as shown in (25).

- (25) I'll be there = (e.g.) I promise you that I'll be there

This was rejected by Fraser (1974), Gazdar (1979), Leech (1983) *inter alia* for a number of well-argued reasons, for example the fact that not all performative verbs have first-person subjects and second-person objects, that there is no one-to-one mapping between utterances and types of speech act, and that it is possible to stack performatives, posing further problems for the interpretation of the (most) subordinate clause.

It must therefore be made clear that the proposal is not that every speech act is a half-pronounced performative structure, nor that every clause counts as a separate speech act. Instead, I will propose that there is a covert operator which relates to the matrix clause type and which selects its arguments on this basis. I will be representing this operator using English verbs of communication, but this should be interpreted solely as a representation. I will elaborate on this idea in section 5.

#### 4.2. *The covert Speech Act structure*

To account for the facts in section 3.2, I propose a covert speech act head (SA) which permits a certain configuration of arguments in its phrase depending on the clause type it c-commands. The SA is the head of a covert Speech Act Phrase (SAP) above the matrix CP.

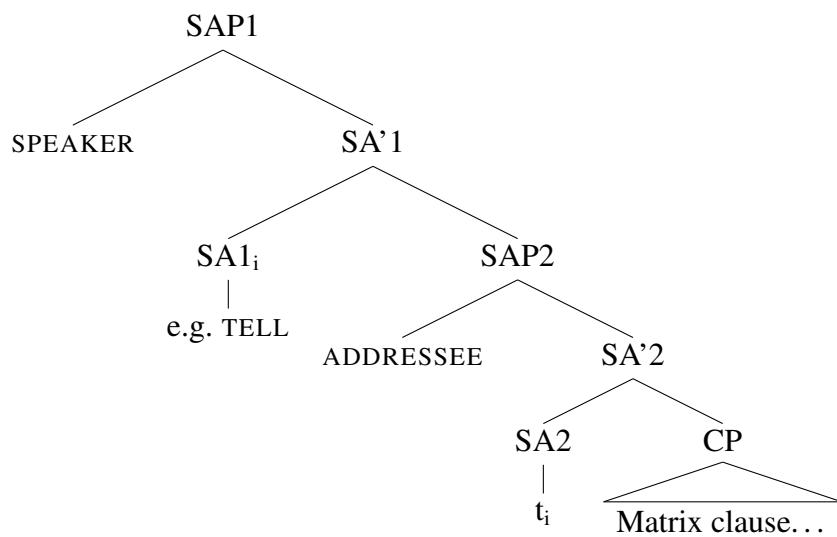
The structure, as a first analysis, is that of a three-place predicate, with the SPEAKER in the specifier (subject position) of the whole projection, the sentence/matrix CP as the complement of the SA head (direct object position) and the ADDRESSEE as the complement of the higher SA head (in the indirect object position). The reader may note that the structure proposed is similar to that used by Hill (2007), Miyagawa (2012) and Haegeman (2014).

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<sup>9</sup>I assume that this is not a case of backward control, as the matrix subject does not control the PRO in matrix cases, even if it is a discourse participant.

- (i) a. You are definitely<sub>speaker</sub> the best footballer in the class.  
 b. #You are definitely<sub>you</sub> the best footballer in the class.

(26)



The advantage of this structure is that it is an accurate analogy<sup>10</sup> for the relationship between the discourse participants and the discourse itself based on verbs of communication. However, it does not yet fully reflect the difference between different clause types; specifically the difference between declarative and interrogative clauses. It is in the following sections that my proposed structure will diverge from those proposed by Hill (2007), Miyagawa (2012) and Haegeman (2014).

#### 4.2.1. Differences in declarative and interrogative SAP structures

I will first refine the structure for declarative SAPs. It is both intuitive and empirically sound to suggest that only speakers and not addressees are obligatorily structurally represented in declarative SAPs. Intuitively, declarative sentences may be uttered without an addressee, as they can be stated to no-one in particular, to an audience which is not one definable entity or set of entities, or to someone who may not even be the intended audience for the sentence. This is not the case with interrogatives; although the speaker and the addressee may in some contexts be the same person, there is always a specific addressee in mind,<sup>11</sup> otherwise the act of asking a question might not provide the speaker with the new information s/he requires.

Deleted arguments provide empirical support to these intuitions; consider (27)-(28).

<sup>10</sup>This is not to say that the SAP is analogous to a parenthetical such as “Louise says” in (i) below:  
 (i) Louise says, “It’s cold in here”.

This is because recent work in child developmental literature which suggests that children respond differently in Theory of Mind tasks when the direct speech of the characters in the task is framed with a parenthetical and when it is not (De Villiers 2014), hence to claim a covert parenthetical would be to claim a correspondence which does not appear to be psychologically real.

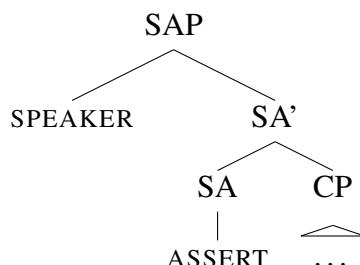
<sup>11</sup>Note that the addressee represented in the speaker’s mind will be the addressee intended by the speaker, not another potential addressee who may or may not be present in the discourse context. As such, whilst rhetorical questions will have an addressee — like all syntactic questions — they are in the unusual position of having an addressee which is coreferential with the speaker, as the speaker intends to answer his/her own question in such contexts. Thanks to an anonymous reviewer for his/her thoughts on this point.

- (27) a. The boss wants to meet *me/?you/us* at 3pm.  
       b. Does the boss want to meet *me/you/us* at 3pm?
- (28) (Context: a company only accepts payments in pounds sterling)  
       a. The client tried to pay *me/\*you/us* in dollars!  
       b. Did the client try to pay *me/you/us* in dollars?

In (27a) and (28a), the preferred reading is that the deleted argument is co-referential with a first-person argument. The second-person reading is strange and dispreferred, if not outright rejected by informants (cf. also Ross's examples in (6)). Informants report that further context is required to readily construe a second-person reading. In contrast, both first- and second-person readings are available in (27b) and (28b). There is other cross-linguistic evidence that there may be a divide between the types of clauses which contain an addressee and those which do not, for example Haegeman's (2014) survey of West Flemish discourse markers, which notes that there are different markers for rhetorical questions as opposed to other interrogatives, and that certain markers are only available with declarative and imperative sentences, but not with interrogatives. A more extensive and detailed survey of these facts will be left for future research, but the view taken here is that the inclusion of the addressee in speech act phrases must be motivated, for example by the addressee taking the role of answerer as in interrogatives, rather than being simply assumed.

I will therefore modify the structure in (26) to show that only SPEAKERs are represented in declarative SAPs.<sup>12</sup>

(29)



The SA in declarative SAPs is something like ASSERT. This reflects the fact that there are only two arguments in the SA structure of declarative sentences.<sup>13</sup> This means that, as the only

<sup>12</sup>It could be argued that addressees are also represented in declaratives, as example (28a) is acceptable with the first-person plural pronoun *we*. However, in this case the speaker is speaking for other people and including others in his perspective. As such, the other participants included within *we* are not ADDRESSEEs, and may not even be present for the discourse at all, but are merely people who share the same relevant coordinates as the SPEAKER. Furthermore, languages which show a distinction between the exclusive and inclusive first-person plural pronoun illustrate the optionality of including the addressee. It is clear based on other facts (including binding and the absence of plural readings in speaker/addressee-oriented phenomena) that such phenomena differ from pronouns and pronominal relations, but resolving and refining these differences lies outside the scope of this paper.

<sup>13</sup>An anonymous reviewer notes that distinctions like the one between (i) and (ii) in the scenario below suggest that the addressee might not be absent after all.

I (A) am walking with a friend (B) and hear her whisper something, but I don't hear what.

(A): Sorry?

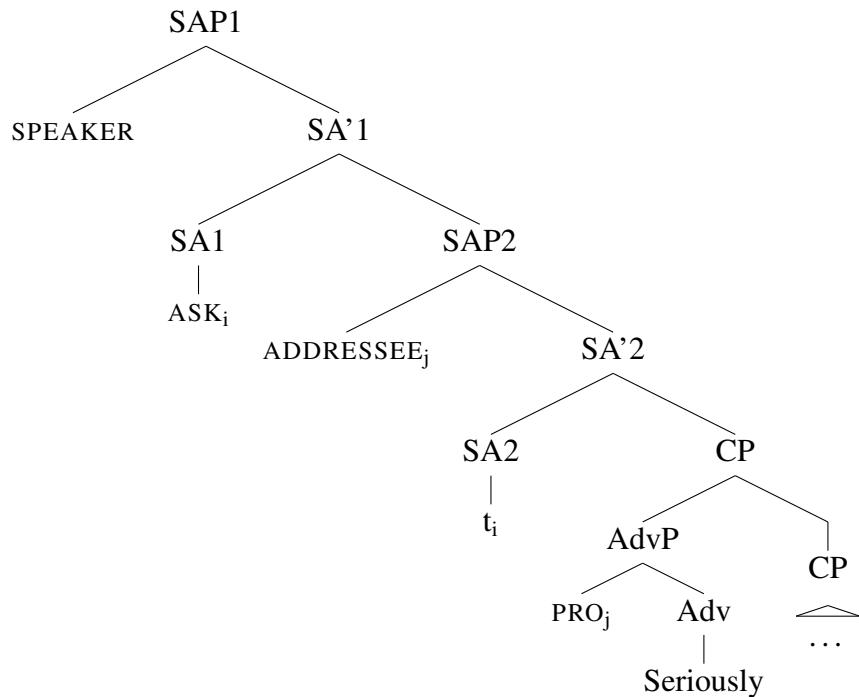
(B)i. Nothing, I'm just talking to myself.

(B)ii. Nothing, \*I'm just talking.

available argument, the SPEAKER controls the PRO argument of the shifting adverb in CP.

However, in interrogative SAPs both the speaker and addressee must be present, as example (27) shows. This means that the SA in interrogative SAPs is a three-place predicate as in (26), but the SA is something like ASK to show that this structure solely applies in interrogative contexts. I have included the adverb in (30) to demonstrate its position within the matrix CP.

(30)



This now means that the adverb's PRO has two potential antecedents to choose from. However, the ADDRESSEE when present is hierarchically closer than the SPEAKER. Therefore, following Rosenbaum's (1970) Minimal Distance Principle (MDP), the ADDRESSEE always controls the adverb's PRO in interrogative clauses.

#### 4.2.2. Embedded contexts

However, as noted in section 3.2, shifting adverbs which are generated lower in Cinque's hierarchy shift in embedded as well as in matrix contexts (cf. example (18)). This is also true in both French and Greek. In contrast, illocutionary adverbs can only shift if pronounced with comma intonation and then the sentence is still considered degraded. The paradigm is illustrated in (31)-(33).

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However, this can be attributed to the properties of the verb 'talk', which is rarely used without some kind of object. Note that the responses in (iii) would be perfectly fine if uttered by B.

(iii) Nothing, I'm just wittering/chatting away/talking rubbish.

## (31) Illocutionary adverbs

- a. \*George told Nikki that honestly<sub>George</sub> Norman had won the race (only VP-adverb reading available)
- b. ?George told Nikki that, honestly<sub>George</sub>, Norman had won the race
- c. \*George asked Nikki whether honestly<sub>Nikki</sub> Norman had won the race
- d. ?George asked Nikki whether, honestly<sub>Nikki</sub>, Norman had won the race

## (32) Evidential adverbs

- a. George told Nikki that Norman had allegedly<sub>George</sub> won the race
- b. George asked Nikki whether Norman had allegedly<sub>Nikki</sub> won the race

## (33) Definitely

- a. George told Nikki that Norman had definitely<sub>George</sub> won the race
- b. George asked Nikki whether Norman had definitely<sub>Nikki</sub> won the race

But why should comma intonation improve (if not render grammatical) the examples in (31b) and (31d)? Emonds (1976:61) suggests that comma intonation around an illocutionary adverb in an embedded clause allows the illocutionary adverb to be distributed as a parenthetical throughout that embedded clause. Furthermore, Emonds draws a parallel between parentheticals pronounced with comma intonation and direct speech contexts (1976:23–25, 44). Specifically, he notes that comma intonation is used to convey direct speech, creating a partition between the parenthetical and the direct quotation, across which the third-person matrix subject of the parenthetical is referred to using the first-person in the quotation. This is illustrated in (34).

- (34) George said to Nikki, “Honestly<sub>George</sub>, Norman won the race. I<sub>George</sub> saw it happen.”

With the caveat that cases such as (31b) and (31d) are only marginally acceptable, it seems that by pronouncing the adverb with comma intonation, the indirect quotation is given a ‘direct-quotation-like’ reading. This creates a kind of embedded root environment, thereby marginally permitting illocutionary adverbs (clearly a root phenomenon) despite their presence in an embedded clause. Quasi-quotational contexts, to use the terminology of Bayer (2004), may also be induced in other syntactic environments. In Hiberno English (McCloskey 2006), some North West English varieties (Woods 2014), African-American English (Green 2002) and New York English (Craig Sailor, p.c.), subject-auxiliary inversion, another root phenomenon, is possible in complement-less embedded interrogative clauses (as in (35), note the contrast in acceptability of (35c)).

- (35) a. He asked me would I cook tea.  
 b. I asked Jack was she in his class.  
 c. \*I asked Jack whether was she in his class. Examples from McCloskey (2002)

As expected, speakers who accept (35) also accept illocutionary adverbs with shifted interpretations in such contexts, as in (36).

- (36) a. He asked me, seriously<sub>me</sub>, would I cook tea.  
       b. I asked Jack, honestly<sub>Jack</sub>, was she in his class.

Note that comma intonation is obligatory (just like in matrix clauses) but these examples are not degraded for speakers of these dialects, unlike the examples in (31b) and (31d).

In sum, illocutionary adverbs are root phenomena that are acceptable in embedded root environments which promote a quasi-quotation context. Such contexts can be created through the use of comma intonation and, in dialects such as Hiberno English, complement-less embedded interrogatives. However, the MDP still holds, as the real-world speaker and addressee are maximally distant and therefore not available to control the adverb's PRO in these cases.

### 5. *The role of logophoricity*

I have shown that the adverb's argument is a PRO, and therefore it must be controlled. But what kind of control is the adverb's PRO subject to? Williams (1992) proposes two forms of control for understood subjects in adjuncts. Firstly, Predicative Control (PC) involves an adjunct which is directly predicated of a subject and strict locality requirements are imposed. He judges that there is no PRO in these cases (contra Chomsky (1981) and Stowell (1983)) as the adjunct directly assigns its theta-role to the subject, for example in (37).

- (37) John<sub>i</sub> arrived asleep<sub>i</sub>

However, Logophoric Control (LC) has no locality requirement and theta-role assignment is separate from indexing. It is therefore considered to involve a PRO and there is a requirement in these cases for the antecedent to be a discourse participant.

It appears that LC is a more appropriate analysis than PC for the kind of control seen in illocutionary and evidential adverbs. An argument against PC is that there is no full DP subject in the same clause as the adverb to which it can assign its theta role (i.e. instead of assigning it to a PRO subject). Even when the matrix subject precedes the adverb (presumably due to some kind of movement) it is clear that the adverb cannot be predicated of this subject given the interpretation that it receives (cf. (19)). This is because the matrix subject has already been assigned a theta-role by the matrix verb and because the matrix subject is not necessarily a discourse participant.

Furthermore, the cases of PC described by Williams which involve adverbs all involve VP adverbs. It is crucial to note that illocutionary and evidential adverbs are *not* simply a kind of manner adverb. This is illustrated by the following paraphrases, of which (38a) does not paraphrase the meaning of the illocutionary adverb whereas (38b) and (38c) do.

- (38) "Seriously, you can play rugby."  
       a. #I said seriously [that you can play rugby]  
       b. I said thus: "Seriously, you can play rugby."  
       c. I convey that I am serious about the proposition that you can play rugby.

Importantly, the adverb and its meaning are clearly part of the utterance rather than part of the utterance context, though other linguistic and non-linguistic factors may make it seem to be so. It has already been shown how the adverb orients to the discourse participants which are represented in a SAP structure above the matrix CP. It is clear therefore that the adverb's subject cannot be and is not locally controlled (as PC would require) and that it is sensitive to the discourse participants (as required by LC). Now it remains to be determined how the adverb's PRO finds its antecedent from among the discourse participants provided by the SAP structure. This section details how the PRO in shifting adverbs is sensitive to the logophoric centre of the speech act.

### 5.1. *The logophoric centre*

First, the term 'logophoric centre' must be defined. Sells (1987:457) proposes that the logophoric 'self' is the individual "whose mental state or attitude the content of the proposition describes"; so in the terms already used in this paper, the individual to whom the adverb orients. However, I will avoid the term 'self' as I will make some assumptions which may not be originally intended by Sells, and will refer to the *logophoric centre* instead.

It is necessary to define the logophoric centre because the data in section 3.2 show that there are arguments which precede the adverb but cannot serve as an antecedent for the PRO. For example, the subject of the clause in which the adverb resides may precede the adverb, but this subject does not act as an intervener between the adverb and the discourse participants, as in (39).

- (39)    a. Seriously<sub>speaker</sub>, you can play rugby.
- b. You seriously<sub>speaker/\*you</sub> can play rugby.

Moreover, neither the embedded subject nor the matrix object block control of PRO by the matrix subject in embedded declaratives, as illustrated in (19a) and (19c). Two consequences follow; firstly, the adverb's PRO is not simply controlled by the nearest antecedent, but by the nearest *viable* antecedent. Secondly, the licensing factor which determines viability is common to both the discourse participants and the matrix arguments of a verb of communication.

I propose that logophoricity is this extra factor because adverbs in the same clause as an intent verb orient to the intent verb's subject.<sup>14</sup> This is because verbs such as *intend* express the mind and consciousness of their subject, so the subject becomes the most minimal viable antecedent, as in (40).

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<sup>14</sup>Note that this is only the case when the adverb follows the intent verb; therefore *seriously* never orients to the subject of a intent verb, as (i) shows.

- (i)    a. Seriously<sub>speaker</sub>, Marie intends to go to the party.
- b. Frankly<sub>speaker</sub>, Marie intends to go to the party.
- c. Marie seriously intends to go to the party.
- d. Marie honestly intends to go to the party.

In (i.c), *seriously* can only be interpreted as a degree adverb.

- (40) John told Harry that Marie intends definitely<sub>Marie</sub> to go to the party, even though she's not sure she'll make it.

Note that logophoricity is not a perpetually available mechanism; it exists because there is a speech act or an act of expression of some kind being performed. In this way, it does not solve the problem of adverb orientation alone, but falls out of the structures that have been proposed in the previous sections. Furthermore, it must be highlighted that, in the case of reported speech, there will be two logophoric centres; one for the reported speech act and one for the main speech act. This fact is important because it means that the adverb is limited by the speech act which it modifies; an embedded adverb may not take wide scope over the entire sentence.

I shall now show that the SA operator determines which of its arguments is the logophoric centre of the main speech act in a similar way to overt lexical verbs of communication, and how this interacts with a theory of questions.

### 5.2. The SA as a logophoric predicate

Verbs of communication have lexical properties which determine the kind of speech act they introduce. For example, *say* and *tell* subcategorise for declarative CP complements, whereas *ask* and *inquire* take interrogative ones. They also differ as to whether they subcategorise for an indirect object (an addressee).

As noted in section 5.1, sentences with a matrix verb of communication have two logophoric centres: one for the main speech act and one for the embedded speech act. Sells notes that it is a lexical property of a verb of communication that its logophoric centre is predicated of its subject (1987:457). If a matrix verb of communication determines the logophoric centre for the embedded speech act, then by analogy the SA head will determine the logophoric centre for the main speech act. This proposal again works on the principle that it is the syntax and semantics of speech acts which determine adverb orientation, specifically the syntactic presence of the discourse participants above the matrix CP, and that the role of logophoricity here falls out of this fact.

Sells (1987:452, 454) refers to verbs of communication such as *say* and *ask* as logophoric predicates. The addition of a logophoric predicate above a non-logophoric statement induces logophoric behaviour in the (newly) subordinate clause, as seen in Icelandic (example (41) from Sells 1987:452).

- (41) a. \*Ólafur hefur ekki enn fundið vinnu, sem sér<sub>Olaf</sub> likar  
           Olaf has not yet found job.ACC that self<sub>Olaf</sub> likes  
           ‘Olaf has not yet found a job that he<sub>Olaf</sub> likes.’
- b. Jón segir að Ólafur hefur ekki enn fundið vinnu, sem sér likar  
           Jon said that Olaf has not yet found job.ACC that self<sub>Jon/Olaf</sub> likes  
           ‘Jon said that Olaf has not yet found a job that he<sub>Jon/Olaf</sub> likes.’

The logophoric pronoun *sér* cannot be bound by Olaf in (41a). However the introduction of the logophoric predicate “Jón says” permits either Jón or Olaf as the antecedent of *sér* in (41b). This fact, with others as presented in Sells’s work, seems to show that the CP containing logophoric

elements must be subcategorised for by a logophoric verb in order for the logophoric element to be correctly bound (Sells 1987:473). I therefore propose that for a shifting adverb to be licensed, it must be contained within a CP c-commanded by a logophoric element. What is more, this logophoric element determines the logophoric centre of the speech act.

In terms of how the logophoric element (the SA operator) determines the logophoric centre, Kuno (1987) suggests that logophoric verbs mark both their speaker and addressee arguments as [+log], whether they are covert or overt. This is in contrast with Sells (1987), who claims that there is no primitive logophoric “speaker” role, though this does not preclude the structural representation of the speaker in syntax for other purposes, such as transmission of person features (see Baker (2008) and Sigurdsson (2011) *inter alia*). Furthermore, the proposal in this paper requires that there is only one logophoric centre and therefore one logophorically active argument in each speech act (cf. Speas and Tenny 2003), so Kuno’s ideas require examination.

Kuno claims that a full non-pronominal DP in the embedded clause cannot be co-indexed with either of the arguments of a logophoric verb (examples in (42) and judgements from Kuno 1987:110).

- (42)    a. \*That John was crazy was just one of the things Mary said to him<sub>John</sub> (John is the addressee of Mary’s remarks)
- b. That John was crazy was just one of the things Mary said about him<sub>John</sub> (John is not the addressee of Mary’s remarks)

Consider what it would mean for the addressee to have a logophoric role in (42). The addressee is not responsible in terms of form, content or point of view for any part of these sentences, and does not contribute to the setting of indexicals. It would be predicted that the addressee would be an anchor for some kind of meaning or coreference if it were in some way logophoric. However, the meaning and interpretation of sentence (42b) does not change whether Mary addresses it to Fred, George, Jane, or any other addressee. The meanings of the speech acts contained within (42a) and (42b) are the same. A small-scale survey of English native speakers also confirmed no differences in grammaticality between (42a) and (42b).

Furthermore, Kuno himself notes distinctions between the speaker and the addressee, for example in ‘as for X-self’ cases (example (43) from Kuno 1987:129).

- (43)    a. As for myself, I won’t be invited
- b. ??As for yourself, you won’t be invited
- c. \*As for herself, she won’t be invited.

Kuno argues that this is because the speaker’s logophoric role is more acceptable than the addressee’s logophoric role as an antecedent for reflexives. However, this seems stipulative, because both logophoric roles were deemed to motivate the same levels of ungrammaticality in (42), and because Kuno does not explain why and in what ways they are different. It is more motivated to suggest that the addressee is marginally available to some speakers in ‘as for X-self’ contexts because of the high degree of saliency of the addressee in the context compared with a third person, but that its marginal status and its variability across idiolects suggests that it is not a syntactic antecedent in the same way the speaker is.

It is therefore more parsimonious to suggest that logophoric verbs of communication which

take declarative CP complements assign one logophoric role to their external argument (their speaker). Furthermore, only SPEAKERs and not ADDRESSEEs are part of the structure of the SAP headed by the declarative logophoric SA head. This is because addressee coordinates are not taken into account and are not available for binding in the matrix CP (at least in English), so their inclusion would be trivial. To represent the declarative SA head in the case of English, the transitive declarative verb *assert* is used because it takes two arguments (the speaker as its external argument and the sentence as its internal argument). As for a representation of the interrogative SA head, *ask* is ditransitive and takes three arguments (the speaker, the sentence as its direct object and the addressee as its indirect object).

However, only through a closer examination of the nature of questions are two vital facts motivated: one, that both the speaker's and addressee's coordinates are represented in questions; and two, that it is a lexical property of interrogative verbs of communication that the logophoric centre is predicated of its indirect object, i.e. the addressee.

### 5.3. The logophoric centre in questions

It is intuitive to suggest that the speaker is the logophoric centre of a simple declarative sentence; it is expected that the speaker can only share the contents of his or her own mind. But what about questions? Firstly, when a speaker utters an interrogative sentence, this sentence does not straightforwardly constitute a proposition. It represents a certain piece of information which the speaker requires but does not know and cannot therefore express the speaker's mind. Instead, the logophoric centre of the sentence becomes the person who will provide an answer, namely the addressee.

An accepted conceptualisation of questions is based on the fact that knowing the meaning of a question means knowing the meaning of the answer. From Hamblin (1973) and Karttunen (1977) to Groenendijk & Stokhof (1994), questions have been conceptualised as a set of possible or true answers, from which the addressee must pick the one which corresponds to his/her situation. This must mean that in order to present an answer-set from which one answer may be chosen, the speaker does not evaluate not his/her own situation, which can offer the alternatives but not choose the true one. Instead, to use Groenendijk and Stokhof's (1994) terms, the speaker chooses an addressee who s/he *considers* to have an epistemic situation which overlaps with the partition of the logical space that the speaker has created by asking the question.

Groenendijk & Stokhof (1994:1095) define answerhood according to a model  $M$  as in (44) ( $\phi$  represents an answer and  $?ψ$  a question).

$$(44) \quad \phi \models_M ?\psi \text{ iff } \exists w \in M : [\phi]_M \subseteq [?\psi]_{M,w}.$$

This means that in the speaker's world, a set of alternatives can be provided which includes the answer, but this is as far as the speaker can go. The speaker therefore chooses an addressee whose world - as far as the speaker is aware - contains both the set of alternatives  $[?\psi]_M$  and the information to select the true one.

It is crucial that, if the speaker wants to elicit a valid answer, then s/he is responsible for choosing an addressee who has the requisite epistemic situation. This actually means that the

ADDRESSEE is identified and *constructed* by the speaker from the speaker's best knowledge. Furthermore, shifts in indexicality in echo questions suggest that the speaker relinquishes the logophoric centre to the addressee in interrogatives. Banfield (1978:436) notes that echo questions typically reproduce the questioned speech verbatim as in (45)—thus, even if the echo-questioner knows that Mary Ann Evans and George Eliot are the same person, s/he cannot replace material in the original question with his/her own perspective on or knowledge of the fact.

- (45)    A. George Eliot wrote Middlemarch.  
           B. George Eliot wrote Míddlemarch?  
           B'. #Mary Ann Evans wrote Míddlemarch?

However, if the original speech contains first- or second-person pronouns, these shift in echo questions to be evaluated against the perspective of the original addressee, as (46) shows.

- (46)    Q. Would you prefer a cup of tea?  
           A. Would I prefer a cup of téa?  
           A'. \*Would you prefer a cup of téa?

As Banfield suggests, this shows that the speaker is “divorced” from the logophoric centre when asking questions (Banfield 1978:437). Because the speaker constructs the ADDRESSEE from his/her own knowledge, s/he can misrepresent the ADDRESSEE's coordinates without causing syntactic ungrammaticality. For example, in the discourse in (47), *definitely* orients to the ADDRESSEE B, even though the continuation of the discourse shows that the addressee herself may not be ‘definite’ about the proposition.

- (47)    A. Did Margarita definitely<sub>B</sub> go to your party?  
           B. Presumably<sub>B</sub> she came, because I saw her coat in the hall (but I didn't see Margarita directly).<sup>15</sup>

The same case holds with Tibetan evidentiality markers. If the speaker presumes indirect evidence on the part of the addressee, but the addressee has direct evidence, the speaker's sentence is not ungrammatical, because it is based on the speaker's representation of the addressee's situation. However, the addressee's reply will be ungrammatical<sup>16</sup> if s/he doesn't correct the evidential. This is illustrated in (48) (from De Villiers et al. (2009:35)), in which the following context holds: speaker A rings speaker B at home to ask if Tashi is there. Speaker A assumes that B will only have indirect evidence of this fact, but B is sat opposite Tashi during the call.

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<sup>15</sup>Littell et al. (2010:94) note that evidentials in Salish languages seem to weaken the interrogative force of the question containing them. This seems to be true of the adverbs discussed here too; (47) is primarily concerned with whether or not the speaker is definite, rather than whether Margarita went to the party. This suggests that the speaker predicts a certain response from the particular addressee on the level of the proposition contained in the answer, further suggesting that the speaker is interested in the addressee's understanding when asking the question.

<sup>16</sup>De Villiers et al. (2009:35) report that if a speaker uses the wrong evidential for the evidence which s/he has, this is judged as a grammatical violation, not just pragmatic infelicity.

- (48) A. Bkra-shis nang-la yod-sa-red<sub>B</sub> pas?  
           Tashi     in     COP.INDIRECT.EVID Q  
           ‘Is Tashi in (can you tell)?’
- B. \*Nang-la yod-sa-red<sub>B</sub>  
     In     COP.INDIRECT.EVID  
     ‘She is in (I can infer)’
- B'. Nang-la dug<sub>B</sub>  
     In     EVID(DIRECT)  
     ‘She is in (I can see her)’

Note that no (other) coordinates shift, and the addressee’s coordinates do not in any way subsume those of the speaker. This is evident because the orientation of indexical pronouns is the same in questions as in statements. It is accounted for because the shift is not related to personhood or indexicality, but to how the type of SA head used subcategorises for the logophoric centre.

However, logophoric pronouns conform to predictions as they do shift orientation in questions. The Chinese logophoric pronoun *ziji*, when not bound in the sentence, is thought to be bound by the speaker ((49) from Chen (2009:466)).

- (49) Zhe-ge mimi zhiyou ziji<sub>speaker</sub> zhidao  
     This-CL secret only self know  
     ‘Only I (lit. *myself*) know this secret’

However, in questions, the ‘default’ interpretation of *ziji* shifts to the addressee ((50) from Pan (2001)).

- (50) Ziji<sub>addressee</sub> wei-she-me bu qu ne?  
     self why no go Q  
     ‘Why don’t you (lit: *yourself*) go?’

These facts show that the logophoric centre in questions shifts because the addressee’s situation, as created by the speaker, is the one at issue.

## 6. Conclusion

This paper shows that orientation shifting in high adverbs is a systematic and consistent phenomenon. The data show that high adverbs orient to a syntactic representation of the SPEAKER in declarative clauses, and that illocutionary and evidential adverbs, as well as *definitely* and *perhaps*, shift in yes-no interrogatives to orient to the ADDRESSEE. The phenomenon also occurs in clauses embedded under verbs of communication in the cases of evidential adverbs and *definitely* and *perhaps*. These adverbs orient to the matrix subject (‘speaker’ of the embedded clause) in declarative embedded clauses and to the matrix object (‘addressee’) in interrogative embedded clauses. Illocutionary adverbs, in contrast, are root phenomena which can only shift in matrix clauses or in embedded root contexts.

The solution postulated rests on the analysis of orientation as a case of predication. The

adverb is predicated of a subject which is bound by a representation of a discourse participant. This solution is solid and elegant because it falls out of independently motivated principles such as the MDP and only postulates structure which has overt correlates across languages. It does not postulate features that are not empirically motivated, but instead focuses on structures and functional projections which have seen strong empirical support. Finally, it can potentially offer with further development a solution to the persistent problem in Minimalist syntax of spelling out the highest projections in a sentence without resorting to stipulative means.

There are several future directions for this research: the proposal must be extended to other clause types such as imperative clauses as well as to languages with grammaticalised means of expressing the moods and modalities of the high adverbs. The question of why certain adverbs are not available in questions, and how these adverbs constrain the answer-set available in the partition formed by questions must also be examined. The psychological reality of the theory proposed also requires testing in the domain of child language acquisition.

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# **Acquisition of null subjects in European Portuguese by Chinese learners**

## Syntax and Discourse

Yi Zheng

This paper investigates whether Chinese learners acquire both the syntactic and discourse-pragmatic properties of null subjects in European Portuguese (EP). Twenty-eight Chinese intermediate and advanced learners of EP (two groups of 14 participants), as well as a control group of 14 native speakers of EP, participated in an off-line questionnaire, which aimed to investigate their knowledge on the occurrence of null and overt subjects in EP. The results show that Chinese learners of EP can acquire the syntactic properties of null subjects yet have difficulties in acquiring the discourse-pragmatic properties of the null and overt subjects in the language.

### *1. Introduction*

As there are several types of null subject languages, the acquisition of null subjects is a topic studied by many linguists working on second language (L2) acquisition. Some authors analyze the acquisition of L2 null subjects in terms of syntax, and others in terms of discourse-pragmatics.

According to some studies, such as White (1985) and Liceras & Díaz (1999), learners are able to acquire the syntactic aspects of the null subject parameter. However, according to the Interface Hypothesis of Sorace & Filiaci (2006), learners will have difficulties in the acquisition of discourse-pragmatic aspects of the null subjects.

This paper aims to investigate the acquisition of the null subject in European Portuguese (EP) by Chinese learners. Both EP and Chinese are null subject languages; however, these two languages differ in several respects regarding the nature and occurrence of null subjects. The null subject of EP is considered as the result of chain reduction, operated by the agreement of features, according to the analysis of Roberts (2010) and Holmberg (2010), while the Chinese null subject is analyzed as a pronoun or a variable, according to Huang (1984, 1989), and Huang, Li & Li (2009). Concerning the occurrence of null subjects in both

languages, the data suggest that there is a more frequent use of null subjects in EP than in Chinese.

It is therefore particularly relevant to analyze the acquisition of null subjects in EP as a second language by speakers of another null subject language with different properties. This experimental study will test whether the syntactic and discourse-pragmatic aspects of null subjects in EP can be acquired by Chinese learners.

In section 2, I will present some basic properties of null subjects in these two languages. In section 3, I will discuss some of the previous studies on the acquisition of null subjects in second language learning. I will present the questions of the research in section 4. Section 5 will show the methodology of the study, while section 6 describes the findings of the experimental tasks. I will present the conclusions in the last section of this paper.

## *2. The properties of null subjects*

This section reviews and compares some syntactic properties of null subjects in languages of the EP type and in Chinese, as well as their discourse-pragmatic properties.

### *2.1. Null subjects in languages of the EP type*

The classic studies (Chomsky 1981, 1982; Rizzi 1982, 1986) have argued that the null subject in Romance languages (except French, which is not considered to be a null subject language) is a pronominal (often called *pro*), which can be legitimated by the rich verbal agreement of this group of languages.<sup>1</sup>

Chomsky (2001) claimed that features should be divided into two groups: interpretable and uninterpretable. The uninterpretable features have to be checked by interpretable ones and eliminated. Holmberg (2005) defends that in Romance null subject languages, T has an uninterpretable  $\varphi$ -feature and the null subject (characterized as a  $\Phi P$ ) has an interpretable  $\varphi$ -feature. The interpretable  $\varphi$ -feature of  $\Phi P$  will value the uninterpretable  $\varphi$ -feature of T. Therefore, T and the null subject, with the agreement of  $\varphi$ -features, will form a definite pronoun, if the language has a Definite-feature (D-feature) in T. According to Holmberg (2005), the function of *pro* is very similar to an overt pronoun; the only difference is that it does not have a phonological realization. Accordingly, *pro* is only an unpronounced pronoun, or a deleted pronoun.

Holmberg (2010) considers the antecedent of the null subject in this kind of null subject languages as the Aboutness-Shift-topic (A-topic), a notion suggested by Frascarelli (2007). He then argued that the A-topic will be in an  $A'$ -position within the C domain of the sentence, and may be null or overt. Thus, the A-topic will value the uninterpretable D-feature of T, while T will copy the referential index of the A-topic. The A-topic may also be a copy of the A-topic of the preceding sentence, if it is null.

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<sup>1</sup> Chomsky (1981) initially considered it as PRO, and then changed it to *pro* in 1982.

- (1) [Top [-] [D] [TP [T Cheg-ou [T [D, φ]]] [vP ~~cheg-ou~~ Φminmax [φ] a casa.]] (EP)  
arrive-PST.3SG                      ~~arrive-PST.3SG~~              to home  
‘(He) arrived home.’

Roberts (2010) explores the nature of *pro*. According to several authors, including Cardinaletti & Starke (1999) and Holmberg (2005), *pro* is a weak pronoun, but not a strong pronoun or a clitic. Roberts (2010) considers *pro* as a constituent of the nature of Determinant, a Dmin/max that occupies the SpecTP position to satisfy the EPP.

He defends that *pro* can be omitted by chain reduction. Since both T and *pro* bear a φ-feature and a D-feature, there will be an agreement operation of these features. Thus, *pro* can be omitted after feature copying and deletion.

- (2) [TP [T Cheg-ou [T [D, φ]]] [vP ~~cheg-ou~~ Dminmax [D, φ] a casa.]] (EP)  
arrive-PST.3SG                      ~~arrive-PST.3SG~~              to home  
‘(He) arrived home.’

Barbosa (2009) holds a similar position to Holmberg. In her opinion, due to the rich verbal agreement of this group of languages, the verbal inflection itself will be pronominal and contains a D-feature that can check the EPP feature by rising V to T. Her basic proposal is that the verbal morphology is an affix, which behaves as a pronominal clitic. The result of this proposal is that there is no movement of the subject to check the EPP, as the A-position of the subject of these languages is post-verbal. She contends then that the nature of the null subject is also a Φminmax, but does not discuss how its reference is recovered.

In summary, although Holmberg, Roberts and Barbosa do not hold an identical position, their basic assumption is that the null subject in this group of languages is pronominal and has an intimate relation with the rich verbal agreement.

## 2.2. Null subject in Chinese

Huang (1984) found that some languages that have no verbal inflection, such as Chinese and Japanese, also allow the omission of the subject in finite sentences. First, Huang emphasized that Chinese is a discourse-oriented language, in which the topic is more prominent than the subject. This kind of language has the property of admitting NP-topic deletion.

Huang (1984) also argues that the null subject of Chinese can be either a pronominal (*pro*) or a variable. The pronominal null subject must obey the Generalized Control Rule (GCR), which states that a pronominal empty category (*ec*) must be co-indexed with the closest nominal element.

In (3), according to Huang, the *ec* can be considered as *pro* and will be controlled by the subject of the matrix sentence *Zhangsan*. As a consequence, there is co-reference between the matrix subject and the embedded null subject.

- (3) [TP Zhangsan<sub>1</sub> shuo *ec*<sub>1</sub> mai shu le]  
           Zhangsan say *ec* buy book PST  
      ‘Zhangsan said that (he) bought the books.’

Another type of null subject in Chinese is variable. In (4), according to Huang, the *ec* can be considered as a variable bound by the topic of the sentence *zhege ren* ‘that person’. Null subjects in matrix sentences are also considered to belong to this type.

- (4) [Top Zhege ren<sub>1</sub>][TP Zhangsan<sub>2</sub> shuo *ec*<sub>1</sub> neng ying.]  
           this person Zhangsan say *ec* can win  
      ‘This person, Zhangsan says that (he) can win.’

Sometimes, the topic can also be omitted, according to the reduction of the topic chain. In this case, the operator (Op) in the topic position can be recovered by the discourse, as in (5).

- (5) [Top Op<sub>1</sub>][TP Zhangsan<sub>2</sub> shuo *ec*<sub>1</sub> mai shu le.]  
           Op Zhangsan say *ec* buy book PST  
      ‘Zhangsan said that (he) bought the books.’

Comparing (3) and (5), it is not difficult to identify that pronominal null subjects and variables may appear in the same contexts in Chinese.

### 2.3. The discourse-pragmatic properties of null subjects of the two languages

Some authors argue that null subjects in languages such as EP tend to seek an antecedent in a more salient position, while overt subjects tend to seek an antecedent in a less salient position (cf. Ariel 1988, 2001 for languages in general; Brito 1991; Costa et al. 1998, 1999 for EP; Carminati 2002 for Italian)

For example, Carminati (2002) argues that the subject position is salient in terms of the syntax and, therefore, the null subject will seek an antecedent in subject position (which is SpecIP) while an overt subject will search for an antecedent in non-subject positions, which are less salient.

The example in (6) shows that EP has a preference for a co-reference interpretation between the matrix subject and the embedded null subject and a disjoint interpretation between the matrix subject and the embedded overt subject. However, as I argued in Zheng (2013), Chinese does not necessarily have this preference. For example, the sentences in (7) may have identical interpretations: both the null and the overt subject admit two interpretations (co-referent and disjoint readings between the matrix subject and the embedded subject) but neither of them is preferred.

- (6) O Jorge<sub>1</sub> disse ao Rui<sub>2</sub> que *pro*<sub>1/ele</sub><sub>2</sub> passou no exame.  
 ART Jorge said to.ART Rui that *pro/he* passed in.ART exam  
 ‘Jorge said to Rui that (he) passed the exam.’
- (7) Zhangsan<sub>1</sub> gaosu Lisi<sub>2</sub> [CP *ec*<sub>1,2</sub>/ta<sub>1,2</sub> kaoshi guo le.]  
 Zhangsan tell Lisi *ec* he exam pass PST  
 ‘Zhangsan told Lisi that (he) passed the exam.’

However, with respect to null subjects in adverbial adjuncts, Chinese is similar to EP, since only the co-reference reading between the embedded null subject and the matrix subject is possible, as can be observed in (8).

- (8) Zhangsan<sub>1</sub> [PPzai *ec*<sub>1/#2</sub> chifan de shihou] xiao le.  
 Zhangsan at *ec* eat GEN time smile PST  
 ‘Zhangsan smiled when (he) ate (something).’

This is because the null subject in island structures cannot be a variable, because of the strong island effect, as suggested by Huang (1984). But if the subject in the island is overt, it will continue to have both the co-referential and the disjoint readings, as observed in (9), such as in the case of complement clauses.

- (9) Zhangsan<sub>1</sub> [PP zai ta<sub>1/2</sub> chifan de shihou] xiao le.  
 Zhangsan at he eat GEN time smile PST  
 ‘Zhangsan smiled when he ate (something).’

The above examples show that the Chinese embedded null subject may have two interpretations (*pro* or variable), which are equally preferred, except in islands, where only the *pro* reading is possible.

### *3. Previous studies on acquisition of null subjects in L2*

Some studies (e.g. White 1985; Liceras & Díaz 1999) investigated whether learners were able to acquire the syntactic aspects of the null subject parameter, that is, if the learners have access to Universal Grammar. The results of these studies showed that it is easy for L2 learners to acquire the syntactic properties of the null subject in Romance languages, even if their L1 is a non null subject language.

Recently, Sorace & Filiaci (2006) proposed the Interface Hypothesis, arguing that the properties of the narrow syntax can be completely acquired in L2 acquisition, while properties that involve the interface between syntax and other cognitive domains may not be fully acquired. This hypothesis predicts that L2 learners may have some difficulty in acquiring the discourse-pragmatic properties of null subjects, which was confirmed by several studies, such as Tsimpli et al (2004); Tsimpli & Sorace (2006); Montrul & Rodríguez-Louro (2006);

Margaza & Bel (2006); Rothman (2007, 2008); Belleti et al. (2007); Madeira et al (2009, 2012), among others.

Many of these studies have shown that L2 learners may acquire the discursive use and interpretation of the null subjects, but have difficulties with overt subjects, namely the redundant use of overt subjects in contexts where null subjects are preferred. For example, L2 learners may choose an antecedent in subject position for a null subject, but when the subject is overt, they maintain the same interpretation, unlike native speakers, even when the learner's L1 has null subjects.

#### *4. Research questions*

The first research question that this study seeks to address is: will Chinese learners acquire the purely syntactic properties of the null subject of EP, and analyze it as *pro*, but not variable?

My first hypothesis is that the Chinese learners may acquire the syntactic and morphological properties of the null subject of EP. Data from several studies have shown that the learners can acquire the syntactic properties of null subjects from a very early stage, regardless of their mother tongue. This means that even learners whose native languages are not null subject language can acquire the null subject of EP. Therefore, I predict that the difference between the null subject of Chinese and EP will not prevent Chinese learners from acquiring the null subject of EP. If this hypothesis holds, it will provide evidence that the Chinese learners have access to Universal Grammar.

The second research question is: will the Chinese learners acquire the discourse-pragmatic properties of the null subject of EP, and distinguish the contexts which favor the use of null subjects from those which favor the use of overt subjects?

According to the Interface Hypothesis of Sorace & Filiaci (2006), and other more recent works (Tsimpli & Sorace 2006; Montrul & Rodríguez-Louro 2006; Margaza & Bel, 2006; Rothman 2007, 2008; Belleti et al. 2007; Madeira et al 2009, 2012; Zhao 2009, among others), the discourse-pragmatic properties of null subjects are more difficult to acquire in L2. That is, speakers may be aware that the language they are learning is a null subject language, but do not know the contexts in which a null subject should be used and the contexts in which an overt subject is preferred. Therefore, my second hypothesis is that the Chinese learners will have difficulties in acquiring the discourse-pragmatic properties of the null subject of EP.

#### *5. Methodology*

Several Chinese learners of EP, as well as some native speakers of EP were requested to take part in an off-line questionnaire, to test if they acquire the syntactic and discourse-pragmatic properties of null subjects in EP, questions outlined in section four.

### 5.1. Participants

Twenty-eight Chinese learners were divided into two groups according to their levels of proficiency: one group at the intermediate level and one at the advanced level.<sup>2</sup> The intermediate group consisted of 14 Chinese students who are attending a Portuguese language course in Lisbon, aged from 18 to 21 years, average 19.79. The beginning age of learning varies between 17 and 20 years, average 18.79. All of them have been learning EP for 14 months. The advanced level group consisted of 14 Chinese students studying Portuguese in Portugal, aged between 20 and 35 years, average 22.57. The beginning age of learning varies between 18 and 32 years, average 20.5. All of them have been learning EP for more than two years.<sup>3</sup>

There were also 14 native speakers of EP, namely university students, who formed a control group. The age of these participants varied between 17 and 21, average 18.79.

### 5.2. Experimental test conditions

The experimental test is divided into two parts, with the first part testing the syntactic properties, and the second testing the discourse-pragmatic properties.

#### 5.2.1. Syntactic conditions

The aim of the syntactic conditions is to test whether the learners analyze the null subject in EP as *pro*. There are three conditions for this part: null subjects in island conditions; sloppy and strict readings in ellipsis constructions; split antecedents for null subjects. The first condition also has a sub-condition. Both were applied in a preference judgment task, which has eight items, with four test items and four filler items. All the items appear in a random order. The participants had to choose from three options (sentences with null or overt subject) the adequate sequence of a background sentence in a written task. The second and third conditions were applied in a multiple choice comprehension task, where the participants had to choose from three options the adequate interpretations of the test sentence.<sup>4</sup> Each condition has two test items.<sup>5</sup>

Condition one – ‘null subject in adverbial adjunct, co-referential reading’ condition and its sub-condition involve strong islands. In each item of these conditions, as in example (10) and (11), there are three sentences to choose from. Each option contains a sentence with an

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<sup>2</sup> Sorace (2011) defends that, to test the Interface Hypothesis, it is necessary to apply the experimental test on near-native speakers of L2. But White (2011) argues that it is also important to test the learners who are still in the process of acquisition.

<sup>3</sup> According to the formative assessment they experienced before attending the courses, the intermediate learners correspond to the level B1, while the advanced learners are B2.

<sup>4</sup> The preference judgment task and the comprehension task, as well as the subsequent tasks for the discursive conditions, allow the participants to choose more than one option. This is to guarantee that all of the possible interpretations of the participants can be recorded.

<sup>5</sup> In the real test, the items of the second and third conditions appear with those of the discursive conditions, which are also applied in a comprehension task.

adverbial adjunct. One option contains an overt DP subject (option A), another option contains a null subject (option B) and the third one contains a null subject which is bound by the sentence topic (option C).<sup>6</sup> Due to the strong island effect, the null subject in the adverbial adjunct is allowed only if it is *pro*. If the participants accept option B in condition one, this implies that they analyze the null subject as *pro*. Option C, on the other hand, should be rejected by the participants, because the topic is assumed to be generated by A'-movement and will bind the null subject in the island. However, A'-movement is excluded from the strong island, which yields the oddness of C. Nevertheless, as the topic in C is itself co-indexed with the subject of the matrix sentence, the structure of this sentence becomes unclear, because one may analyze the first *O João* ‘John’ as a topic which is base-generated in SpecTopP, while the null subject in adverbial adjunct as *pro*, which is co-indexed with the second *O João* ‘John’, which is the subject of the matrix clause. Therefore, the Sub-condition one – ‘null subject in adverbial adjunct, disjoint reading’ condition is also applied to reduce the ambiguity. In this case, the only difference from condition one is that the topic is disjoint from the subject of the sentence. As a consequence, to keep the intended reading, *O João* ‘John’ in option C of (11) will only be considered as a topic generated by A'-movement, which binds the null subject in the adverbial adjunct. Since this kind of movement is sensitive to strong islands, the option C in Sub-condition one should be rejected.<sup>7</sup>

- (10) *O João saiu da empresa mais cedo do que habitual.* \_\_\_\_\_.

‘John left the company earlier than usual’

- A. *O João ficou feliz quando o João chegou a casa.*

‘John felt happy when John arrived home.’ [DP subject]

- B. *O João ficou feliz quando chegou a casa.*

‘John felt happy when [-] arrived home.’ [null subject] (the expected answer)

- C. *O João, o João ficou feliz quando chegou a casa.*

‘John, John felt happy when [-] arrived home.’ [topicalization]

- (11) *A Maria faz anos hoje. O João chegou a casa muito cedo.* \_\_\_\_\_.

‘Today is Mary’s birthday. John arrived home very early.’

- A. *A Maria ficou feliz quando o João chegou a casa.*

‘Mary felt happy when John arrived home.’ [DP subject] (the expected answer)

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<sup>6</sup> The options A, B and C of this task and of all the following tasks appear in a random order in the real test.

<sup>7</sup> However, for option B of Sub-condition one, ‘Mary felt happy when [-] arrived home’, native speakers of EP show a special preference for the co-reference between the matrix subject and the embedded null subject (as I have shown in 2.3). So the sentence should have the meaning of ‘Mary felt happy when she arrived home’, but not the intended reading ‘Mary felt happy when John arrived home’. In fact, the option C may also be analyzed in this way, considering the null subject as *pro*. But this does not maintain the intended reading in the same way as option B. Therefore, the only possible answer for this sub-condition will be A, with an overt subject. As a result, if the participants accept B in condition one and reject C in sub-condition one, that will indicate that the EP L2 participants analyze the null subjects as *pro*, but not variable.

B. *A Maria ficou feliz quando chegou a casa.*

‘Mary felt happy when [-] arrived home.’ [null subject]

C. *O João, a Maria ficou feliz quando chegou a casa.*

‘John, Mary felt happy when [-] arrived home.’ [topicalization]

In each item of condition two – ‘strict and sloppy readings’ condition, as in the example in (12), the first conjunct of the main sentence contains a null subject in the complement subordinate clause and the second conjunct has an ellipsis of this complement clause. The participants will choose the interpretation of the ellipsis of the second conjunct. Option A implies that the null subject in the omitted complement clause has a strict reading. Option B implies that it has a sloppy reading. If the omitted subject in the second conjunct is analyzed as *pro*, either the strict reading or the sloppy reading will be permitted. In this case, if the parser considers no change in the discourse topic in the second conjunct of coordination, then the strict reading is rendered; if the parser does consider a change in the discourse topic (i.e. the topic of discourse is not associated with the subject of the first conjunct of the coordination and becomes associated with the subject of the second conjunct), then the sloppy reading is available. So if the participants accept both the strict and the sloppy readings, this implies that they are analyzing the null subject of the second conjunct as *pro*.

(12) *O João anunciou que vai estudar na Itália e o Rui também anunciou.*

‘John announced that [-] will study in Italy and Rui also announced.’

*Quem é que o Rui anunciou que vai estudar na Itália?*

‘Who did Rui announce will study in Italy?’

A. *o João ‘John’* [strict reading] (the expected answer)

B. *o Rui ‘Rui’* [sloppy reading] (the expected answer)

C. *uma outra pessoa ‘another person’*

In each item of condition three – ‘the split antecedent’ condition, the first sentence provides the context and the second sentence contains a null subject in the complement clause (13). If the null subject is analyzed as *pro*, it must allow a split antecedent. This condition serves to test whether the participants accept this interpretation. The option C is the split antecedent, while options A and B correspond to the antecedent in subject and object position.

(13) *Os professores e os alunos vão fazer uma viagem neste verão. Os professores disseram aos alunos que vão visitar a China.*

‘The teachers and the students will make a trip this summer. The teachers told the students that [-] will visit China.’

*Quem é que vai visitar a China?*

‘Who will visit China?’

A. *Os professores ‘the teachers’* [antecedent in subject position]

B. *Os alunos ‘the students’* [antecedent in object position]

C. *Os professores e os alunos ‘the teachers and the students’* [split antecedent] (the expected answer)

### 5.2.2. The discourse-pragmatic conditions

The discourse-pragmatic conditions involve constructions of complement clause and adverbial adjunct. The aim of these conditions is to test whether learners accept an antecedent in the matrix subject position for null subjects and antecedent in other positions for overt subjects. In this part, every condition has a sub-condition, where the null subject is substituted by an overt pronoun. Thus, there are four pairs of conditions and sub-conditions. Every condition/sub-condition contains two items, with an additional twelve filler items.<sup>8</sup> All of the items appear in a random order.<sup>9</sup>

In each item of condition one and its sub-condition – ‘null or overt pronominal subject in complement clause, two antecedents in subject position’ conditions, as in example (14), as well as condition two and its sub-condition – ‘null or overt pronominal subject in adverbial adjunct, two antecedent in subject position’ conditions, as in example (15), the first sentence is composed of two declarative coordinated clauses, which serves as the context of the following sentence, while the second sentence contains a complement clause or an adverbial adjunct with a null or overt subject. There are two potential antecedents (of the null or overt subject of the second sentence) in the first sentence and both are located in the subject position. The first one is co-indexed with the matrix subject of the second sentence, which c-commands the embedded subject. The other antecedent, though also in the subject position, does not c-command the embedded subject. I will name the first antecedent as ‘matrix subject antecedent’, and the second as ‘previous subject antecedent’. Participants will choose the antecedent of the embedded subject. Thus, there is also an option that corresponds to a potential antecedent in the discourse, named as ‘in discourse antecedent’. In the sub-conditions, the null subject in the second sentence is replaced by an overt pronoun.

- (14) *O Pedro come três gelados e o Rui come quatro. O Pedro disse que [-]/ele não deve comer tantos gelados.*

‘Peter ate three ice-creams and Rui ate four. Peter said that [-]/he should not eat so many ice-creams.’

*Na opinião do Pedro, quem é que não deve comer tantos gelados?*

‘In Peter’s opinion, who should not eat so many ice-creams?’

A. *o Rui* ‘Rui’ [previous subject antecedent] (the expected answer for overt subject)

B. *o Pedro* ‘Peter’ [matrix subject antecedent] (the expected answer for null subject)

C. *uma outra pessoa* ‘another person’ [in discourse antecedent]

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<sup>8</sup> Four items from the syntactic conditions were also mixed in this part, as showed in 5.2.1.

<sup>9</sup> All the randomizations of the items in this study were performed manually.

- (15) *O Rui está no metro e o Tiago também está no metro. O Rui comprou um jornal quando [-]/ele saiu do metro.*

‘Rui was in the underground and Tiago was also in the underground. Rui bought a newspaper when [-]/he left the underground.’

*Quem é que saiu do metro?*

‘Who left the underground?’

- A. *o Rui* ‘Rui’ [matrix subject antecedent] (the expected answer for null subject)
- B. *o Tiago* ‘Tiago’ [previous subject antecedent] (the expected answer for overt subject)
- C. *uma outra pessoa* ‘another person’ [in discourse antecedent]

In each item of condition three and its sub-condition – ‘null or overt pronominal subject in complement clause, two antecedents, one in subject position, the other in indirect object position’ conditions, as in example (16), as well as condition four and its sub-condition – ‘null or overt pronominal subject in adverbial adjunct, two antecedents, one in subject position, the other in indirect object position’ conditions, as in example (17), the matrix clause has a subject and an indirect object. The subordinate clause is a complement clause or adverbial adjunct that contains a null or overt subject. Both the subject and the indirect object of the matrix clause may become the antecedent of the embedded subject. Participants have to choose its antecedent. The subject of the matrix clause corresponds to the ‘matrix subject antecedent’, while the indirect object corresponds to the ‘object antecedent’, in other words, an antecedent in non-subject position. There is also an option that corresponds to a potential antecedent in the discourse, named as ‘in discourse antecedent’. In the sub-conditions, the embedded null subject is replaced by an overt pronoun.

- (16) *O João disse ao Rui que [-]/ele passou no exame.*

‘John told Rui that [-]/he passed the exam.’

*Quem é que passou no exame?*

‘Who passed the exam?’

- A. *o João* ‘John’ [matrix subject antecedent] (the expected answer for null subject)
- B. *o Rui* ‘Rui’ [object antecedent] (the expected answer for overt subject)
- C. *uma outra pessoa* ‘another person’ [in discourse antecedent]

- (17) *A Joana escreveu uma carta à Ana quando [-]/ela trabalhava no Brasil.*

‘Joana wrote a letter to Ana when [-]/she worked in Brazil.’

*Quem é que trabalhava no Brasil?*

‘Who worked in Brazil?’

- A. *a Joana* ‘Joana’ [matrix subject antecedent] (the expected answer for null subject)
- B. *a Ana* ‘Ana’ [object antecedent] (the expected answer for overt subject)
- C. *uma outra pessoa* ‘another person’ [in discourse antecedent]

## 6. The results and discussion

This section demonstrates the results of the syntactic and discourse-pragmatic conditions of the experimental tests, as well as their respective discussions. The final part of this section also summarizes the individual behaviors of the participants.

### 6.1. Syntactic conditions results

Options	Null subject		Overt DP subject		Topicalization	
	No. of answers	Percentage	No. of answers	Percentage	No. of answers	Percentage
Intermediate	20/28	71%	4/28	14%	5/28	18%
Advanced	26/28	93%	9/28	32%	2/28	7%
Control	28/28	100%	0/28	0%	0/28	0%

Table 1 Condition 1 Null subject in adverbial adjunct, co-referential reading

As the co-reference interpretation between the matrix subject and the embedded subject is forced by the context, all native speakers accept the sentence with an embedded null subject and no one chooses the sentence containing the overt subject DP. Most of the learners (from both groups) also choose the null subject option.

There is no significant difference between the advanced learners' group and the control group concerning the acceptance of null subject by subjects ( $F_1(1, 26)=1, p=0.33$ ).<sup>10</sup> However a difference does exist between the intermediate learners and the native speakers (71% vs. 100%) by subjects ( $F_1(1, 26)=6.3, p=0.02$ ). In spite of this, the percentage of 71% from the intermediate learners still shows that they have a strong preference for the null subject in this condition.

Options	Null subject		Overt DP subject		Topicalization	
	No. of answers	Percentage	No. of answers	Percentage	No. of answers	Percentage
Intermediate	7/28	25%	19/28	68%	3/28	11%
Advanced	8/28	29%	25/28	89%	2/28	7%
Control	1/28	4%	27/28	96%	0/28	0%

Table 2 Sub-Condition 1 Null subject in adverbial adjunct, disjoint reading

In this case, it can be seen that almost all the native speakers accept the overt subject, as predicted in 5.2.1

The learners also follow this judgment: there is no significant difference between the advanced learners and the native speakers concerning the acceptance of overt DP subject

<sup>10</sup> As the variance of both groups is zero when taking the items as random effect, it is impossible to calculate  $F_2$  in this case. The same is true for the intermediate vs. control group matchup.

( $F_1(1, 26)=0.7$ ,  $p=0.41$ ,  $F_2(1, 2)=2$ ,  $p=0.29$ ). But there is some difference between the intermediate learners and the native speakers by subjects, not by items ( $F_1(1, 26)=9.67$ ,  $p=0.004$ ,  $F_2(1, 2)=2.42$ ,  $p=0.26$ ). Like the previous condition, although there is statistically difference between the intermediate learners and the native speakers, the acceptance percentage of the former for overt subject still reaches 68%. Furthermore, it is worth highlighting that some of the learners from both levels accept the null subject here, which implies an overuse of null subjects.

Options	Strict		Sloppy		Other	
	No. of answers	Percentage	No. of answers	Percentage	No. of answers	Percentage
Intermediate	12/28	42%	14/28	50%	4/28	14%
Advanced	22/28	79%	17/28	61%	3/28	11%
Control	20/28	71%	13/28	46%	0/28	0%

Table 3 Condition 2 Strict and sloppy readings

At first glance, it seems that the native speakers prefer the strict reading over the sloppy reading (71% vs. 46%). But this difference is not statistically significant ( $t_1(13)=1.286$ ,  $p=0.221$ ,  $t_2(1)=1.389$ ,  $p=0.397$ ), which means that both the strict and the sloppy readings are acceptable for the native speakers.

The L2 participants from both learner groups fluctuate between the strict reading and the sloppy reading: 42% vs. 50% for intermediate learners and 79% vs. 61% for advanced learners. There is no significant difference between the learners and the native speakers concerning the acceptance of strict and sloppy reading by subjects and items (for strict readings,  $F_1(2, 39)=2.94$ ,  $p=0.06$ ,  $F_2(2, 3)=9.42$ ,  $p=0.05$ ; for sloppy readings,  $F_1(2, 39)=0.41$ ,  $p=0.67$ ,  $F_2(2, 3)=1.3$ ,  $p=0.39$ ).

Options	Subject		Object		Split	
	No. of answers	Percentage	No. of answers	Percentage	No. of answers	Percentage
Intermediate	8/28	29%	8/28	29%	17/28	61%
Advanced	6/28	21%	10/28	36%	20/28	71%
Control	10/28	36%	3/28	11%	17/28	61%

Table 4 Condition 3 Split antecedent

In this condition, most native speakers accept the split antecedent (61%), while the acceptance of antecedent in subject position is also possible (36%).

As for the Chinese learners, their behavior is quite similar to that of the native speakers: 61% of the intermediate learners' answers and 71% of the advanced learners' answers

correspond to the split antecedent. There is no significant difference between the learners and the native speakers concerning the acceptance of the split antecedent ( $F_1(2, 39)=0.41, p=0.66$ ,  $F_2(2, 3)=0.08, p=0.93$ ). Like the natives, there are also some learners who accept the antecedent in subject position or even accept the antecedent in object position.

### *6.2. Discussion of the syntactic conditions results*

The results have shown that the control group of Portuguese participants usually accepts the null subject in adverbial adjunct - a strong island condition - if the context permits this possibility. However, they do not accept null subjects which are generated by A'-movement and bound by the sentence topic. This is in line with the literature, which indicates that the native speakers analyze the null subject in adverbial adjunct as *pro* but not as variable.

Concerning the conditions of strict and sloppy readings, it seems that the behavior of the native participants is consistent with the prediction, since both the strict and the sloppy readings are accepted. However, the acceptance rate of the sloppy reading does not reach 50%. Not all participants accept the two readings simultaneously. Possibly, this is due to the fact that some participants do not think there is a change of topic, as I mentioned in 5.2.1. This is a question which deserves to be analyzed in future work. As for the conditions of split antecedent, the majority of the native speakers accept the split antecedent although there are still some participants with other interpretations.

Returning to the Chinese groups, the first observation to make is that they also accept null subjects in strong islands like adverbial adjuncts (in condition one, when the context is adequate) and do not accept the options where the embedded null subject is bound by the topic of the sentence (in sub-condition one). This entails that they do analyze the null subject as *pro*, but not as variable, since they reject the A'-movement out of strong island in this case. The Chinese learners also accept both the strict and the sloppy readings for the elliptical constructions, although the acceptance percentage is not very high. However, since the learners' results are quite similar to those of the native speakers', it can be judged that they already interpret the sloppy and strict readings in the same way as the native speakers do. Furthermore, most Chinese learners also accept the split antecedent for the embedded null subject. Taken together, these three facts contribute to the confirmation of the hypothesis that they are able to acquire the null subject of EP as *pro*.

### 6.3. Discourse-pragmatic conditions results

Options	Matrix subject		Previous subject		In discourse	
	No. of answers	Percentage	No. of answers	Percentage	No. of answers	Percentage
Intermediate	16/28	57%	13/28	46%	3/28	11%
Advanced	20/28	71%	11/28	39%	1/28	4%
Control	24/28	86%	8/28	29%	0/28	0%

Table 5 Condition 1 Null subjects in complement clause, two antecedents in subject position

According to the results, the native participants prefer the element that c-commands the embedded null subject (matrix subject antecedent) as its antecedent. Its percentage of acceptance is higher than that of the ‘previous subject antecedent’ by subjects, but not by items (86% vs. 29%,  $t_1(13)=4.95$ ,  $p<0.001$ ,  $t_2(1)=1.33$ ,  $p=0.41$ ).

As for the learner groups, the data have shown that they also have a similar preference, although not as marked as the control group. However, it is also notable that the acceptance rate of the ‘previous subject antecedent’ by the intermediate group reaches 46% and the preference for the ‘matrix subject antecedent’ is not significant ( $t_1(13)=0.64$ ,  $p=0.53$ ,  $t_2(1)=0.6$ ,  $p=0.66$ ). There is also a significant difference between the intermediate learners’ group and the control group when comparing their acceptance for the ‘matrix subject antecedent’ by subjects ( $F_1(1, 26)=4.73$ ,  $p=0.04$ ). Although the preference for the ‘matrix subject antecedent’ is also not statistically significant for the advanced learners, there is no difference between the advanced learners’ group and the control group in this respect ( $F_1(1, 26)=2.36$ ,  $p=0.14$ ,  $F_2(1, 2)=0.19$ ,  $p=0.7$ ). Hence, there is a progress in the transition from intermediate to advanced level.

Options	Matrix subject		Previous subject		In discourse	
	No. of answers	Percentage	No. of answers	Percentage	No. of answers	Percentage
Intermediate	11/28	39%	13/28	46%	4/28	14%
Advanced	18/28	64%	17/28	61%	0/28	0%
Control	5/28	18%	26/28	93%	0/28	0%

Table 6 Sub-Condition 1 Overt pronominal subject in complement clause, two antecedents in subject position

In this condition, the native speakers prefer the ‘previous subject antecedent’ to the ‘matrix subject antecedent’ (93% versus 18%) when choosing an antecedent for the embedded overt subject ( $t_1(13)=-6.6$ ,  $p<0.001$ ,  $t_2(1)=-21.57$ ,  $p=0.03$ ). However, the percentage of acceptance of the ‘previous subject antecedent’ for the intermediate group is only 46%. This rate increases to 61% in the advanced level, but neither of the learner groups have a significant preference for the ‘previous subject antecedent’. That said, the learners, especially in the advanced group (which attains 64%, significantly different from the native speakers,  $F_1(1,$

$26)=13$ ,  $p=0.001$ ,  $F_2(1, 2)=176.5$ ,  $p=0.006$ ), continued to choose the ‘matrix subject antecedent’ for the embedded overt subjects. In the transition from the intermediate level to the advanced level, no progress can be observed regarding the rejection of the ‘matrix subject antecedent’. In this sense, it seems that the Chinese learners, especially those in the advanced level, think that overt subjects may have either antecedent and have no preference in this respect.

Options	Matrix subject		Previous subject		In discourse	
	No. of answers	Percentage	No. of answers	Percentage	No. of answers	Percentage
Intermediate	20/28	71%	8/28	29%	2/28	7%
Advanced	26/28	93%	3/28	11%	1/28	4%
Control	28/28	100%	0/28	0%	0/28	0%

Table 7 Condition 2 Null subject in adverbial adjunct, two antecedents in subject position

In this condition, all the native participants prefer the ‘matrix subject antecedent’ for the null subject in adverbial adjuncts and no one chose the subject in the previous sentence. The behavior of the advanced learners is very similar to those of the control group ( $F_1(1, 26)=2.17$ ,  $p=0.15$ ,  $F_2(1, 2)=1$ ,  $p=0.42$ ): almost all prefer the ‘matrix subject antecedent’ ( $t_1(13)=9.7$ ,  $p<0.001$ ). As for the intermediate group, even if they have a slight tendency to accept the ‘previous subject antecedent’, the majority of their answers favor the matrix subject as the antecedent of the embedded null subject ( $t_1(13)=2.48$ ,  $p=0.03$ ). There is no significant difference between the learners and the native speakers.

Options	Matrix subject		Previous subject		In discourse	
	No. of answers	Percentage	No. of answers	Percentage	No. of answers	Percentage
Intermediate	18/28	64%	9/28	32%	1/28	4%
Advanced	17/28	61%	15/28	54%	2/28	7%
Control	6/28	21%	24/28	86%	1/28	4%

Table 8 Sub-Condition 2 Overt pronominal subject in adverbial adjunct, two antecedents in subject position

In this condition, as the subject is overt, the native speakers again prefer the ‘previous subject antecedent’ for the overt subjects (86%) against the ‘matrix subject antecedent’ (21%) ( $t_1(13)=-5.26$ ,  $p<0.001$ ). However, it is not difficult to find that the learners at both levels do not show any preference for the ‘previous subject antecedent’. Only the advanced learners’ group has a higher acceptance rate of the ‘previous subject antecedent’ (54%), but this figure is much lower than that found in the control group (which reaches 86%) and there is significant difference between them by subjects,  $F_1(1, 26)=7.69$ ,  $p=0.01$ ). The Chinese learners and the native speakers diverge again at this point.

Options	Matrix subject		Object		In discourse	
	No. of answers	Percentage	No. of answers	Percentage	No. of answers	Percentage
Intermediate	15/28	54%	14/28	50%	7/28	25%
Advanced	22/28	79%	6/28	21%	1/28	4%
Control	26/28	93%	4/28	14%	0/28	0%

*Table 9 Condition 3 Null subject in complement clause, two antecedents, one in subject position, the other in indirect object position*

The results for this condition show that the native speakers still prefer the ‘matrix subject antecedent’ for the embedded null subject (93%) over the ‘object antecedent’ (14%) ( $t_1(13)=5.40$ ,  $p<0.001$ ). However the judgment of the intermediate learners is quite different: only 54% of their answers correspond to the same interpretation as that of the control group. Precisely half of the answers accept an element in non-subject position as the antecedent of the null subjects, which is significantly different from the native speakers by subjects ( $F_1(1, 26)=7.22$ ,  $p=0.01$ ). Learners at this level do not exhibit as clear a preference as the native speakers do. However, there is an improvement in the transition from the intermediate level to the advanced level. For the advanced group, they do not show significant difference comparing their acceptance percentage with the control group (79% vs. 93% for ‘matrix subject antecedent’,  $F_1(1, 26)=1.63$ ,  $p=0.21$ ,  $F_2(1, 2)=3.74$ ,  $p=0.19$ ; 21% vs. 14% for ‘object antecedent’,  $F_1(1, 26)=0.30$ ,  $p=0.59$ ,  $F_2(1, 2)=1$ ,  $p=0.42$ ).

Options	Matrix subject		Object		In discourse	
	No. of answers	Percentage	No. of answers	Percentage	No. of answers	Percentage
Intermediate	18/28	64%	20/28	71%	7/28	25%
Advanced	21/28	75%	20/28	71%	5/28	18%
Control	15/28	54%	23/28	82%	4/28	14%

*Table 10 Sub-Condition 3 Overt pronominal subject in complement clause, two antecedents, one in subject position, the other in indirect object position*

In this condition, the native speakers still prefer the element in non-subject (object) position as the antecedent of the overt subject (82%). However, the acceptance percentage of the ‘matrix subject antecedent’ also reaches 54%, meaning that the native speakers also allow an antecedent in subject position for the overt subject.

Turning to the learners, we can see that the percentages of acceptance of the antecedent in non-subject position of both groups also reach 71%. However, their acceptance rates of the antecedent in subject position are higher than that of the control group. It seems that the Chinese learners think that both options are possible and there is no difference between the two antecedents. But in terms of statistical analysis, there is no significant difference between the three groups by subjects and items (for ‘matrix subject antecedent’,  $F_1(2, 39)=0.92$ ,  $p=0.41$ ,  $F_2(2, 3)=1.45$ ,  $p=0.36$ ; for ‘object antecedent’,  $F_1(2, 39)=0.46$ ,  $p=0.63$ ,  $F_2(2, 3)=0.97$ ,

p=0.47).

Options	Matrix subject		Object		In discourse	
	No. of answers	Percentage	No. of answers	Percentage	No. of answers	Percentage
Intermediate	21/28	75%	7/28	25%	2/28	7%
Advanced	25/28	89%	9/28	32%	1/28	4%
Control	26/28	93%	4/28	14%	0/28	0%

*Table 11 Condition 4 Null subject in adverbial adjunct, two antecedents, one in subject position, the other in indirect object position*

In this condition, the preference for an antecedent in subject position continues to be dominant for the control group (93% vs. 14% over the ‘object antecedent’,  $t_1(13)=6.27$ ,  $p<0.001$ ). The learners also have a similar preference and there is no significant difference between them concerning the acceptance of ‘matrix subject antecedent’ ( $F_1(2, 39)=1.69$ ,  $p=0.20$ ,  $F_2(2, 3)=2.16$ ,  $p=0.26$ ). Although not all of the answers are correlated to this antecedent, most participants of both learner groups prefer this interpretation: 75% for the intermediate level and 89% for the advanced level.

Options	Matrix subject		Object		In discourse	
	No. of answers	Percentage	No. of answers	Percentage	No. of answers	Percentage
Intermediate	15/28	54%	14/28	50%	5/28	18%
Advanced	19/28	68%	21/28	75%	1/28	4%
Control	4/28	14%	27/28	96%	0/28	0%

*Table 12 Sub-Condition 4 Overt pronominal subject in adverbial adjunct, two antecedents, one in subject position, the other in indirect object position*

In this condition, the control group has a dominant preference for the ‘object antecedent’ (96%) over the ‘matrix subject antecedent’ (14%) ( $t_1(13)=-8.25$ ,  $p<0.001$ ,  $t_2(1)=-23.57$ ,  $p=0.03$ ). This preference is not so clear for the Chinese learners, however, especially for the intermediate level group, which only has an acceptance percentage of 50%. Moreover, as the Chinese learners also tend to accept the antecedents in subject position for the overt subjects, there is a significant difference between them and the native speakers, concerning the acceptance percentage for ‘matrix subject antecedent’ ( $F_1(2, 39)=6.72$ ,  $p=0.003$ ,  $F_2(2, 3)=94.26$ ,  $p=0.002$ ) and ‘object antecedent’ ( $F_1(2, 39)=8.17$ ,  $p=0.001$ , not significant by items).

#### *6.4. Discussion of the results of the discourse-pragmatic conditions*

In general, it can be observed that the answers of the native speakers correspond to the

hypotheses proposed in the literature. That is, the Portuguese participants usually accept an element in the subject position (if there are two in the subject position, they will accept the one that c-commands the null subject, which is the subject of the matrix sentence) as the antecedent of the null subject in either the embedded complement clause, or the adverbial adjunct. They will also accept an element in non-subject position (or subject position in the previous sentence) as the antecedent of the overt pronoun in the embedded clauses. Only in some conditions do native speakers also accept an element in the subject position as the antecedent of an overt subject. As such, I believe that the data from this study confirm is the position argued in the literature.

As for the Chinese learners, it seems that they behave differently from the native speakers in the cases of null subjects in complement clauses. The Chinese participants, especially the intermediate level group, unlike the native speakers, tend to accept an element in non-subject position as the antecedent of the embedded null subject. However, in the cases of adverbial adjuncts, this phenomenon is no longer significant. This may mean that the Chinese learners more easily acquire the embedded null subject in the adverbial adjunct than in the complement clauses. This may result from the fact that the Chinese also do not accept the disjoint reference between the matrix subject and the null subject of the adverbial adjunct. However, as for the overt subjects, it can be found that the Chinese learners always tend to accept the element in the subject position as the antecedent of the embedded overt subject, which is different from native speakers' behavior. There are no differences between the complement clauses and the adverbial adjunct at this point. This interpretation is also in line with Chinese, which is their mother tongue.

Regarding the transition from the intermediate level to the advanced level, it is found that the learners do not show progress in all aspects. In general, they have some progress in the case of null subjects, where advanced participants have a higher acceptance percentage of the antecedent in subject position than the intermediate level and also have a lower percentage of acceptances of the antecedent in non-subject position than the latter. The behavior of the advanced learners is already similar to that of the native speakers', in some sense.

However, where the learners make less progress, or do not make any progress, is in the case of the overt pronominal subjects. According to the data, both the intermediate group and the advanced group have a relatively higher percentage than the control group on the acceptance of an element in subject position as the antecedent of an overt subject and no significant progress was found in the transition from the intermediate level to the advanced level. This may be due to the influence of their mother tongue, because in Chinese, either the element in the subject position or the element in the non-subject position can be the antecedent of the embedded overt pronoun. Nevertheless, it is still worth to be discussed in future works.

### *6.5. The individual behaviors of the participants*

Concerning the individual behaviors of the participants on the discourse-pragmatic conditions, it has been found that there are two patterns for the null subject conditions and four patterns

for the overt subject conditions.

Null subjects		Overt subjects	
Patterns	Preferences	Patterns	Preferences
Co-reference	Matrix subject antecedent	Co-reference	Matrix subject antecedent
Fluctuation	Occasionally matrix subject antecedent, occasionally non-matrix subject antecedent	Disjoint reading	Non-matrix subject antecedent
		Fluctuation	Occasionally matrix subject antecedent, occasionally non-matrix subject antecedent
		Double	Both interpretations

*Table 13 Patterns of the individual behaviors*

	Null subjects		Overt subjects			
	Co-reference	Fluctuation	Co-reference	Disjoint	Fluctuation	Double
Intermediate	4	10	2	3	9	0
Advanced	11	3	3	2	6	3
Control	14	0	0	10	4	0

*Table 14 Summary of the patterns of the individual behaviors*

In summary, it can be seen that the most common pattern in the null subject conditions for native speakers is the ‘pattern of co-reference’, while the most common pattern in the overt subject conditions is the ‘pattern of disjoint reading’. However, for the Chinese learners, not many participants have a similar behavior to that of the native speakers. In the intermediate group, there are only four people who belong to the same pattern as the native speakers in terms of the null subject conditions, and there are only three people who belong to the same pattern as the native speakers in terms of the overt subjects. In the advanced level group, there are only two people who belong to the same pattern as the native speakers in terms of overt subjects. Only under the null subject condition are there eleven people who belong to the same pattern as the native speakers. It is not difficult to observe that the individual behaviors of the Chinese learners are different from those of the native speakers, except in the null subject conditions for the advanced group. Many of the Chinese learners who do not have a similar behavior of that of the native speakers belong to the ‘fluctuation pattern’, that is they fluctuate between the two readings or accept the two readings at the same time.

Comparing the null subject and overt subject conditions, it can be seen that most of the learners (from both groups) behave in a different way from the native speakers in terms of overt subjects. But for the null subjects, many of the advanced learners already show a similar behavior from the control group. This implies that the overt subject conditions are more problematic than the null subject conditions, even though the native speakers also showed some indeterminate judgment on the overt subjects.

There is significant progress in the transition from intermediate to advanced level under the

conditions of null subjects for the L2 learners. In the advanced group, eleven of the fourteen participants already have a similar behavior to that of the native speakers. However, this progress is not observed under the conditions of overt subjects, where the advanced group has only two participants who show a similar behavior as the native speakers.

In conclusion, the individual behavior of the Chinese learners is different from that of the native speakers. Overt subject conditions are more problematic than the null subject conditions. There is progress in the transition from the intermediate level to the advanced level in terms of the null subjects, but this does not occur in the conditions of overt subjects.

### *7. Conclusion*

In general the test findings confirmed my first hypothesis. The Chinese learners were shown to be able to acquire the purely syntactic properties of the null subjects in EP, even if the acceptance percentage is not very high in all cases. They reject an analysis of the EP null subject as a variable in the island structures; they accept the strict reading and the sloppy reading for null subjects in the omitted coordinated complement clauses, even though not all of them accept both readings simultaneously, which merits further investigation; they also accept null subjects with split antecedents. In sum, these results demonstrate that Chinese learners are analyzing the null subjects of EP as *pro*.

As for my second hypothesis, regarding the discourse-pragmatic properties, the behavior of the Chinese learners diverges in terms of null and overt subjects. Unlike many studies that argue that L2 learners have few problems in the acquisition of the discourse-pragmatic properties of null subjects, this study shows that Chinese learners may also have problems in terms of the null subjects.<sup>11</sup> That is, some Chinese participants, especially from the intermediate group, tend to seek an antecedent in the non-subject position for a null subject. However, there is an improvement in the transition from the intermediate level to the advanced level in this respect, because the advanced learners barely have this reading.

However, the same does not occur in conditions concerning overt pronominal subjects. Accordingly, both the intermediate learners and the advanced learners show a strong preference for the antecedent in subject position for an overt subject, which is the marginal reading of the native speakers. This time, there is no progress concerning the rejection of the antecedent in subject position for an overt subject. Therefore, this study shows that the Chinese learners have difficulties in acquiring the discourse-pragmatic properties of the null and overt subjects in EP, residually accepting for the overt subjects an antecedent in the matrix subject position. This result favors the Interface Hypothesis.

In summary, this study makes a primary analysis of how Chinese learners acquire the null and overt subjects of EP. Future investigations should be focused on the assumptions about the residual acceptance of an antecedent in subject position for overt subjects: is there a transfer of the properties from Chinese, or is this the unmarked universal (processing) strategy to reduce ambiguity? There is also a question to be answered in future studies: why do some

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<sup>11</sup> Studies such as Montrul & Rodríguez-Louro (2006) and Rothman (2009) also argue that the discursive difficulties may affect the use and interpretation of null subjects.

native speakers of EP not accept both the sloppy and strict readings in the ellipsis constructions? Finally, another factor that should be taken into consideration is the size of the tasks. As in this study, every condition only contains two items, which causes some results to be significant only by subjects, but not by items. As such, future studies should enlarge the tasks' size to test if the results are also significant by items.

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