Hiatus in Argentinian Spanish

Gustavo Beritognolo

In this paper, I deal with the syllabification of an unstressed high vowel (H) followed by a vowel (V) in a CHV context. Unstressed H is expected to surface as a glide. However, in some cases it is a full vowel: word-initially and with stress on V or one syllable at the right of the word-initial sequence; at the boundary between two stems in compounds when stress is on V. I propose that hiatus in these environments is a means of providing a perceptual cue for edges and boundaries of words.

1. Introduction

This paper examines the syllabification of high vocoids (H) followed by other vocoids (V). The general tendency for high vocoids in this configuration in Spanish is to surface as glides (in the same syllable as V) if unstressed (e.g. [far.má.sja] 'pharmacy') and as a vowel (in its own syllable) if stressed (e.g. [ma.rí.a] 'Mary'). However in certain contexts H is realized as a vowel even if it is not stressed. Most studies of hiatus in Spanish have concentrated in Peninsular Spanish (PS), (e.g. Hualde 1997, 1999, 2005; Aguilar 1999; Colina 1999; Face & Alvord 2004; Simonet 2006; Cabré & Prieto 2006). The present study aims to provide a broad description of the distribution of and account for hiatus in my dialect of Argentinian Spanish (AS). The contribution of this paper is twofold: (i) it expands the description of the dialectal distribution of hiatus; (ii) it provides an analysis which is more adequate than previous studies in both its formalisation and its ability to account for unsatisfactorily explained data. It is important to note that, as in other dialects, hiatus in AS is a tendency that in some speakers is disappearing at least in some contexts. I will deal with the cases where hiatus is observed and leave dialectal variation for future research.

The paper is organized as follows. In section 2, I present the data, which are divided into the different contexts where hiatus appears. In section 3, I state my assumptions concerning the syllabification of HV. Section 4 reviews other approaches to this phenomenon. In section 5, I offer my own analysis within the framework of Optimality Theory (OT) (Prince & Smolensky 1993; McCarthy & Prince 1995). I contend that hiatus is triggered for perceptual reasons. I specifically propose that hiatus is a means of providing a perceptual cue for edges and boundaries of words. Finally, I conclude in section 6.

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2. Gliding/hiatus contexts

This section describes the environments that favour or disfavour the appearance of hiatus. I provide data already described for PS and also observed in AS. I will restrict my data to configurations of the type C(onsonant)H(igh)V(owel).[1] The main factors relevant for hiatus are: (a) the position of the sequence HV in the word (initial *vs*. medial and final) and (b) the presence of HV at word boundaries, where H belongs to the right edge of a constituent and V to the left edge of the following constituent. Note that the factors just mentioned are necessary but not sufficient conditions for the appearance of hiatus. Stress is also important: its presence on the second vowel of the sequence or near the sequence is crucial for favouring hiatus. Thus, not only are the position in the word and, in some cases, the consonant preceding H but also the distance that separates the sequence from the stressed syllable determinants for hiatus.[2]

2.1 Word position

In this section, I show the positions within roots where hiatus can appear.

2.1.1 Word initiality

Hiatus is favoured word-initially.[3] When the sequence is located word-initially and stressed falls on V, hiatus appears:

(1)	[di.á.blo]	'devil'	[fi.ám.bre]	'cold meat'
	[si.á.ti.ka]	'sciatica'	[di.ó.do]	'diode'
	[mi.ó.pe]	'myopic'	[bi.ó.lo.go]	'biologist'
	[su.ám.po]	'swamp'	[bu.í.do]	'pointed'[4,5]

[1] When the high vocoid is at the absolute beginning of a word or is preceded (and followed) by another vocoid (VHV), it always surfaces as a glide and even consonantalises (e.g. /koiote/ [ko.ʒó.te] 'coyote' (see Harris & Kaisse (1999) for discussion)

[2] I provide the examples transcribed in IPA. Syllables are separated with dots and stress is marked with an acute accent, whether it is written in the orthography or not.

[3] i.e. immediately after the word-initial consonant.

[4] Some exceptions include [pjá.no] 'piano', [bján.da] 'food', [pjó. xo] 'louse', [fjór.do] 'fiord', [bjú.da] 'widow', [bwí.tre] 'vulture', [swí.sa] 'Switzerland'. The HV sequence is also tautosyllabic when H is *u* and the preceding consonant is *k* or *g* (e.g. [kwá.dro] 'picture', [gwár.dia] 'guard').

[5] The sequences *ie* and *ue* have been noted to be peculiar in Spanish (see Hualde 1997, 2005; Cabré & Prieto 2006). They display two different patterns: a. the so-called historical diphthongs, which developed from stressed Vulgar Latin mid-low vowels [ɛ, ɔ] (*ferrum* > *hierro* 'iron', *ovu* > *huevo* 'egg'), alternate with [e] and [o]. [je] and [we] appear when stressed, a monopthong surfaces when stress is not present on the sequence:

(i) [djén.te /den.tál] 'tooth'/ 'dental' [dwé.lo /do.lór] 'mourning'/'pain'

The historical sequences *ie* and *ue* have been claimed to be always pronounced as diphthongs in PS (Hualde 1997, 2005; Cabré & Prieto 2006), independently of the fact that they meet the condition for hiatus, i.e. whether the sequence is word-initial and the second vocoid of the sequence is stressed.

b. sequences *ie* and *ue* not derived from the historical diphthongs (and non alternating). Some words containing these non-historical sequences are pronounced with a diphthong (iia) and some with a hiatus (iib):

(ii) a. [sjén.sja] 'science' [swé.ter] 'sweater'
b. [du.é.to] 'duet' [bi.é.la] 'connecting rod'

When HV is word-initial and stress is placed only one syllable to the right of the sequence, hiatus also surfaces:

(2) [si.a.nú.ro] 'cyanide' [di.a.frág.ma] 'diaphragm',
[mi.o.kár.dio] 'myocardium' [di.u.ré.ti.ko] 'diuretic'
[di.ok.sí.na] 'dioxin' [bu.ar.dí.ʒa] 'loft'[6]

However, if stress falls two or more syllables to the right of HV, then gliding is favoured:

(3) [sja.nu.rá.to] 'cyanide' [dja.go.nál] 'diagonal',
[fjo.ri.tú.ra] 'fioritura' [dwa.li.dád] 'duality'

2.1.2 Word medial or final position

In cases where the HV sequence is stressed but located in a position other than the initial one, gliding is generally preferred, both in medial (4a) and final (4b) position:

(4) a. [ta.tjá.na] (proper name) [pi.twí.ta] 'flegm'
b. [ru.fján] 'scoundrel' [kam.pjón] 'champion'

The sequence is also tautosyllabic when it is non-initial and unstressed, whether followed by stress (5a) or preceded by it (5b):

(5) a. [me.dja.sjón] 'mediation' [a.bjo.né.ta] 'light aircraft'
[si.twa.sjón] 'situation'
b. [pa.ró.dja] 'parody' [má.fja] 'mafia'
[pré.djo] 'place' [kon.tí.nwa] 'continuous'

Table 1 summarizes the contexts of appearance of hiatus just described:

Stress	Initial Position	Non-Initial Position
On HV sequence	CV.V′CV(...)	CV.CGV′(…)
Immediately following HV	CV.V.CV′(...)	CV.CGV.CV′(…)
Following HV further away	CGV.CV.CV′(...)	CV.CGV.CV.CV'(…)
Preceding HV sequence	---	(…).CV′.CGV

Table 1
(C= consonant; V= full vowel; G= glide)

Cabré & Prieto (2006) suggest that examples in (iia) might be pronounced with a diphthong by analogy with words like those in (i), hence the presence of diphthongs even in word-initial position (cf. (1) and (2)). In AS *ie* and *ue* seem to display the same behaviour with respect to hiatus. I leave this peculiarity of these sequences for future research.

[6] Except [sju.dád] 'city'.

The word-initial effect has also been attested in PS. Hualde (1997, 2005) and Cabré & Prieto (2006) mention that in PS hiatus also arises in the contexts illustrated (1) and (2) but not in examples like those in (3) and (4).

2.2 Complex words

In many languages, complex words formed with two roots and those formed with a root and suffixes have been observed not to behave alike with respect to phonological processes (see e.g. Peperkamp 1997). This distinction is also visible in AS with respect to hiatus.

At the boundary between two words (6a) or a bound non-native root[7] and a word (6b), hiatus is preferred if stress falls on V; if the sequence is not stressed then gliding takes place (6c-d):

(6)	a.	/bok-i-antʃo/ mouth-*i*-wide	[bo.ki.án.tʃo]	'wide-mouthed'
		/barb-i-etʃo/ beard-*i*-done	[bar.bi.é.tʃo]	'clean shaved'
	b.	/anti-asido/ anti-acid	[an.ti.á.si.do]	'antiacid'
		/multi-uso/ multi-use	[mul.ti.ú.so]	'multi-purpose'
	c.	/bok-i-abierto/ mouth-*i*-open	[bo.kja.bjér.to]	'surprised'
		/barb-i-espeso/ beard-*i*-thick	[bar.bjes.pe.so]	'thick-bearded'
	d.	/anti-aereo/ anti-aerial	[an.tja.é.re.o]	'anti-aircraft'
		/pluri-empleado/ several-employer	[plu.rjem.ple.á.do]	'person that holds more than one job'

As indicated, the high vowel forms a syllable with the last consonant of the first component while the second vowel of the HV sequence belongs to the second root.[8] The high vocoid in

[7] It seems that there is no consensus with respect to the morphological status of morphemes like *anti-*, *semi-*, etc. Some linguists consider them non-native roots while others classify them as prefixes. I take stance for the first position (cf. Varela & García 1999). The main arguments are (i) they can be conjoined (e.g. *pro y antiaborto* 'pro and anti-abortion', *pluri y unicelular* 'pluri and unicellular') like native compounds (e.g. *boqui y cariancho* 'wide-mouthed and 'broad-faced', and unlike prefixes (e.g. *des y reunir 'disjoin and rejoin'); (ii) they can be equated with prepositions and quantifiers: they cannot combine with suffixes, like prepositions and quantifiers (e.g. **anti-ción*, **contra-ción* 'against-tion', **multi-dad*, **mucho-dad* 'many-ity', and they can form syntactic relations with the other member of the compound in a similar way as in phrases (*multiuso*/*muchos usos* 'multi-purpose/several purposes' quantifier+complement) (see also Moyna 2000).

[8] The compounds in (6a) and (6c) are a combination of a noun plus an adjective (see section 5.2.2). They are relatively productive and many of them have a compositional meaning. There is another type of compounds formed with a linking H. These are a concatenation of two nouns and those whose second member is vowel-initial are pronounced with a diphthong. They are almost unproductive and for most of them their meaning is not compositional (e.g. *maniobra* 'manoeuvre' (literally *mano* 'hand' and *obra* 'work'). They are analysed as a single word (see Val Álavaro 1999) and therefore subject the same restrictions as examples in (4a).

(6a) and (6c) is a linking H which replaces the final vocalic desinence of the first member (cf. [boka] 'mouth').

As for suffixes, the HV sequence forms a diphthong even though V is stressed:

(7)	/konfi-able/	[kon.fjá.ble]	'trustful,	/xesu-ita/	[xe.swí.ta]	'Jesuit'
	/xeni-al/	[xe.njál]	'great',	/iubi-oso/	[ʒu.bjó.so]	'rainy'
	/mafi-oso/	[ma.fjó.so]	'Mafioso'	/odi-oso/	[o.djó.so]	'hateful'

The examples show that stress on V is not enough of a factor for the occurrence of hiatus in a root-suffix boundary. That is to say, unlike compounds, even though stress falls at the root-suffix boundary, H, which belongs to the base and V, which belongs to the suffix, are tautosyllabic.

In conclusion, whereas morphological boundaries of compounds produce some effects in the choice of hiatus or gliding, i.e. they favour glide formation only when V is not stressed, they have no influence on suffixed words, i.e. HV in suffixed forms behaves just as in roots. In Section 5.2.2, it will be seen that the difference in behaviour between compounds and suffixed forms on the other is due to a difference in prosodic structure.

Stress	Compound boundary	Suffix-stem boundary
Stress on V	CV.CV.V′CV(…)	CV.CGV′.CV(…)
Immediately following HV	CV.CGV.CV′(…)	CV.CGV.CV′(…)
Following HV further away	CV.CGV.CV.CV′(…)	----

Table 2

The behaviour of compounds in PS is identical to that in AS. That is, hiatus obtains only when V is stressed. As for suffixes the two dialects differ. According to Hualde (1999, 2005) and Cabré & Prieto (2006), suffixed forms do not behave uniformly with respect to a HV cluster. Words having a root ending in [u] and a suffix starting with a stress V trigger hiatus (e.g. /actu-al/ [ak.tu.ál] 'present'), while this effect is not observed if the base ends in [i] (e.g. /labi-al/ [la.bjál] 'labial').

3. Syllabification of glides

As mentioned in the introduction, when an unstressed high vocoid is followed by another vocoid, it is expected to surface as a glide. However in very specific contexts, unstressed H is realized as a vowel.[9] Before giving an account of this apparent particularity, I state my assumptions about the structural difference between a H syllabified as a glide or as a vowel.

[9] The concatenation of /u/ and /o/ constitutes an additional context where H and V are heterosyllabic. The cluster always surface as hiatus in AS with no concern of its position in the word, the placement of stress and the content of the relevant onset:

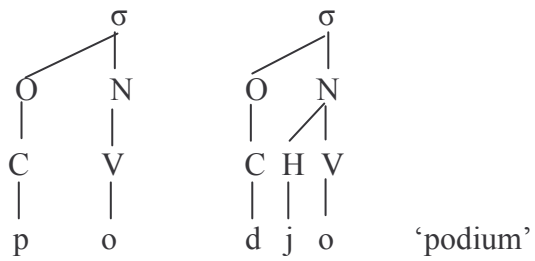
(i) a. du.o.dé.no 'duodenum'
b. du.o.de.ní.to 'little duodenum'
c. su.pér.flu.o 'superfluous'
d. ár.du.o 'arduous'

Carreira (1991) claims that Spanish displays a ban on tautomorphemic *uo* sequences, contrary to facts (c.f. ia, b). In PS, the sequence seems to surface tautosyllabic in all contexts. I leave this issue to future research.

It has been recognized for a long time that there are no featural differences between glides and vowels (see e.g. Roca 1997). The corresponding surface effect (i.e. a high vocoid either as a glide or as a full vowel) stems from the mechanics of syllabification, thanks to which glides and vowels have distinct syllabic affiliation. Vowels are syllabic peaks whereas glides are non-peaks. If a vocoid is a syllabic peak, it heads the syllable, and if it is non-peak, it is dependent of some head. In a CHV configuration two possibilities are offered to non-peak vocoids: either to attach to the onset headed by the preceding consonant or to the nucleus headed by the following vowel. Following Rosenthall (1994), Roca (1997) and Harris (2000), among others, I propose that Spanish prevocalic H in a CHV configuration is syllabified in the nucleus, not in the onset (contra Cabré & Prieto 2006, see below).

The structure of tautosyllabic CHV can be represented as in (8):

(8)



The combination of a high vocoid and another vocoid in the same syllabic constituent, i.e. the nucleus, results in a rising diphthong. V is the nuclear head and the syllabic peak, and H is the dependant and a non-peak.

4. Previous analyses

This section examines previous phonological analyses applied to hiatus in PS and highlights some drawbacks at least for AS and some advantages.

4.1 Morphological relations and lexically-specified syllabification

Hualde (1997) examines his own dialect of Peninsular Spanish (PS). He observes that the HV sequence surfaces as hiatus word-initially, in prefixed and suffixed words, and in compounds. The occurrence of hiatus with unstressed H is treated by Hualde (1997) from a point of view of markedness. He seems to relate markedness to the notion of rare frequency of occurrence. He contends that diphthongisation is a much more frequent configuration than hiatus. Thus Spanish has a rule of glide formation for unstressed high vocoids appearing in a position adjacent to another vocoid. This rule has morphological and idiosyncratic exceptions. According to him, morphological exceptions are explained by appealing to related forms (e.g. /bi-able/ [bi.á.ble] 'viable' cf. [bí.a] 'way'), and morphological boundaries (e.g. /bi-enio/ [bi.é.njo] 'bienium'; /santu-ario/ [san.tu.á.rjo] 'sanctuary', /birtu-oso/ [bir.tu.ó.so] 'virtuous'). Idiosyncratic exceptions block gliding because they have a lexically-specified syllabification: the high vocoid is underlyingly marked as nuclear (e.g. /di.ablo/).

Hualde admits that this configuration is not randomly distributed in the lexicon: morphological and phonological factors favour the presence of hiatus. However, his analysis

remains at the descriptive level, that is to say, he does not attempt to explain why morphologically derived words and morphologically related words surface with hiatus instead of a diphthong. Moreover, his description of the phenomenon is not complete. For instance, he does not take into account the influence of stress: as observed in section (2) when stress is not on V or on the syllable right next to the HV sequence, then diphthongisation is favoured, even in PS (cf. Cabré & Prieto 2006; Pensado 1999). As for non-morphologically motivated hiatus, lexically-specified syllabification is not an adequate account. Special lexical marking devices are used for unpredictable exceptions. But hiatus occurring e.g. word-initially does not seem just a merely exceptional phenomenon.

4.2 Identity and correspondence

Taking some data from the PS dialect studied by Hualde (1992), Colina (1999) provides an OT account in terms of identity (McCarthy & Prince 1995; Kenstowicz 1995) and correspondence (McCarthy & Prince 1995; Benua 1995). She focuses on the same type of items as Hualde (1997): compounds (e.g. /anti-asido/ [an.ti.á.si.do] 'antiacid') and suffixed forms (/manu-al/ [ma.nu.ál] 'manual'), derived words morphologically related to words with a high stressed vowel (/piad-oso/ [pi.a.dó.so] ~ [pí.o] 'merciful ~ devout') and underived words (especially those with word-initial HV) ([di.á.blo] 'devil', [e.du.ár.do] 'Edward'). For compounds and suffixed words, her proposal, based mainly on Kenstowicz' (1995) Uniform Exponence, consists of an output-output identity constraint (IDENT Base-Root/Affixed form (σ))[10] requiring that segments keep the same syllabic role in corresponding forms. In this case, a vocoid parsed in the nucleus in one correspondent must fill the same position in the other. This constraint is ranked higher than ONSET, the restriction against onsetless syllables (the square brackets indicate the base, i.e. the form to which the output is compared):

(9)

/manu-al/ [mano]	IDENT B-R/A (σ)	ONSET
a. ☞ ma.nu.ál		*
b. ma.nwál	*!	

Candidate (b) loses because it violates the identity constraint: the last vocoid of the base occupies the nucleus position, but in the derived form it is a satellite, i.e. a glide, so it does not have the same syllabic role in both correspondents. In contrast, candidate (a) is the winner since the segment [u] heads its own syllable both in the base, where in isolation it surfaces as [o], and in the derived word.

This analysis might succeed in accounting for some compounds and some suffixed forms in PS. But it is not sufficient. As already mentioned, in a compound, when stress does not fall on V of the HV sequence, diphthongisation is favoured. Colina's analysis cannot capture the difference in syllabification between forms like [an.ti.á.si.do] 'anti-acid' [an.tja.é.re.o] 'anti-aircraft'. It predicts that both words should surface with hiatus or a diphthong, depending on the syllabic role of H in the base:

[10] Colina (1999) does not identify the members that enter into the identity relation. I use the terms "base", "root" and "affixed form" for derived forms as well as for non-morphologically related forms for the sake of exposition.

/anti-/ [an.ti.mi.síl ‘antimissile’, an.ti.so.sjál ‘antisocial’] (nuclear H)

(10)

/anti-asido/	IDENT B-R/A (σ)	ONSET
a. ☞ an.ti.á.si.do		*
b. an.tjá.si.do	*!	

IDENT B-R/A (σ) evaluates the identity of the syllabic role that segments have in all the realizations of a morpheme. That is to say, the constraint is complied with if segments keep the same syllabic role in all the realizations of a morpheme. In tableau (10) the ranking correctly selects candidate (a): this candidate satisfies the dominant identity constraint, because the root high vowel [i] in [an.ti.á.si.do] has the same syllabic role, i.e. nucleus, as in the other prefixed forms. Candidate (b) loses since in [an.tjá.si.do] the high vocoid surfaces as a syllabic satellite, not as a nucleus.

/anti-/ [an.ti.mi.síl ‘antimissile’, an.ti.so.sjál ‘antisocial’] (nuclear H)

(11)

/anti-aereo/	IDENT B-R/A (σ)	ONSET
a. ☞ an.ti.a.é.re.o		*
b. ☹ an.tja.é.re.o	*!	

According to this ranking, H in the first root is predicted to have the same syllabic role in all its realizations, in this case, the syllabic nucleus and so in tableau (11) candidate (a) is chosen. However the actual candidate is (b).

Hiatus in underived words is also analysed by Colina (1999) with a correspondence-based analysis. According to Hualde (1997, 1999, 2005), hiatus particularly in this set of data undergoes variation in PS: the sequence HV (e.g. word-initially) is syllabified with hiatus in some words and with a diphthong in other words (e.g. [swá.be] ‘soft’). Colina (1999) attempts to explain this variation and its greater incidence in underived words. She proposes that underived words with hiatus establish a correspondence with other words where H is nuclear, just as in the case of morphologically related words. The difference between the set of morphologically related words and underived words resides in the type of correspondence between the items. According to Colina (1999), underived words can establish correspondence relations with some related or unrelated form (affix, word, etc). She gives the word *biólogo* ‘biologist’ as an example. She affirms that this word is syllabified as [bi.ó.lo.go], with a hiatus, because the sequence /bi/ is in correspondence with the form [bi] “possibly analogically with the suffix *bi-* ‘two’ like in /bi-polar/ [bi.po.lár] ‘bipolar’” (Colina 1999: 129). IDENT B-R/A (σ) requires that H realized as a syllabic nucleus in the prefix [bi] be also a nucleus in *biólogo*. Thus underived words can have idiosyncratic correspondents. She claims that this idiosyncratic nature of correspondence results in (i) the variation in the setting up of correspondence relations, i.e. the fact that different speakers create correspondences with different set of words, and (ii) the difficulty in the identification of the correspondence relations, which, according to Colina (1999) explains the greater incidence of variability in the set of underived words with respect to hiatus. She concludes that for underived forms, the syllabification of the HV in the relevant contexts as a diphthong indicates no correspondence relation. IDENT B-R/A (σ) is not applicable and in order to satisfy ONSET, the form with the glide is selected. The presence of hiatus reveals a correspondence relation between a derived form with the HV sequence and some (un)related

form with nuclear H. IDENT B-R/A (σ) is relevant and its ranking over ONSET results in hiatus.

This part of the analysis is also inadequate. The postulation of idiosyncratic correspondence can lend itself to very arbitrary and far-fetched relations between correspondents, as in the case of *biólogo* and the prefix *bi-*. Output-output correspondences are usually set up with forms that are morphologically linked. This type of link can provide some principled motivation for a phonological correspondence. But with the case that I am reporting, no such link is possible. Besides, identification of correspondence relations between underived forms and unrelated forms is difficult just because there might be no relation whatsoever. From a theoretical point of view, Colina seems to misuse Kentowicz' (1995) Uniform Exponence, since she employs it in order to explain apparent relations between elements that are neither part of the same paradigm nor morphologically related. From an empirical point of view, her account is not applicable at least in AS. First, cases like [sja.nu.rá.to] 'cyanide', where stress is far removed from the HV sequence and which is related to a form with hiatus, [si.a.nú.ro] 'cyanide', are not explained. Second, although Colina (1999) mentions that hiatus in underived words is mainly observed word-initially, the identity constraint makes no reference to specific positions in the word and the stress factor. This implies that an idiosyncratic correspondence relation could be established between a word with the HV sequence and other form with a nuclear H both in any position and independently of the influence of stress.

4.3 Positional segmental faithfulness

In their study, Cabré & Prieto (2006) aim to explain the behaviour of HV in a conservative variety of PS, for which they also provide an OT account. They examine the HV sequence in initial position, with observations similar to the ones described in section (2.1), and in morpheme boundaries.

For their analysis, Cabré & Prieto (2006) assume that glides in sequences of rising sonority that do not derive from the historical diphthongs, i.e. *ia*, *io*, *iu*, *ua*, *ui*, *uo*, are underlying vowels, not underlying glides. They also adopt the view, contrary to standard assumptions (see e.g. Hualde 1991, 1997, Harris 2000), that these glides, except the historical ones, are positioned in the onset. Thus in words like [kamjón] 'truck' the nasal and the glide form a complex onset.

For their account for the presence of diphthongs, Cabré & Prieto (2006) employ a constraint prohibiting the attachment of a high vowel to one of the syllabic margins, in this case the onset, $*M/V_{[+high]}$. This constraint is dominated by ONSET:

(12)

/kamion/ 'truck'	ONSET	$*M/V_{[+high]}$
a. ka.mi.ón	*!	
b. ☞ ka.mjón		*

For the word-initial factor, Cabré & Prieto (2006) claim that hiatus occurrence is due to greater phonological salience typical of word-initial position. The idea is that the beginning of words is usually a psycholinguistically prioritized or perceptually prominent position (Beckman 1997). This observation is captured through a faithfulness constraint (MAX_{INIT-V})

which requires that every word-initial vowel in the input have an output correspondent. This constraint competes with ONSET:

(13)

/diana/ 'Diana'	MAX $_{\text{INIT-V}}$	ONSET	*M/V$_{[+high]}$
a. ☞ di.á.na		*	
b. djá.na	*!		*

MAX $_{\text{INIT-V}}$ guarantees the surfacing of H as a full vowel and so the tendency to pronounce hiatus in word-initial position is accounted for, according to Cabré & Prieto (2006).

Cabré & Prieto (2006) claim that the lack of preference for hiatus when stress is far away from the word-initial HV sequence is due to a propensity to reduce the number of successive unstressed syllables. This prosodic tendency disfavours a succession of more than two unstressed syllables. They express this effect with the constraint *LAPSE. This constraint is ranked above MAX $_{\text{INIT-V}}$:

(14)

/sianurato/	*LAPSE	MAX $_{\text{INIT-V}}$	ONSET	*M/V$_{[+high]}$
a. ☞ sja.nu.rá.to		*		*
b. si.a.nu.rá.to	*!		*	

The ranking in (14) indicates that it is preferable for a word to have no more than two unstressed syllables preceding the tonic syllable. Candidate (a) has two pretonic syllables whereas candidate (b) has three. That is why candidate (a) is selected.

As for derived words, recall that in PS if a stem ends in *u* and V is stressed then the vowels surface in hiatus (e.g. /birtu-al/ [bir.tu.ál] 'virtual'), unlike those stems ending in *i* (e.g. /labi-al/ [la.bjál] 'labial'). Cabré & Prieto (2006) do not provide any analysis. They just mention that /u/ is less prone to gliding, for which they just offer an imprecise comment. According to them, the resistance of /u/ to gliding is due to a segmental requirement imposed by a "minor faithfulness constraint [that] applies to very few cases, [given] that the amount of roots ending in /u/ is lower than [the number of roots] ending in /i/" (Cabré & Prieto 2006: 24). Compounds are also not analysed. An account for hiatus in these forms is not even attempted.

While the resort to the notion of perceptual prominence and salience of the word-initial syllable is appealing, I think that Cabré & Prieto (2006) do not succeed in explicating the phenomenon under investigation in an adequate manner from a theoretical point of view. The usage of a faithfulness constraint as MAX $_{\text{INIT-V}}$ is not appropriate mainly for two reasons. First, faithfulness constraints are normally employed to account for deletion. That is, a high ranked MAX $_{\text{INIT-V}}$ constraint prohibits the absence of an input segment in the output. But in the case at hand an input initial vocoid is not removed from the output. So in a candidate like (13b) there is no faithfulness violation. As a consequence, a MAX constraint cannot be used to prevent a high vocoid from appearing as a glide, instead of as a full vowel. Second, this MAX constraint is especially problematic with respect to Richness of the Base (ROB). ROB determines that there are no constraints on inputs. Since there is no underlying contrast between glides and high vowels, either type of segment can be in the input. So if both the input and the output have a vowel, then the constraint is satisfied; with a vowel in the input and a glide in the output the constraint is violated, as in (13). If the input has a glide and the output either a glide or a vowel, the constraint is also respected. So the constraint cannot exclude a form like [djá.blo] when a glide is in the input. We can see that the constraint

produces the correct results in three cases, but one case renders it useless. Consequently a different type of constraint is needed. Likewise, the prohibition of lapses is not well-implemented. I will provide a more precise version.

5. Analysis

In this section, I provide an account that overcomes all the difficulties stated above. I propose that hiatus arises because of perceptual reasons. A HV cluster is heterosyllabic in word initial position and complex words so as to cue the beginning of words and thus facilitate the perception of word edges.

5.1 Diphthongisation

In section 3.1 I mentioned that the difference between a glide and a full vowel resides in their syllabic affiliation. Vowels are syllabic peaks while glides are non-peaks. Gliding occurs in order to satisfy ONSET, one of several constraints expressing a preference for CV syllables. ONSET interacts with a MAX and a DEP constraint, which prohibit deletion and epenthesis respectively. The association of vocoids and syllabic nuclei is also controlled by the intervention of constraints. Based on Bakovic (2006), I propose that the link between syllabic nuclei and vocoids is established by ONE-TO-ONE:

(15) ONE-TO-ONE: every nucleus must dominate one and only one vocoid and every vocoid must be dominated by only and only one nucleus.

The constraint in (15) prohibits the dominance of more than two vocoids by the same syllabic nucleus.

From the previous tableaux, it can be seen that vocalic segments in clusters are never deleted in order to satisfy ONSET. This means that both faithfulness constraints dominate the markedness constraint. Moreover, since an unstressed high vocoid can precede another vocoid within the same syllable but at the expense of surfacing without its own nucleus, the high vocoid must be syllabified under the nucleus dominating the second vowel. The HV string forms a diphthong. Thus the requirement of a bijective relation between syllabic nuclei and vocoids is overridden. This is indicated with a low ranking of ONE-TO-ONE:[11,12]

(16)

/farmasIa/	DEP-IO	MAX-IO	ONSET	ONE-TO-ONE
a. far.má.si.a			*!	
b. far.má.si.Ca	*!			
c. far.má.sa		*!		
d. ☞ far.má.sja				*

[11] A capital I or U in the input indicates a high vocoid.

[12] A candidate like [far.má.sia] with two tautosyllabic vowels is excluded since all vowels are peaks and all peaks project their own syllable. Therefore two abutting vowels are never prosodised within the same syllable.

One of the faithful outputs, candidate (a), is excluded because it violates ONSET. The second and third are not faithful to the input; therefore they are not chosen either. Only candidate (d) can win because it complies with the dominant constraints although it violates the requirement on the link between vocoids and syllabic nuclei.

I mentioned in the introduction that high vocoids followed by vowels in Spanish surface as glides (in the same syllable as V) if unstressed and as a vowel (in its own syllable) if stressed. The ranking in (16) predicts that high vocoids in this configuration will always be syllabified as diphthongs, since it is not stressed. However, in section 2, it was seen that in certain contexts hiatus formed by HV sequences arises, even if H is unstressed. In the subsequent sections I will provide a formalisation of the circumstances under which this configuration occurs in AS.

5.2 Word boundary cues

5.2.1 Hiatus at the left edge

It has been suggested (e.g. Beckman 1997; Casali 1996; Smith 2002) that word initiality is a psycholinguistically important position. Its importance resides in its role in speech processing, lexical storage, and retrieval. Smith (2002) specifically argues that the word initial position is relevant for word recognition. That is, the word-initial position helps "the match[ing of] an acoustic signal with lexical entries so that the words in the utterance can be identified" (Smith 2002:254). For word recognition to take place, the speech stream must be segmented and the edges of words be demarcated. Demarcation of edges has been observed to be facilitated by the usage of several phonetic and phonological cues. For the left edges of words, i.e. word initial position, Pierrehumbert & Talkin (1992) state that some English left-edge consonants are strengthened, i.e. articulated with a tighter constriction. It was also discovered that left-edge consonants enjoy a reduced amount of overlap with a preceding segment across boundaries (see Côté 2000). Smith (2002) observed that in several languages (e.g. the Northern dialect of Arapaho (Algonquian), Guhang Ifugao), require the presence of consonants in the onset position of initial syllables while they tolerate onsetless syllables medially, that is, no word starts with a vowel in these languages. Other languages (e.g. Mongolian) allow only non-sonorant consonants in word initial position, i.e. liquids and glides are banned in this position. Casali (1996) also reports the special behaviour of word initial position in some African languages. For instance, Nawuri has a process in which front vocoids centralize interconsonantally. The process applies to word-final vowels when followed by a word-initial consonant, but it never affects word-initial vocoids which follow a word-final consonant. Côté (2000) and Smith (2002) conclude that all these devices contribute to an effective localisation of word boundaries and word recognition.

The facts mentioned in the previous paragraph indicate that the left edge of words benefit from a special status which renders it different from other positions. This status was acquired by virtue of phonetic and phonological cues. We observed that hiatus is favoured word-initially but not word-medially or finally. A HV cluster can occur in any position. At the left edge of words it syllabifies heterosyllabically whereas in other positions it is tautosyllabic. I suggest that hiatus arises word-initially so as to provide a cue for the left edge of words. That is, a syllabification of a vocalic cluster which is different in word-initial position from its

syllabification in other positions is a good indication of the point where a new word starts in the speech stream. Consider the samples of speech from AS in (17):

(17) a. [far.má.sja.núro] *Farmacia Nuro* '(proper name) pharmacy'
b. [to.ma.si.a.nú.ro] *toma cianuro* 'he takes cyanide'

Both chunks contain the same segments, including a HV sequence, except for the first syllable. In (17a) the sequence is prosodised in one syllable whereas in (17b) it surfaces in two syllables. Hiatus in (17b) indicates that the second word starts with the syllable *si*, and so the first word ends in *ma*. In (17a) the diphthong is a sign that the stream cannot be separated before *sja*, but it can be divided after it. Thus I propose that hiatus at the word-left edge facilitates speech segmentation and consequently word recognition.

5.2.1.1 Positional markedness

I turn now to formalize the perceptual argument for word-initial hiatus using positional markedness. The preceding discussion indicates that hiatus formed by a HV string is restricted to a specific position. In OT terms, hiatus is the result of the intervention of constraints that target this position. Based on Smith (2002), I suggest that the obtention of word-initial hiatus can be encapsulated with the use of a markedness constraint that is relativized to this position.

Note that perceptibility motivates position-specific constraints but the constraints themselves are not defined in perceptual terms, but in phonological terms. That is to say, although the constraints responsible for hiatus are phonetically grounded, they are formalized with phonological elements (cf. Beckman 1997 and Smith 2002).

We saw in section 5.1 that gliding is the result of the association of two vocoids to one nucleus. But in the context of initial hiatus, both H and V are realized as vowels. This indicates that each vocoid is linked to a syllabic nucleus on its own in the output. I suggest that this one-to-one relation in word initial position is due to the following positional markedness constraint:

(18) ONE-TO-ONE$_{\text{(PWD-LEFTMOST)}}$: every Pwd-leftmost nucleus must dominate one and only one vocoid.

The data in (2.1.1) shows that the leftmost vocoid surfaces as a vowel, as it is associated with its own nucleus. The resulting prosodisation of HV is heterosyllabification, i.e. the vocoids have their own syllables. Since the syllable hosting the second vowel is onsetless, the positional constraint must dominate the constraint against empty onsets:

(19)

/dIablo/	1-TO-1$_{\text{(PWD-LEFTMOST)}}$	ONSET	ONE-TO-ONE
a. ☞ di.á.blo		*	
b. djá.blo	*!		*

Candidate (19b) is excluded because it does not honour the restriction that determines the one-to-one relation between the initial nucleus and the initial vocoid. Candidate (19a) violates the constraint against onsetless syllables, but it is chosen because it complies with positional markedness restriction.

Hiatus in word-initial position and stress placed one syllable to the right of the HV also reflects the relative strength of ONE-TO-ONE$_{(\text{PWD-LEFTMOST})}$:

(20)

/sIanuro /	1-TO-1$_{(\text{PWD-LEFTMOST})}$	ONSET	ONE-TO-ONE
a. ☞ si.a.nú.ro		*	
c. sja.nú.ro	*!		*

Candidate (20b) is ruled out and candidate (20a) is grammatical for the same reasons invoked for (19a).

We have observed in examples like the ones in (4) repeated here in (21) that the preference for hiatus disappears:

(21) [sja.nu.rá.to] 'cyanide' [dja.go.nál] 'diagonal'
[fjo.ri.tú.ra] 'fioritura' [dwa.li.dád] 'duality'

It happens that the effects of the positional constraint diminish when stress is not located on the second vowel of the sequence or one syllable to its right. Cabré & Prieto (2006) argue that this is due to the tendency to reduce the length of the pretonic sequence when the distance between the initial syllable and the stressed syllable increases. They consider this propensity as an effect of reducing the number of successive unstressed syllables. As mentioned in section 4.3, they express this effect with an anti-lapse constraint. I accept their explanation as correct. However, I provide a more precise implementation, which makes the difference between a lapse of two syllables and a lapse of more than two.

The intervention of an anti-lapse constraint can also be attributed to perception. I stated that the word-initial syllable is a perceptually relevant position. The stressed syllable is also phonetically important. It seems that shortening the distance between the left edge of the word and the left edge of the foot is beneficial for the perception of words. In the cases at hand this shortening is achieved by reducing the number of consecutive unstressed syllables. Thus, in a word like *fioritura* 'fioritura', having two pretonic syllables is more optimal than having three in terms of perceptibility on the stress dimension.

I base my analysis on Gordon (2002). He adopts a grid-based representation of stress, which determines that the level of stress associated with a syllable is a function of the number of levels of grids marks above a given syllable. Thus, an unstressed syllable has one grid mark, a secondary stressed syllable has two and a primary stressed syllable has three marks above it (adapted from Gordon 2002):

(22)

	[σσσσ]
Primary stress	x
Secondary stress	x x
Syllable	xxxx
	σσσσ

A lapse is a sequence of unstressed syllables, i.e. a string of syllables that have only one grid mark. Gordon proposes two types of constraints that prohibit lapses: *LAPSE and *EXTENDED LAPSE. The former bans sequences of more than one unstressed syllables, whereas the latter has the effect of prohibiting more than two consecutive unstressed syllables. For my account I adopt *EXTENDED LAPSE (adapted from Gordon 2002):

(23) *EXTENDED LAPSE: A sequence of more than two consecutive syllables with only one mark above it is banned.

This constraint targets configurations like the one in (24): [13]

(24)

	[σσσσσ]
Primary stress	x
	x
Syllable	xxxxx
	σσσσσ

Let's see how *EXTENDED LAPSE works in Spanish. The constraint requires avoidance of illegal neighbouring syllables with only one grid mark. This can be achieved by reducing the number of unstressed syllables whenever possible. In the case of a HV sequence, it is possible to do so by syllabifying the two vocoids in the same constituent, which results in gliding. Since an instance of gliding in word initial position is an indication of failure to associate the initial vowel with its own nucleus, ONE-TO-ONE$_{(\text{PWD-LEFTMOST})}$ must be violated. Violation of the latter constraint must be caused in order to satisfy the rhythmic constraint. Therefore *EXTENDED LAPSE must outrank ONE-TO-ONE$_{(\text{PWD-LEFTMOST})}$:

(25)

/fIoritura/	*EXT LAPSE	1-TO-1$_{(\text{PWD-LEFTMOST})}$	ONSET	1-TO-1
a. fi.o.ri.tú.ra	*!		*	
b.☞ fjo.ri.tú.ra		*		*

Candidate (a) loses because it does not meet the condition on the number of grid marks. It contains three adjacent unstressed syllables (*fi*, *o* and *ri*). Candidate (b) is selected since it contains only two pretonic syllables, therefore it respects *EXTENDED LAPSE. The tableau indicates then that it is more harmonic to affect the cue to the left edge of words than have more than two pretonic syllables.

5.2.2 Hiatus at word boundaries

As shown in section (2.2), when the first member of a compound ends with a high vowel and the second member starts with a stressed vowel, hiatus is favoured. I repeat in (26) examples given in (6):

(26) a. /barb-i-etʃo/ [bar.bi.é.tʃo] 'clean shaved'
b. /anti-ásido/ [an.ti.á.si.do] 'antiacid'

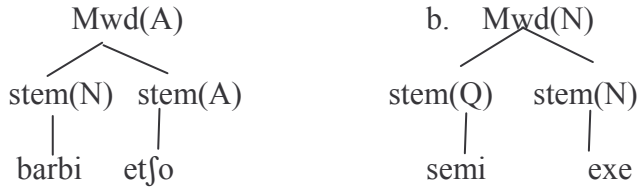
Before presenting an account for glide blocking in this context, I will provide the relevant morphological and prosodic structure for these complex words.

[13] Since Spanish does make use of lexical secondary stress, I am only concerned with level 1 and 3.

5.2.2.1 Structure of Compounds

I assume that compounds like those in (26) have the following morphological structure:

(27) a. b.



The structures in (27) involve two stems.[14] (27a) is an adjective with a noun as complement and (27b) is a noun with a quantifier as a complement. Despite the fact that these compounds are constructed with two stems, they are atomic morphological words, i.e. they are X° categories. The main argument in favour of this position is the fact that the first member of the compounds in question is not free. In addition, it is not possible to insert modifying material between the stems (e.g. **barbi-bien-hecho* 'well-clean shaved'), or for any member to undergo wh-movement:

(28) Q: *¿Qué es Gonzalo barbi? A: Hecho
What is Gonzalo mouth? Wide

The conclusion is that they are treated by sentential syntax as unique entities (see Moyna 2000).

Now I turn to the mapping of these morphological structures into their prosodic structure. First I establish the prosodisation of simple words. As Cardoso (2003) states, simple lexical words are standardly assigned the status of prosodic word. This type of words bears stress, so they form a foot and consequently they can also form a prosodic word. This observation is captured by the alignment constraint ALIGN Mwd/Pwd (Peperkamp 1997; Cardoso 2003):

(29) ALIGN (Mwd, L/R; Pwd, L/R): the left/right edge of every morphological word must coincide with the left/right edge of a prosodic word.

Next, I show the prosodic structure of compounds. Following Peperkamp (1997), I assume that the members of a compound do not form a single prosodic word. That is to say, they are not incorporated into the same prosodic word. Evidence for this assumption mainly comes from two segmental processes, *e*-epenthesis and *r*-strengthening.

- Epenthesis

It is well known that Spanish does not allow initial /sC/ onsets (see e.g. Harris 1983). Words having this underlying sequence surface with an epenthetic [e]. For instance, native words which originally had this /sC/ sequence in Latin have this epenthetic vowel added (e.g. from Hualde (2005) SPINA > [espína] 'thorn'). This process is still active as shown by adapted borrowings (e.g. [estrés] 'stress', [esnób] 'snob', [estándar] 'standard'). As Peperkamp (1997) notes, epenthesis is triggered by a constraint prohibiting /s/ to be followed by a tautosyllabic

[14] A stem is defined as the element that results from the removal of inflexional markers (Pena 1999).

consonant in onset position. The epenthetic vowel provides a nucleus so that /s/ can be syllabified in coda position. When the cluster appears intra-word, /s/ is syllabified as a coda consonant and epenthesis does not apply (e.g. [ís.la] 'island', [obs.tá.ku.lo] 'obstacle').

Now consider the following data (from Peperkamp 1997):

(30)	a.	estrella	superestrella	'star – superstar'
		estructura	superestructura	'structure – superstructure'
	b.	español	antiespañol	'Spanish – anti-Spanish'
		esclavismo	antiesclavismo	'slavery – anti-slavery'

The compounds in (30) apparently present a case of overapplication of epenthesis, i.e. epenthesis takes place although its condition is not met, since /sC/ is not word-initial.

Epenthesis does not apply in the example in the right column in (31) even though the roots are preceded by morphemes like *anti-*:

(31)	estrofa	antistrofa	'strophe - antistrophe'

According to Peperkamp (1997), the difference between the items in (30) and that in (31) resides in: (i) that the morpheme *anti-* in (31) is not the same as that used in (30): the former is non-productive and does not derive a transparent meaning with its base, unlike the latter, which is synchronically transparent and derives a compositional meaning with its bases; (ii) the bases in (30) are independent words but that in (31) is not.

Peperkamp (1997) concludes that epenthesis takes place at the left edge of prosodic words. Epenthesis applies in (30) because the members of the compounds are not prosodised within the same prosodic word. That is, the bound roots are outside the prosodic word that includes the base to which they combine. The combination of stems and transparent bound roots thus does not eliminate the context for epenthesis. Epenthesis does not apply within the prosodic word. Non-transparent bound roots are incorporated to the same prosodic word as their bases. Since the sC sequence is not at the left edge, the environment for epenthesis is not met.

- Strengthening

Spanish makes use of two rhotic segments, an alveolar flap [ɾ] and an alveolar trill [r]. These segments are distinctive only in intervocalic position (e.g. fo[ɾ]o 'forum'/fo[r]o 'lining'). In all other contexts, they are in complementary distribution, with only [r] word-initially (cf. Roca 2005a). Harris (1969, 1983) argues that both rhotics are not underlyingly distinct but are derived from a single phoneme. One main argument for this stance involves /rC/ clusters. The alveolar flap appears in coda position before onset-initial syllables (e.g [káɾ.pa] 'tent', [páɾ.te] 'part'). Nevertheless, [ɾ] never occurs in coda position before an [ɾ]-initial syllable. Harris (1983) claims that this gap is explained by positing an underlying geminate rhotic /ɾ-ɾ/ which surfaces heterosyllabically and by taking this geminate to be the source the intervocalic alveolar trill.

As regards the phonetic realization of the rhotic in word-initial position, Harris (1983) proposes a rule of *r*-strengthening by virtue of which /ɾ/ becomes [r]. Harris (1983) illustrates the activity of this process with two pieces of evidence. The first is shown by diachronically related examples in (32):

(32) a. [r]o-er e-[ɾ]o-sión ‘to eat away - erosion’
b. [r]ec-to e-[ɾ]ec-ción ‘upright - erection’

When the rhotic in the stems *ro-* and *rec-* is intervocalic it surfaces as the flap, but when it is word-initial it realizes as the trill. As Peperkamp (1997) mentions, this alternation suggests that ɾ is the underlying phoneme, which is changed into [r] word-initially.

The second is provided by a popular language game played in Lima, which involves metathesis of syllables:

(33) a. base [r]aya ‘stripe’
b. slang ya[ɾ]a
c. *ya[r]a

Underlying /ɾ/ is prohibited word-initially, hence it must surface as a trill in the unmetathesized word, but in the metathesized word /ɾ/ is not word-initial, so it can be pronounced as a flap.

As can be seen from the examples in (32) diachronically prefixed words can surface with a rhotic flap. However, with synchronic, semantically transparent bound roots words, base-initial /ɾ/ always realizes as [r] (e.g. from Peperkamp 1997):

(34) a. [religioso] [antireligioso] ‘religious – anti-religious’
b. [recto] [semirecto] ‘right – angle of 45 degrees’

The fact that the base rhotic in words like those in (34) undergoes r-strengthening as if it were word-initial leads Peperkamp (1997) to claim that this process also applies at left edges of prosodic words, just like *e*-epenthesis. Thus both processes provide evidence that bound roots and the stems with which they combine do not form a single prosodic word.

Having argued that the stems in the compounds under examination do not form a single prosodic word, I have to explicit where they are attached in the prosodic hierarchy. For this account I mainly follow Cardoso (2003). The compounds in (26) contain two stems. I assume that since the elements in the compounds are stems, they are lexical words and so they can form their own prosodic word. It remains to know whether these prosodic words are attached directly to the phonological phrase or they form a recursive prosodic word. I suggest that the second option correctly accounts for the facts. The main argument is that they carry only one stress, on the second member (see Hualde to appear). If they were linked directly to the phonological phrase, they should bear each stress (c.f. /ombre-rana/ [ómbre]$_{Pwd}$ [rána]$_{Pwd}$ ‘frogman’). Thus, the structure of the compounds in (26) and the relevant constraints are (cf. Peperkamp 1997):

(35) a. [[stem]$_{Pwd}$ [stem]$_{Pwd}$]$_{Pwd}$
b. ALIGN (Lex, L/R; Pwd, L/R): the left/right edge of every lexical word must coincide with the left/right edge of some prosodic word.
c. ALIGN(Pwd, L/R; Lex, L/R): the left/right edge of every PW must coincide with the left/right edge of some lexical word.
d. EXHAUSTIVITY: No C_i immediately dominates a constituent C_j, $j < i-1$.
e. NON-RECURSIVITY: No C_i must dominate a C_i.

ALIGN (Lex, L/R; Pwd, L/R) mandates that every lexical word begins at the left edge of a prosodic word and ends at the right edge of a prosodic word (McCarthy & Prince 1993) , thereby ensures that both members of the compound bear the status of a prosodic word. ALIGN(Pwd, L/R; Lex, L/R) (McCarthy & Prince 1993) expresses the notion that each prosodic word must contain a lexical word. EXHAUSTIVITY and NON-RECURSIVITY concern dominance within the prosodic hierarchy. EXHAUSTIVITY penalizes the skipping of levels. For instance, a Pwd cannot immediately dominate a syllable because it skips the foot. NON-RECURSIVITY prohibits recursion, i.e. the domination of a category by a category of the same level; for example no Pwd dominates another Pwd. I provide the ranking of the constraints in (35) together with ALIGN (Mwd, L/R; Pwd, L/R) in (36):

(36) AL (Mwd, L/R; Pwd, L/R), AL (Lex, L/R; Pwd, L/R), AL (Pwd L/R, ; Lex L/R,) >> EXH >> * RECURSIVITY

According to the structure in (35a), the surface form a compound violates * RECURSIVITY, since a Pwd dominates another Pwd. So this constraint is dominated. EXHAUSTIVITY is also dominated for an independent reason: syllables are not iteratively parsed into feet in Spanish. The other constraints are all satisfied by the winner candidate, so they cannot be hierarchized. The effects of the ranking are shown in (37):

(37)

/barbi + etʃo/	AL(Mwd; Pwd)L/R	AL(Lex; Pwd)L/R	AL(Pwd; Lex) L/R	EXH	* REC
a. [barbietʃo]$_{Pwd}$		*!			
b. barbi [etʃo]$_{Pwd}$	*!	**	**	*	
c. [barbi [etʃo]$_{Pwd}$]$_{Pwd}$		*!			*
d☞[[barbi]$_{Pwd}$[etʃo] $_{Pwd}$]$_{Pwd}$					**

Candidate (a) is excluded mainly because it incurs a violation of AL(Lex, L/R; Pwd, L/R) since the left edge of the stem *hecho* 'done' does not coincide with the left edge of a Pwd and the right edge of the stem *barbi-* 'beard' does not coincide with the right edge of a Pwd. Candidate (b) is also not optimal mainly because the left edge of the Mwd *barbihecho* is not aligned with a Pwd. Candidate (c) does not satisfy the requirement of lexical words: the right edge of a *barbi-* is not aligned with the right edge of a Pwd. Finally candidate (d) is chosen as it only violates the lower ranked constraints.

5.2.2.2 Syllabification of HV at word boundaries

Having described the morphological and phonological structure of the relevant compounds in Spanish, I proceed to explain why hiatus obtain at the boundary of two stems forming a compound.

The explanation is similar to the one offered for hiatus at word-initial position: easy perceptibility of words edges in order to facilitate word segmentation and demarcation of edges. That is to say, hiatus at word boundaries is a cue for the identification of the left edge of the second member of the compound. This is supported by observing the behaviour of the HV sequence at word boundaries and word-internally. Recall that the cluster in question is always syllabified as a diphthong word-internally, even if V is stressed (c.f. [se.mjó.ti.ka]

'semiotics'), but when the sequence is placed at word boundaries, then hiatus arises (c.f. [se.mi.é.xe] 'semi-axle'). Thus, a person hearing HV as a diphthong will interpret it as inserted in one morphological word, whereas if heard in a hiatus, it will be construed as a word boundary.

As in the case of word-initiality, hiatus has cognitive consequences. It is assumed that lexical access proceeds from left to right; successful word recognition is usually attained before the end of the word has been heard (Maroldt 1995). Therefore word-initiality is crucial for lexical retrieval. For an optimal lexical retrieval, it is necessary to leave stems clearly recognizable. Heterosyllabification of HV at word boundaries when V is stressed then results in an enhancing help for the recognizability of stems.

I now formally implement hiatus in this context. Gliding is blocked at the left edge of the inner prosodic word when V is stressed. I attribute this to an alignment constraint that makes sure that a stem final vowel of the left root forms a separate syllable from a stem initial vowel of the right root. I propose that this alignment constraint targets syllabic nuclei: [15]

(38) ALIGN (St, Syll-Nuc)LEFT: the left edge of every stem must coincide with the left edge of a syllabic nucleus.

This constraint states that the left edge of stems must be aligned with the left edge of a syllabic nucleus. In order to be satisfied, the initial vowel of the second member of a compound cannot share its nucleus with a preceding vowel. The only way for the preceding vowel to be parsed is to prosodise in its own syllable. The result is hiatus. Since this is the configuration obtained in the cases at examination, which results in an onsetless syllable, the alignment constraint dominates ONSET:

(39)

/semI+exe/	ALIGN(St, SyllNuc)L	ONS	ALIGN-(St, σ)L
a. [[se.mj] $_{Pwd}$ [é.xe]$_{Pwd}$]$_{Pwd}$	*!		*
b.☞[[se.mi.]$_{Pwd}$ [é.xe]$_{Pwd}$]$_{Pwd}$		*	

The examples in (6c-d) repeated in (40) show that when stress does not fall in the initial vowel of the right root, HV in compounds is syllabified in a diphthong:

(40) a. /bok-i-abierto/ [bo.kja.bjér.to] 'surprised'
/barb-i-espeso/ [bar.bjes.pe.so] 'thick-bearded'
b. /anti-aereo/ [an.tja.é.re.o] 'anti-aircraft'
/pluri-empleado/ [plu.rjem.ple.á.do] 'person that holds more than one job'

The final vowel of the first stem is associated to the first vowel of the second one. I appeal again to *EXTENDED LAPSE in order to account for diphthongization in this configuration. Recall that this constraint forbids the occurrence of more than two pretonic syllables. If the items in (40) were pronounced with hiatus there would be three pretonic syllables (e.g. *bo*,

[15] Note that the alignments constraints introduced in (35) are not adequate enough for the account of hiatus: other compounds (e.g. /xentil-ombre/[[xen.ti.l]$_{Pwd}$[óm.bre]$_{Pwd}$]$_{Pwd}$, 'gentleman' /sur-este/ [su.r]$_{Pwd}$[és.te] $_{Pwd}$]$_{Pwd}$ 'southeast') violate them in order to comply with ONSET, which indicates that the latter constraint dominates the alignment constraints.

qui, and *a*). The fact that the final vowel of the left root does not have its own nucleus indicates that *EXTENDED LAPSE is ranked above ALIGN(St, SyllNuc)L:

(41)

/antI+aereo/	*EXT LAPSE	ALIGN(St,SyllNuc)L	ONSET
a.☞[an.tj]$_{Pwd}$[a.é.re.o]$_{Pwd}$]$_{Pwd}$		*	
b. [an.ti.]$_{Pwd}$[a.é.re.o]$_{Pwd}$]$_{Pwd}$	*!		*

The ranking in (41) demonstrates that it is more harmonic to form a diphthong so as to eliminate pretonic syllables than to have stems and nuclei aligned at word boundaries.

6. Conclusion

We have seen that hiatus in AS does not appear only when H is stressed. The HV sequence can also be heterosyllabic in some specific environments. Hiatus occurs at word initial position and between word boundaries. These positions are important for word segmentation and recognition. Hiatus in these contexts constitutes a prosodic cue so that these processes are facilitated. However, when the stressed syllable is far from the HV sequence, the perceptual cue provided by hiatus is overridden so that the number of unstressed syllables is reduced. The fact that hiatus surfaces in contexts with precise properties contradicts the view that the cases under study are instances of prosodic and morphological arbitrariness and exceptionality. I have shown that the syllabification of HV at least in these environments is systematic and predictable.

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Gustavo Beritognolo
McGill University
gberitognolo@yahoo.com

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Intensionality and extraction as reflexes of syntactic structure

Carlos de Cuba and Tomoko Kawamura

In the sententialist view of intensionality, intensionality arises only in bi-clausal contexts. However, not all bi-clausal contexts give rise to intensionality, and the level of intensionality can vary. Non-factives display full intensional properties, factives are only partially intensional, and temporal adverbial constructions have no intensional properties. We argue that these three levels of intensionality are associated with different syntactic structures. Extraction data provide support for this three way syntactic division. We argue that three levels of intensionality are present at the DP level as well.

1. Introduction

In the sententialist view of intensionality, all intensionality phenomena are associated with bi-clausal structures (McCawley 1974; Ross 1976; den Dikken, Larson and Ludlow 1996). However, not all bi-clausal structures result in intensionality. One test for intensionality is that non-denoting objects need not induce falsity in intensional environments. This is shown in (1), where non-denoting *a unicorn* induces falsity in a mono-clausal structure (1a), but does not necessarily induce falsity in the bi-clausal structure in (1b).

(1) a. # Mary hit *a unicorn*. *False*
b. Tom thinks [that Mary hit *a unicorn*]. *True/False*

While the bi-clausal structure with 'fully intensional' *think* passes the non-denoting object test in (1b), a similar sentence with 'partially intensional' *regret* bi-clausal construction in (2) does not (Larson 2002).[1] This suggests that bi-clausality alone cannot fully explain all intensional behavior.

(2) # John regrets [that Mary hit *a unicorn*]. *False/Presupposition failure*

[1] The 'partial' intensionality behavior of factive verbs like *regret* will be described in more detail in section 2.

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In addition to the full and partial intensional cases above, there are bi-clausal constructions that exhibit no intensionality. Non-denoting *a unicorn* in the bi-clausal Temporal Adverbial Construction (TAC) in (3) also induces falsity, just as in partially intensional (2).

(3) # John left [when Mary hit *a unicorn*]. *False/Presupposition failure*

In this paper we examine the three levels of intensionality mentioned above (full, partial and non-intensionality) and argue that each of these three semantic levels corresponds to a different syntactic configuration. We show that the three types of intensional behavior shown by three classic tests for intensionality are actually independent phenomena, and propose the behaviors tested for are derived from the differences in syntactic structures we propose. Evidence for the three syntactic configurations comes from extraction data. We show that in addition to the three levels of intensionality we note, there are three different extraction patterns associated with the three different structures we propose. We also examine intensionality patterns at the DP level, and conclude that the syntactic differences found at the sentential level exist at the DP level, as well.

The paper is organized as follows. In section 2, we present the three classic tests of intensionality, and show that non-factive constructions, factive constructions, and TACs pattern differently in their intensional behavior. Non-factives are fully intensional, factives are partially intensional, and TACs show no intensionality. In section 3, we propose that the three intensionality patterns are mirrored by three different syntactic structures. Non-factives are argued to have a more articulated complement clause structure than factives, and the difference in intensional behavior between them is explained by the presence of a semantic operator, which is present under non-factives but not under factives. TACs differ from non-factives and factives in being adjunction structures as opposed to complements. The lack of any intensionality in TACs is a result of the lack of a head-complement syntactic configuration. In section 4, we present extraction data in support of our proposed syntactic differences. We show that non-factive constructions, factive constructions, and TACs pattern differently in their extraction possibilities. Non-factives freely allow extraction of arguments and adjuncts from their complements, while factives are weak islands (no adjunct extraction) and TACs are strong islands (no adjunct or argument extraction). These differences in extraction possibilities are shown to result from the syntactic structures we propose. In section 5, we show that the same three levels of intensionality displayed at the CP level are present at the DP level. Non-factive nominals are fully intensional, factive nominals are partially intensional, and relative clauses show no intensionality. We argue that there is also a three way syntactic distinction at the DP level. However, extraction is not possible from any of these constructions. We appeal to the phase-hood of DP to account for this lack of extraction.

2. Three levels of intensionality

In the literature, there are three traditional tests for intensionality (den Dikken, Larson and Ludlow 1996; Larson 2002; among others). These are given in (4).

(4) a. **<u>The non-denoting element test</u>:** Non-denoting objects (*a unicorn*) need not induce false/presupposition failure in intensional environments.

b. **The substitution test:** Substitution of co-referring terms (*Boris Karloff* and *Bill Pratt*, who are in fact the same person) need not preserve truth in intensional environments.
c. **The specific/non-specific reading test:** An indefinite (*a Swede*) can be read non-specifically in intensional environments.

Non-factive constructions pass all three tests of intensionality. A non-denoting element does not induce falsity/presupposition failure (5), the substitution of co-referring terms does not preserve truth (6), and an indefinite can have a specific or non-specific reading (7).

(5) John believes that **a unicorn** died. *No falsity/presupposition failure*

(6) a. John believes that **Boris Karloff** died. *Truth not preserved*
b. John believes that **Bill Pratt** died.

(7) John believes that **a Swede** died. *Non-specific reading available*

The sentence in (5) can be evaluated as true, regardless of the existence of unicorns. The sentences in (6a) and (6b) may have different truth-values, since John may not know that Boris Karloff and Bill Pratt refer to the same person. Finally, *a Swede* in (7) can be specific or non-specific. These facts indicate that non-factive constructions are fully intensional.

Factive constructions show a different pattern. A non-denoting object does induce falsity/presupposition failure (8), so factives are not fully intensional. However, factives do pass the other two tests of intensionality. Substitution of co-referring terms does not preserve truth (9) and an indefinite can be specific or non-specific (10). This is why we refer to factives as 'partially intensional'.

(8) # John regrets that **a unicorn** died. *Falsity/presupposition failure*

(9) a. John regrets that **Boris Karloff** died. *Truth not preserved*
b. John regrets that **Bill Pratt** died.

(10) John regrets that **a Swede** died. *Non-specific reading available*

TACs have bi-clausal structures, but unlike non-factives and factives, they fail all three tests of intensionality. The non-denoting object *a unicorn* (11) induces falsity/presupposition failure, truth is preserved in (12a) and (12b) (even if John does not know that Boris Karloff and Bill Pratt refer to the same person), and the non-specific reading of *a Swede* is unavailable in (13). This shows that TACs have no intensional properties.

(11) # John left the party when **a unicorn** died. *Falsity/presupposition failure*

(12) a. John left the party when **Boris Karloff** died. *Truth preserved*
b. John left the party when **Bill Pratt** died.

(13) John left the party when **a Swede** died. *Only specific reading available*

Table 1 summarizes the three levels of intensional behavior (full, partial, and non-intensionality) discussed in this section. In section 3, we argue that each of these three levels corresponds to a different syntactic configuration.

	Full	**Partial**	**Non**
Non-denoting element	Yes	No	No
Substitution Failure	Yes	Yes	No
Specific/non-specific reading	Yes	Yes	No
	non-factives *believe that*	factives *regret that*	temporal adv *left when*

Table 1 *: Three levels of intensionality behavior*

3. Three syntactic structures and triggers of intensional effects

In this section we propose that the three intensionality patterns presented in section 2 correspond to three different syntactic structures. We first contrast non-factive and factive constructions, which both show at least some intensional properties, then show how non-intensional TACs differ from both non-factives and factives.

3.1. Non-factives (full intensional) vs. factives (partial intensional)

It has recently been argued (de Cuba and Ürögdi 2001; de Cuba 2002, 2006a, 2006b, to appear; McCloskey 2005; Haegeman 2006) that non-factive constructions have a more articulated complement structure than factives (contra Kiparsky & Kiparsky 1971). Several asymmetries between non-factive and factive constructions have been observed. One such asymmetry occurs in Swedish, where embedded verb second (EV2) is allowed only under non-factive predicates.

(14) a. Richard **sa** **[**att [han **var** inte **t** hemma]**]**. *non-factive*

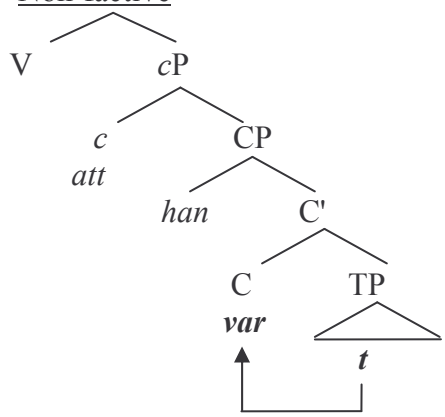
Richard said that he was not home
'Richard said that he was not home.'

b. *Richard **ångrade** **[**att [han **var** inte **t** hemma]**]**. *factive*

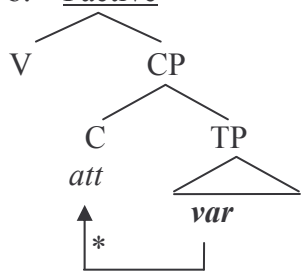
Richard regretted that he was not home
'Richard regretted that he was not home.'

The classic analysis of verb second movement has the verb moving to C, and some XP moving to SpecCP. EV2 is usually blocked in the presence of an overt complementizer. However, under the non-factive predicate *sa*, the verb *var* in the embedded clause appears to the left of negation (14a), showing that verb second movement has taken place in the embedded clause, despite the presence of the overt complementizer *att*. This EV2 is not available under the factive predicate *ångrade*, as indicated by the unacceptability of (12b). de Cuba (2006b) argues that this asymmetry arises from a difference in CP-level structures. He proposes that non-factive constructions have an extra CP layer (*c*P), while factive predicates select CP directly.

(15) a. Non-factive



b. Factive



Non-factive constructions have a *c*P layer, and the *c*-head may contain the complementizer *att*. Since C-head is open, the embedded predicate *var* may target this C-head for movement. In factive constructions, the complementizer *att* must appear in the C-head, as there is no *c*P layer. Movement of the embedded predicate *var* to this already filled C-head is thus blocked.[2]

More evidence for an extra layer of structure associated with non-factives comes from Hungarian. In Hungarian, the pronominal *azt*, which refers to the embedded clause, appears in non-factive constructions (16a), but not in factive constructions (16b).

(16) a. Péter azt **hiszi** [hogy Mari beteg]. *non-factive*
Peter it-acc believes comp Mary sick
'Peter believes that Mary is sick.'

b. Péter (*azt) **sajnálja** [hogy Mari beteg]. *factive*
Peter it-acc regrets comp Mary sick
'Peter regrets that Mary is sick.'

de Cuba (2006b) argues that *azt* is base-generated in *c*P spec as in (17).

---

[2] A reviewer points out that German has a similar contrast to Swedish, in that EV2 is acceptable in sentences embedded by non-factives like 'say' (i) but ungrammatical under factive predicates (ii).

(i) Richard sagt er war nicht zu Hause.
Richard says he was not at home
'Richard says that he was not home'

(ii) *Richard bedauert er war nicht zu Hause.
Richard regrets he was not at home
'Richard regrets that he was not home'

However, V2 and the complementizer *dass* are in complementary distribution under non-factive predicates. In (iii) EV2 is not allowed in the presence of *dass*, and in (iv) *dass* is obligatory in a V-final sentence.

(iii) *Richard sagt dass er war nicht zu Hause.
Richard says that he was not at home
'Richard says that he was not home'

(iv) Richard sagt *(dass) er nicht zu Hause war.
Richard says that he not at home was
'Richard says that he was not home'

This complementary pattern in (iii) and (iv) is not predicted by the analysis presented here. We leave an explanation of the German facts to future research.

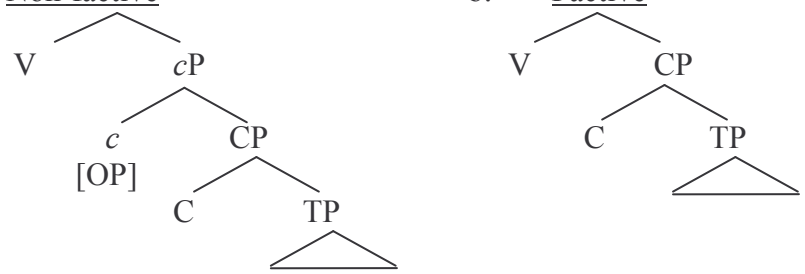
(17) Péter azt **hiszi** [$_{cP}$ **t**$_{azt}$ [$_{CP}$ hogy Mari beteg].

Since only non-factives select *c*P as its complement, *azt* may appear only in non-factive constructions, not in factive constructions. Interestingly, when *azt* is not present with a non-factive, a factive reading results, as in (18).

(18) a. **Azt** mondta Péter, hogy késő́n kezdődik a meccs.
that-ACC said Péter Comp late begins the match
'Péter said that the match will begin late' (but we don't know if this is true)
b. Mondta Péter, hogy késő́n kezdődik a meccs.
said Péter Comp late begins the match
'Péter told (me) that the match will begin late' (and in fact it will)

We argue that the asymmetric syntactic behavior of non-factive vs. factive constructions in this section arises from the syntactic difference between non-factives and factives illustrated in (15). Non-factives select *c*P, which in turn selects CP, while factives directly select CP. On the semantic side, we claim that the full intensional behavior of non-factives also arises from the *c*P structure. Following de Cuba (2006a, 2006b, to appear), we propose that a semantic operator [OP] appears in *c* (19a), and that this operator is responsible for allowing non-denoting terms as in (20a). The lack of this operator in (19b) yields falsity/presupposition failure in (20b).

(19) a. Non-factive b. Factive



(20) a. John believes [$_{cP}$ **OP** [$_{CP}$ that **a unicorn** died]].
b. # John regrets [$_{CP}$ that **a unicorn** died].

The operator in (20a) removes the speaker from responsibility for the truth-content of the embedded clause. This allows the presence of non-denoting elements like *a unicorn*. Since there is no operator in the factive case (20b), the speaker remains responsible for the truth-content of the embedded clause, just as is the case with a matrix predicate like (21).

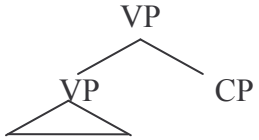
(21) #**A unicorn** died.

The idea that there is an operator that is associated with non-factive contexts is not new. Other analyses that postulate such an operator include Progovac (1994) and Nichols (2001). However, neither Progovac nor Nichols associates the operator with extra syntactic structure. Given the evidence in this section from Swedish and Hungarian though, proposing a syntactic projection associated with the operator seems quite natural. This extra structure will also turn out to be useful in explaining extraction asymmetries between non-factives and factives in section 5.

3.2. Non-factives and factives vs. temporal adverbial constructions (TAC)

Semantically, TACs show no intensional behavior, unlike non-factives (pass all 3 tests) and factives (pass 2 of 3 tests). Syntactically, we have analyzed both non-factive (19a) and factive (19b) constructions as involving complementation. In contrast, we analyze TACs as involving adjunction, as in (22).

(22) Temporal Adverbial Construction (TAC)



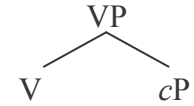
Let's take the non-denoting element test first. TACs do not allow non-denoting elements, as shown in (23).

(23) # John left the party [$_{CP}$ when **a unicorn** died].

Only non-factive complements allow non-denoting elements. Following our claim that non-denoting elements can only appear in the presence of the operator (19a), it is clear why TACs do not allow them. There is no *c*P available in the structure in (22) to house the operator.

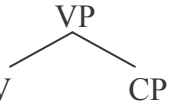
Next, let's look at the other two tests of intensionality, the substitution test and the specific/non-specific reading test. Both non-factives and factives pass these two tests, while TACs do not. Looking at the proposed structures for each class of constructions in (24), we see the similarity between the non-factive (24a) and factive (24b) complementation structures vs. the TAC adjunction structure (24c).

(24) a.



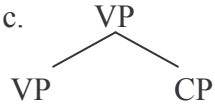
full intensional
(non-factive)

b.



partial intensional
(factive)

c.



non-intensional
(TAC)

We claim that intensional properties of substitution failure and the availability of specific/non-specific readings can only arise in head-complement structures like (24a) and (24b), and not with adjunction structures like (24c). This gives us a clear connection between syntactic structures and semantic interpretation. The correlations we have found between the three types of intensionality and the three syntactic configurations are summarized in Table 2.

	Full	**Partial**	**Non**
Syn. Presence of *c*P *Sem.* Non-denoting element	Yes Yes	No No	No No
Syn. Selected by a head *Sem.* Substitution Failure *Sem.* Specific/non-specific reading	Yes Yes Yes	Yes Yes Yes	No No No
	non-factives	factives	TAC

Table 2: Syntactic-semantic correlations

In the next section we show that the three syntactic configurations we have proposed correspond to three different patterns of extraction. We exploit these syntactic differences to account for the extraction facts.

4. Extraction

Thus far, we have shown that three levels of intensionality correspond to a three way syntactic division. Full intensionality is found when there is a head-complement structure and *c*P, partial intensionality is found when there is a head-complement structure but no *c*P, and no intensionality is found when there is no head-complement structure and no *c*P. There are three patterns of extraction that correlate with these three structures. Non-factive complements allow extraction of both arguments and adjuncts (25), factive complements allow extraction arguments but not adjuncts (26), and TACs allow extraction of neither arguments nor adjuncts (27).

(25) a. **What** did John believe [$_{cP}$ [$_{CP}$ that Mary ate ***t***]]? *non-factives*
b. **Why** did John believe [$_{cP}$ [$_{CP}$ that Mary ate the apple ***t***]]?

(26) a. **What** did John regret [$_{CP}$ that Mary ate ***t***]? *factives*
b. ***Why** did John regret [$_{CP}$ that Mary ate the apple ***t***]?

(27) a. ***What** did John leave the party [$_{CP}$ when Mary ate ***t***]? *TAC*
b. ***Why** did John leave the party [$_{CP}$ when Mary ate apples ***t***]?

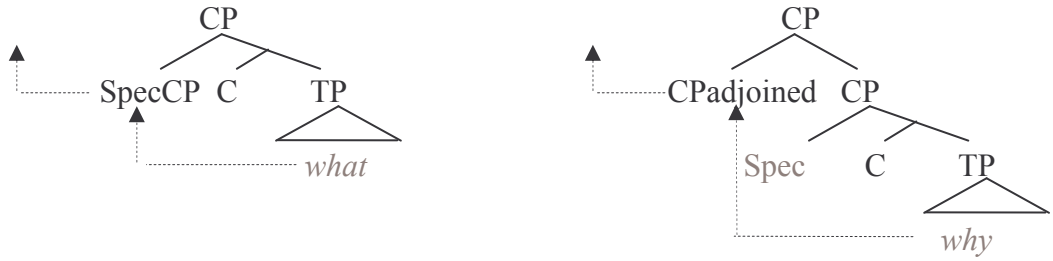
We first examine the difference between non-factives (25) and factives (26), and then move on to the difference between non-factives and factives vs. TACs (27).

Following de Cuba (2006a), we claim that the difference between (25) and (26) can be explained by the presence or absence of *c*P. McCloskey (2005), following Chomsky (1986), proposes the Adjunction Prohibition.

(28) **<u>The Adjunction Prohibition</u>:** Adjunction to a phrase which is s-selected by a lexical (open-class) head is ungrammatical.

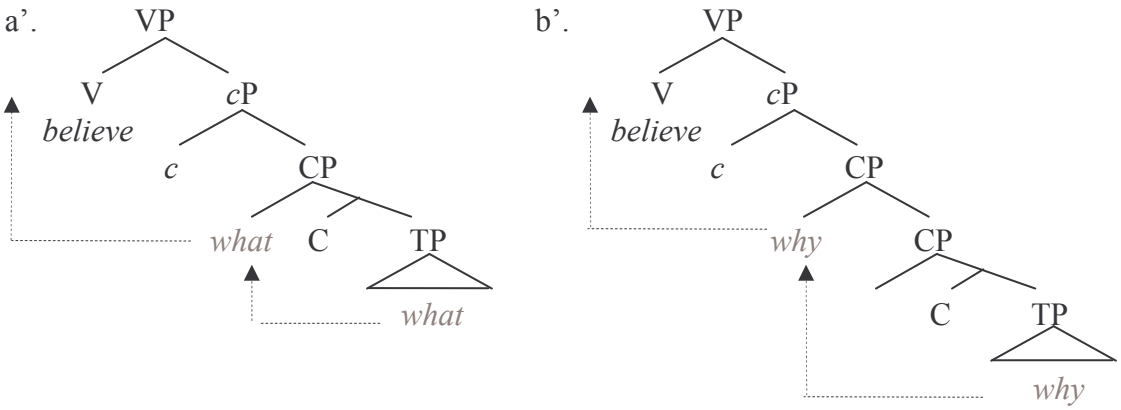
de Cuba (2006a) adds to this the proposal that movement of arguments proceeds through SpecCP (29a), while movement of adjuncts proceeds through adjunction to CP (29b).

(29) a. <u>movement of an argument phrase</u> b. <u>movement of an adjunct phrase</u>



Non-factive argument extraction is shown in (30a'), and non-factive adjunct extraction in (30b').

(30) a. **What** did John believe [$_{cP}$ [$_{CP}$ that Mary ate ***t***]]?
b. **Why** did John believe [$_{cP}$ [$_{CP}$ that Mary ate the apple ***t***]]?

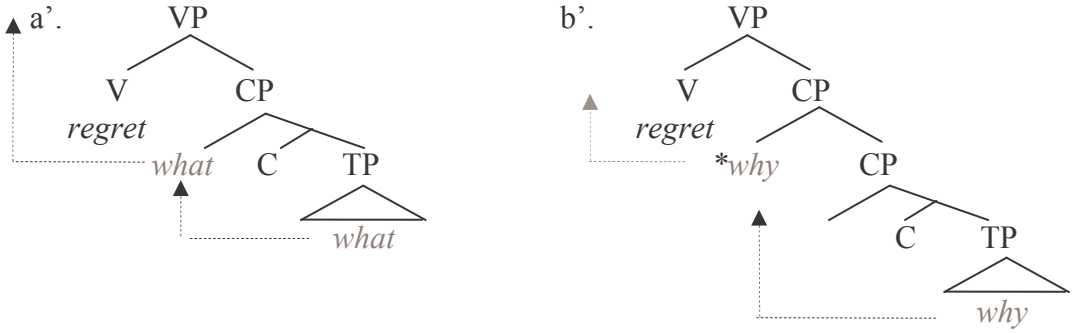


The argument *wh*-phrase moves though SpecCP, as is standardly assumed. However, the adjunct *wh*-phrase *why* adjoins to CP to move out of the embedded clause. The CP in (30b') is <u>not</u> s-selected by an open-class lexical head (it is selected by the functional head *c*), so adjunction to CP in this case does not violate the Adjunction Prohibition condition. This allows *why* to reach the edge of the phase for extraction to the matrix clause.[3]

Factive constructions, in contrast, receive the structures in (31). Factive argument extraction is shown in (31a'), and the unavailability of Factive adjunct extraction is represented in (31b').

(31) a. **What** did John regret [$_{CP}$ that Mary ate ***t***]?
b. ***Why** did John regret [$_{CP}$ that Mary ate the apple ***t***]?

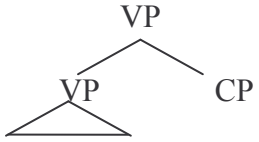
[3] de Cuba (2006a) assumes that *c*P extends the CP phase, and that CP remains part of the edge, still active for syntactic operations.



Just as the non-factive cases in (30a'), the argument *wh*-phrase in factive (31a') moves through SpecCP. However, the adjunct *why* is unable to adjoin to the embedded CP in (31b') due to the Adjunction Prohibition. The factive predicate *regret* does not select for *c*P, but directly select CP. Since *regret* is an open-class lexical head, adjunction to its complement is ruled out. The adjunct *why* is thus unable to reach the edge of the phase, so it cannot be extracted.

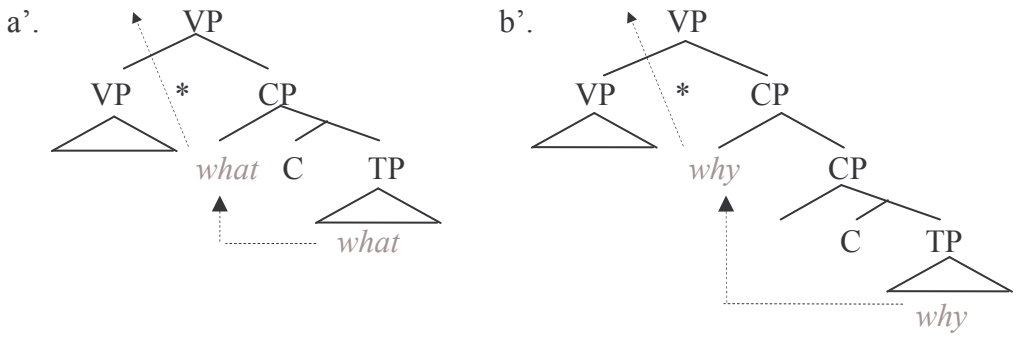
Having provided an account for the adjunct/argument extraction asymmetry for non-factives vs. factives, we now compare these two with TACs. When we look at argument extraction, we notice that both non-factives (25a) and factives (26a) allow it, while TACs (27a) do not. We again argue that this difference in extraction possibilities arises from their differing syntactic configurations. In TACs, the CP adjoins to the phrase of main clause, as in (32) ((22) repeated).

(32) <u>Temporal Adverbial Construction</u> (TAC)



Following Huang's (1982) Condition on Extraction Domains (CED), extraction out of any adjoined phrase is disallowed. Thus, both argument and adjunct extraction out of CP is ruled out in a structure like (32). In non-factive (30) and factive (31) constructions, the embedded clause is selected by the main predicate, and it is a complement of the main predicate, so argument extraction is not blocked. In contrast, in TAC constructions both arguments (33a') and adjuncts (33b') are stranded.

(33) a. ***What** did John leave the party [$_{CP}$ when Mary ate ***t***]?
b. ***Why** did John leave the party [$_{CP}$ when Mary ate apples ***t***]?



The syntactic-semantic correlations and extraction facts we have covered to this point are summarized in the Table 3. The constructions with a *c*P allow adjunct extraction and non-denoting elements. When then main predicate selects the embedded clause, argument extraction is allowed and substitution failure is observed. Furthermore, the sentence allows non-specific readings of indefinites. In adjunction structures, no extraction is allowed and no intentional behavior is observed.

	Full	**Partial**	**Non**
Syn. Presence of *c*P	Yes	No	No
Syn. Adjunct Extraction	Yes	No	No
Sem. Non-denoting element	Yes	No	No
Syn. Selected by a head	Yes	Yes	No
Syn. Argument Extraction	Yes	Yes	No
Sem. Substitution Failure	Yes	Yes	No
Sem. Specific/non-specific reading	Yes	Yes	No
	non-factives	factives	TAC

Table 3: Syntactic-semantic correlations and extraction facts

In the next section we find familiar intensional behavior, this time at the DP level. We provide a similar account for this semantic behavior, while also accounting for a different pattern of extraction at the DP level as opposed to the VP level.

5. DP internal intensionality

5.1. Three levels of DP intensionality

The three levels of intensionality discussed so far in this paper can also be observed DP internally. Full intensionality is found in the noun-complement construction with a non-factive noun.

(34) John has [$_{DP}$ the <u>belief</u> [that **a unicorn** died]]. *True/False*

(35) a. John has [$_{DP}$ the <u>belief</u> [that **Boris Karloff** died]]. *Truth not preserved*
b. John has [$_{DP}$ the <u>belief</u> [that **Bill Pratt** died]].

(36) John has [$_{DP}$ the <u>belief</u> [that **a Swede** died]]. *Non-specific reading available*

In examples (34) through (36), the non-factive noun *belief* takes an embedded clause as its complement. Despite the fact unicorns don't exist, (34) may be evaluated as true, as long as *John* holds that belief. Truth is not preserved in (35) in the case that *John* does not know that Boris Karloff and Bill Pratt refer to the same person. Finally, in (36), the indefinite *a Swede* may be specific or non-specific.

When the non-factive noun *belief* is replaced with the factive noun *realization*, as in (37) through (39), partially intensionality is observed.

(37) # John came to [$_{DP}$ the <u>realization</u> [that **a unicorn** died]]. *Presupposition failure*

(38) a. John came to [$_{DP}$ the <u>realization</u> [that **Boris Karloff** died]]. *Truth not preserved*
b. John came to [$_{DP}$ the <u>realization</u> [that **Bill Pratt** died]].

(39) John came to [$_{DP}$ the <u>realization</u> [that **a Swede** died]]. *Non-specific reading available*

Regardless of John's beliefs, (37) induces presupposition failure, failing the non-denoting test of intensionality. As observed with factive verbs, factive nominals pass the other two intensionality tests. The sentences in (38a) and (38b) may have different truth-values, and *a Swede* in (39) may be specific or non-specific.

Finally, relative clause constructions show no intensional behavior, as illustrated in (40) through (42).

(40) # John saw [$_{DP}$ the man [that killed **a unicorn**]]. *Presupposition failure*

(41) a. John saw [$_{DP}$ the man [that killed **Boris Karloff**]]. *Truth preserved*
b. John saw [$_{DP}$ the man [that killed **Bill Pratt**]].

(42) John saw [$_{DP}$ the man [that killed **a Swede**]]. *Only specific reading available*

Regardless of what John believes, (40) always induces presupposition failure, (41a) and (41b) always have the same truth-values, and in (42), *a Swede* has only the specific reading. The three patterns of intensionality in DPs are summarized in Table 4.

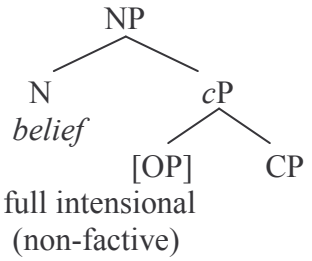
	Full	**Partial**	**Non**
Non-denoting element	Yes	No	No
Substitution Failure	Yes	Yes	No
Specific/non-specific reading	Yes	Yes	No
	N-complement non-factive *belief*	N-complement factive *realization*	Relative clause

Table 4: Three levels of DP intensionality

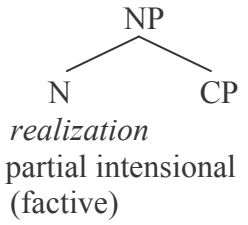
5.2. Three syntactic structures

Noun-complement constructions are fully intensional when the head noun is non-factive, and partially intensional when the head noun is factive. Relative clauses are not intensional. We give these three constructions the structures in (43a), (43b), and (43c) respectively.

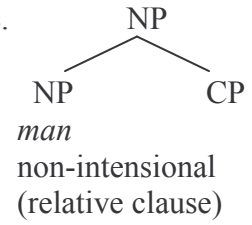
(43) a.



b.



c.



Non-factive nouns select a *c*P complement, while factive nouns select a CP complement. Following Chomsky and Lasnik (1977), Stowell (1981) and McCawley (1981), among others, we claim that relative clause constructions involve adjunction, not complementation. In these constructions, CP adjoins to NP.

Note that the NP (or DP) structures in (43) mirror the VP structures in (24). Just as was the case with non-factive verbs, non-factive nouns select *c*P, headed by the operator (43a). Since non-denoting elements are allowed in the presence of the operator, noun-complement constructions with a non-factive noun can have the non-denoting element *a unicorn* (34). Neither the factive noun-complement structure in (43b) nor the relative clause construction in (43c) has *c*P, so they do not allow non-denoting elements (37, 40).

In the VP cases discussed above, we claimed that the other two intensional behaviors (substitution failure, non-specific reading availability) can only arise in a head-complement structure. Both the non-factive (43a) and factive (43b) structures above fulfill this requirement. So it is no surprise that they both pass the substitution test (35, 38) and the specific/non-specific reading test (36, 39) of intensionality. The relative clause structure in (43c) is not a head-complement structure, but an adjunction. This structure does not satisfy the syntactic configurational requirement for intensionality, so as expected, relative clauses fail the substitution test (41) and the specific/non-specific reading test (42).

5.3. DP extraction

Unlike the verbal cases in section 4, where at least some kinds of extraction were allowed, all kinds of extraction out of DP structures are blocked. Extraction of both arguments and adjuncts is possible from non-factive verb complements (25), and argument extraction is allowed from factive verb complements (26a). However, the corresponding non-factive (44) and factive (45) nominals block all extraction.

(44) a. ?***What** did John have [$_{DP}$ the belief [that Mary ate ***t***]]? *non-factive*
b. ***Why** did John have [$_{DP}$ the belief [that Mary ate the apple ***t***]]?

(45) a. ?***What** did John come to [$_{DP}$ the realization [that Mary ate ***t***]]? *factive*
b. ***Why** did John come to [$_{DP}$ the realization [that Mary ate the apple ***t***]]?

To account for the difference in extraction between the verbal and nominal cases, we appeal to the familiar Complex Noun Phrase Constraint of Ross (1967). Extraction from a complex NP is ruled out, ruling out extraction in (44) and (45). Translated to current syntactic terms, we can say that the *wh*-phrases in (44) and (45) are spelled out when the DP phase closes, leaving them unavailable for movement.

The relative clause examples in (46) receive the same analysis as the TACs in (33). Both cases involve adjunction structures, so we again appeal to the CED of Huang (1982). Extraction out of any adjoined phrase is disallowed. Thus, both argument and adjunct extraction out of CP is ruled out in (46), given the structure in (43c).

(46) a.***What** did John see [$_{DP}$ the man [that ate ***t***]]? *relative cl.*
b.***Why** did John see [$_{DP}$ the man [that ate the apple ***t***]]?

6. Speculations on the triggers of intensional effects

In this section we briefly speculate on what triggers the three types of intensional behaviors shown by the tests in (4). We first consider the non-denoting element test, which only non-factive constructions pass. In section 3, we proposed that non-factives select cP, which contains a semantic operator that allows for non-denoting elements. We hypothesize that the function of this operator is to eliminate the actual world from the evaluation set of worlds for the embedded CP. Since the actual world is not evaluated, non-denoting elements do not necessarily induce falsity/presupposition failure. In the absence of the operator (as with factives and TACs), the actual world is not eliminated from the evaluation set, so non-denoting elements do induce falsity/presupposition failure.

As for the substitution test and the specific/non-specific reading tests, we tread more lightly. It is clear that propositional attitude reporting predicates (non-factives and factives) that pass these tests are responsible for intensional behavior. In the non-intensional adjunction cases (TACs and relative clauses) there is no trigger of intensionality (despite bi-clausal structure), so the complementation structure is key. For substitution failure, we speculate that propositional attitude reporting predicates add the belief world of the matrix subject to the evaluation set for the embedded CP. This belief world can differ from the actual world, leaving open the possibility that substitution of identicals will lead to different truth-values: one value for the belief world, and another for the actual world.

Finally, we speculate that the availability of non-specific readings under propositional attitude reporting predicates may also be due to the complementation structure. We hypothesize that a non-specific reading is available in the scope of a propositional attitude-reporting predicate, while the definite reading can occur if the indefinite phrase raises above the predicate through QR.

If we are on the right track with these speculations, then what have traditionally been seen as three tests of intensionality, are actually decomposed into three somewhat independent phenomena. These speculations are preliminary, but we hope to test the viability of this line of thinking in future research.

7. Summary

In this paper, we have shown that there are three levels of intensionality, full intensionality, partial intensionality, and non-intensionality. We have argued that full and partial

intensionality arise in bi-clausal head-complement structures, and that full intensionality arises only in the presence of *c*P. In a sentence with a bi-clausal adjunction structure, no intensionality is found. We have shown that three extraction patterns correlate with the three levels of intensionality. Full and partial intensionality structures both allow for argument extraction, while only full intensional structures allow adjunction extraction. Non-intensional structures are islands for both argument and adjunct extraction. These extraction facts fall out from the syntactic structures we have proposed. Finally, we have shown that these three levels of intensionality are also present at the DP-level, and they receive a parallel syntactic analysis to the VP-level correlates.

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Carlos de Cuba
Department of Linguistics
Stony Brook University
lin200cdc@hotmail.com

Tomoko Kawamura
Department of Linguistics
Stony Brook University
tkawamur@hotmail.com

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Again and the structure of result states

Eva Dobler

Recent analyses (Beck & Johnson 2004; von Stechow 2007) for lexical causatives propose that the direct object is the argument of the verb rather than the result-state denoting predicate as previously assumed (Hoekstra 1988; von Stechow 1996). I focus on the interaction between *wieder* 'again' and existential operators in object position, and demonstrate that both theories can only account for part of the data. There is a crucial difference between causatives referring to a change of state and causatives that constitute a change of location. That is, only the latter allow an existential operator to be interpreted inside the presupposition of restitutive *again*.

1. Introduction

It is a well-known fact that the event structure of causative predicates is inherently complex. That is, the event structure of a causative predicate can be divided into a causing event (1a) and a state that results from this event (1b):

(1) Pandora opened the box.
  a. Event: Pandora manipulates the box.
  b. Result state: The box is open.

What is more, the two parts can be targeted separately by certain modifiers (e. g. *again*, *for*-adverbials). Consider the data in (2) where the *for*-adverbial can either single out the event (2a) or the result state (2b):

(2) Zeus was giving evil boxes to unsuspecting souls for two days.
  a. Over a period of two days, Zeus continued to give away boxes.
  b. The recipients were in possession of the boxes for a period of two days.

Data like the ones in (2) indicate that both parts of the event structure are available for modification at one point in the derivation. The question is whether this decomposition is lexical or syntactic in nature. In this paper, I will take the position that event and result state are both present in the syntactic representation of causative predicates. The most compelling argument for this hypothesis comes from German data with *wieder* 'again'. As von Stechow

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(1996) demonstrates, there is a correlation between the word order in German and the interpretation of *wieder*. In section 2 of this paper, I will summarize von Stechow's observations as well as his analysis. Furthermore, I will show how von Stechow's approach can be unified with general assumptions on the position of direct objects (DOs) in German. In section 3, I will examine the interaction between *again* and an existential operator in object position. As Nissenbaum (2006) demonstrates, interaction between *again* and existentials can provide us with new insights into the structure of lexical causatives. The reason existentials are relevant is illustrated with the sentence in (3) where *again* is assumed to be attached to the edge of vP:

(3) Someone is sneezing again.
  a. again [∃x.x is sneezing]
  b. ∃x [x is sneezing again]

In (3), the existential operator can be interpreted inside the presupposition triggered by *again* (3a). In this case, the sneezing-event is repeated but the person sneezing is not the same. In contrast, if the existential operator is interpreted outside the presupposition (3b), it is the same person who is sneezing once more. A similar ambiguity can be observed with *again* and existentials introduced by indefinite DOs. In this paper, I will focus on contexts where *again* singles out the result state of an event (restitutive *again*). I will present new data that reveal that causative predicates do not constitute a homogeneous group. Instead they must be divided into at least two subgroups according to the position where the existential operator can be interpreted. I will confirm Nissenbaum's proposal and demonstrate that certain causatives indeed lack a reading where the existential operator is interpreted inside the presupposition of restitutive *again* (4):

(4) Pandora scrubbed [a donkey clean again].
  a. #again [∃x.x is a donkey and x is clean]
  b. ∃x.x is a donkey and again [x is clean]

However, I will subsequently show that this phenomenon does not carry over to all causatives. In fact, only causatives that describe a change of state do not allow the reading represented in (4a). Causatives that denote a change of location allow both interpretations shown in (5a & 5b):

(5) Pandora put [a donkey in her stable again].
  a. again [∃x.x is a donkey and x is in Pandora's stable]
  b. ∃x.x is a donkey and again [x is in Pandora's stable]

In section 4 of this paper, I will present an analysis that accounts for the difference between the two groups that can roughly be summarized as change-of-state versus change-of-location verbs. I will argue that the contrast between these two groups can be linked to the operators that combine the result state with the DO. This will not only explain the missing reading in (4a) but also correctly predict that creation verbs should pattern with change-of-location verbs. This is due to the fact that both denote a change of existence in a location whereby the location can be left implicit with creation verbs. I will conclude this paper with a brief discussion and suggestions for future research.

First, let me define what I mean by *lexical causatives.* This term is still mostly reserved for verbs that undergo the causative-inchoative alternation displayed in (6):

(6) a. The box opened.
b. Pandora opened the box.

However, I will follow McCawley (1976) and others (e.g. Hale & Keyser 1993; Sybesma 1992), and consider all verbs that involve direct causation in the sense of Lewis (1973) as lexical causatives. This includes predicates like the ones represented in (7):

(7) a. Hephaestus painted the box purple.
b. Zeus gave the box to Pandora.
c. Pandora put the box on the floor.

The relevant property for this investigation is that these predicates consist of a result state and a causing event that brings this state about. Note that the event in question has to be the main factor in the act of causation. That is, the result state would not hold if the event had not occurred. Moreover, the event has to cause the state directly and not via causing an intermediate eventuality that in turn causes the state. Consequently, the sentence in (7a) is not adequate in a context where Hephaestus accidentally pushes a can of paint from the shelf and the paint pours all over the box, causing it to be purple. As far as the verbs that undergo the causative-inchoative alternation are concerned, I will assume that they constitute a subclass of lexical causatives and will henceforth refer to them as *causative-inchoative* verbs.

2. Complex event structure in the syntax

2.1. Lexical decomposition in the syntax: evidence from German 'wieder' (again)

One potential source of evidence for a theory of lexical decomposition comes from adverbs, in particular from *again*.[1] Sentences with *again* can give rise to a well-known ambiguity: a repetitive and a restitutive reading (8). Under the repetitive reading (8a), the process of closing the box has happened already at a previous time; now Pandora is closing it once more. Under the restitutive reading (8b), Pandora did not close the box before. It was closed when she received it. She opened and then closed it again, thus restoring its former state.

(8) Pandora closed the box again.
a. Pandora had closed the box before. (REP)
b. The box was closed before. (REST)

It is crucial to be aware that the repetitive reading always entails the restitutive reading, i.e., the repetitive reading is a subset of the restitutive reading. It has therefore been proposed that the repetitive reading as such is not part of the semantic or syntactic representation but merely a by-product of it (e.g. Fabricius-Hansen 2001).[2] As long as sentences are ambiguous between

[1] Note that again has already been used as an argument for decomposition by McCawley (1976) and Dowty (1979) among others. However, the data from English are not as conclusive as the ones from German.

[2] According to Fabricius-Hansen (2001), the German *wieder* is polysemous but what she calls the counter-directional restitutive interpretation should be taken as the basic meaning. All other interpretations that she

a repetitive and a restitutive reading, all we know for a fact is that the restitutive interpretation of *again* must exist. The repetitive reading, however, could be there as a special case of the restitutive reading, possibly due to pragmatic reasons. For example, the sentence in (9) is true in any of the given contexts (9a, b & c):

(9) Clyde cleaned his boots again (REP/REST)
   a. and Clyde had cleaned his boots before.
   b. and Bonnie had cleaned his boots before.
   c. and his boots were clean before.

Importantly, (9a) and (9b) entail (9c). The sentence *Clyde cleaned his boots again* can only be true if it is true that his boots were clean at some time prior to the cleaning event. Consequently, all the sentence in (9) tells us is that *again* must have a restitutive interpretation. Evidence for a separate repetitive interpretation of *again* can only come from an example that is not acceptable in a context where it is true that the result state is restored but false that the event has happened before. Looking at German, von Stechow (1996) observes that such sentences do exist (10):

(10) Clyde hat wieder seine Stiefel gesäubert (REP/#REST)
   Clyde has again his boots cleaned
   'Clyde cleaned his boots again.'

For this German translation of (9) to be acceptable, it is not enough if (9c) is true but (9a) has to be true as well. Moreover, von Stechow notes that it depends on the position of *wieder* 'again' with respect to the DO if a sentence is ambiguous or if it has the repetitive reading only. Whenever *wieder* precedes a DO, only the repetitive reading seems to be available (10). Yet whenever *wieder* follows the DO, both interpretations exist (11):

(11) Clyde hat seine Stiefel wieder gesäubert. (REP/REST)
   'Clyde cleaned his boots again'

As Beck & Johnson (2004) point out, something similar can be observed in English. The sentence in (12) is felicitous only if Clyde cleaned his boots at a previous time:

(12) Clyde again cleaned his boots. (REP/#REST)

From sentences like the ones in (10) and (12), when compared to (9) and (11) respectively, we know that *again* gives rise to two different interpretations. This is due to the fact that in (10) and (12), *again* must have a meaning that forces the repetitive interpretation. This contrasts with the examples in (9) and (11) where the denotation of *again* must account for the restitutive reading, whereas the repetitive reading might just be a by-product. If we want to solve this problem by proposing two homophonous adverbs, we have to explain why only the adverb with the repetitive interpretation is allowed to precede the DO in German (10) or the

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distinguishes from this basic meaning are the result of interaction between this reading and sentence-internal or sentence-external context. Unfortunately, Fabricius-Hansen does not show in detail how the various meanings could be derived under her account. Note that under the syntactic approach that we are taking here, only the distinction between restitutive and repetitive readings is relevant. The subtle differences within the set of restitutive or repetitive readings, respectively, are most likely due to pragmatics.

finite verb in English (12), respectively. Therefore, von Stechow's observation that the availability of an interpretation varies with the word order is a compelling argument in favor of a syntactic account.

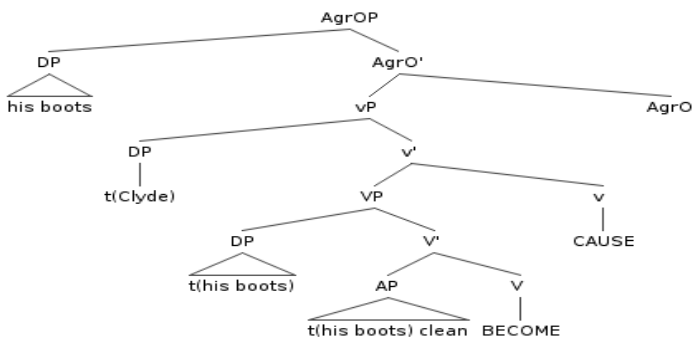
The basic idea of von Stechow's analysis is that *again* has only one lexical entry (13) of type <<s,t>,<s,t>> that can attach to any projection of type <s,t> in the syntactic structure.[3]

(13) Let P be a property of eventualities and let e be an eventuality.
||**again**||(P)(e) is defined only if ∃e' [||MAX||(P)(e') = 1 & e' < e].
Where defined, ||**again**||(P)(e) = 1 iff P(e) = 1. (von Stechow 1996:95, ex. 3-7)

MAX is a symbol of type <<s,t>,<s,t>>. ||MAX||(P)(e) = 1 iff P(e) and there is no e' such that e is a proper part of e' and P(e') = 1. (von Stechow 1996:96, ex. 3-8)

According to the definition in (13), *again* introduces the presupposition that the proposition expressed by (P) was already true at another time (e'). This other time (e') must have been entirely before the current time (e), i.e., the two eventualities must not be part of the same eventuality. This is achieved by the MAX-operator. MAX ensures that we cannot take one event where P was true, split it into two events and then say that the later event is a repetition of the earlier one. It only counts as two separate events if there was an interruption. The interpretation of *again*, i.e., the presupposition it triggers, depends entirely on its argument. If the argument is *his boots are clean*, then *again* triggers the presupposition that his boots were clean at some previous time. This gives us the restitutive reading. On the other hand, if the argument of *again* is *Clyde is cleaning his boots*, it elicits the presupposition that Clyde is cleaning his boots not for the first time. This means that attachment to the vP is predicted to result in a repetitive reading. From a syntactician's point of view, the repetitive reading is then easily accounted for. However, to achieve the restitutive reading, we have to first make the result state accessible. Therefore, von Stechow reverts to lexical decomposition and proposes that a complex event structure is represented in the syntax. Based on McCawley (1968), von Stechow proposes that a verb like *clean* is decomposed into the heads CAUSE, BECOME and the adjectival root *clean* (14):[4]

(14)



CAUSE combines a property of eventualities (P) with an event (e) where e brings P about (15). More precisely, P could not have occurred if e would not have taken place. Hence, without Clyde's actions, the boots could not have changed their state from dirty to clean.

[3] Type s refers to eventualities (states and non-states), type e to individuals, and t to truth values. Accordingly, a node of type <s,t> is a property, i.e., a predicate together with its arguments like a VP or a SC.

[4] In von Stechow (1996), the CAUSE-operator is replaced with Kratzer's (1996) *voice*.

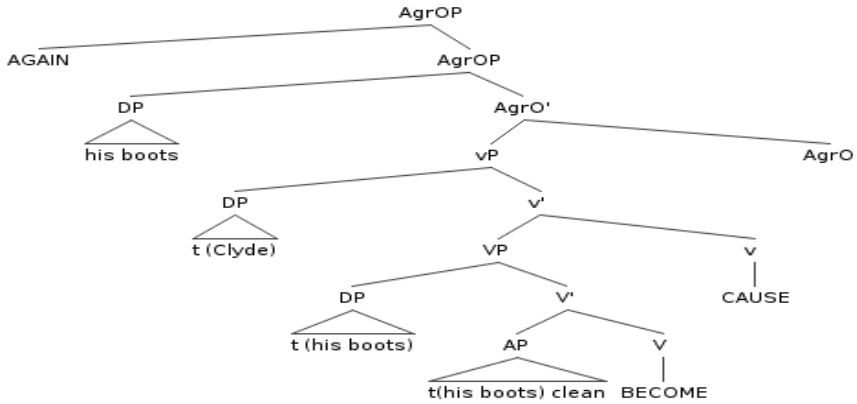
(15) ||CAUSE||(P)(x)(e) = 1 iff ∃e'[P(e') = 1 and cause(e)(e') and agent(e)(x)]

The operator BECOME denotes a property of an event (16). Applied to [$_{AP}$ his boots clean], it tells us that there is an event that changes the truth value of 'his boots clean' from false to true.

(16) ||BECOME||(P)(e) = 1 iff e is the smallest event such that P is not true of the pre-state of e but P is true of the target state of e. (von Stechow 1996:96, ex. 3-11)

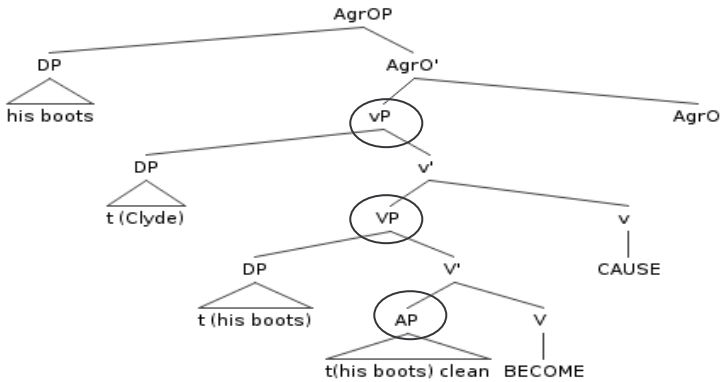
This structural decomposition offers various attachment sites for *again*. However, to make the correct predictions for German, von Stechow has to make two additional assumptions. First, in German only the surface scope interpretation is available. Second, the DO must always move out of the vP. The first assumption is well-established; the second assumption, however, is not uncontroversial, and I will get back to this problem in section 2.2. First, let me illustrate how von Stechow accounts for the difference in meaning between (10) and (11). The representation of the sentence in (10) where *again* precedes the DO is shown in (17):

(17) DO > *wieder* 'again':



In (17), the DO moved out of the vP. Consequently, if *again* precedes the DO, its sister is AgrOP and the presupposition includes the whole event of 'Clyde CAUSE his boots BECOME clean'. Thus, the sentence in (10) is only acceptable if Clyde cleaned his boots before. Now let's look at the sentence in (11) which has a repetitive as well as a restitutive interpretation. Contrary to the sentence in (10), the sentence in (11) is ambiguous between three different structures because there are three attachment sites for *again* below the DO:

(18) *wieder* 'again' > DO:



Hence under von Stechow's analysis, the availability of different readings corresponds to a structural ambiguity. The highest attachment site for *again* is the vP, which results in a repetitive reading similar to (17). As already mentioned earlier, it is irrelevant for this analysis whether *again* attaches above or below AgrO because AgrO has no semantic content. The second potential attachment site for *again* in (18) is VP. In this case, the agent and, more importantly, the CAUSE-operator are both outside the presupposition triggered by *again*. However, the VP contains the BECOME operator and is thus eventive. We are therefore dealing neither with the same repetitive reading as before nor with a purely restitutive interpretation. The reading that should correspond to this representation is the one where the action was performed before but perhaps by a different agent or cause (e.g. wind, gravity). For example, Bonnie might have previously cleaned Clyde's boots. Von Stechow notes this attachment site for *again* as a potential problem of his analysis; there does not seem to exist a sentence that is only acceptable in this scenario but not also in a merely restitutive context. As a matter of fact, we will see data in section 3.3 that support this intermediate attachment site. Finally, *again* can be adjoined directly to the AP which results in a purely restitutive reading.

To conclude, von Stechow's analysis predicts that a sentence where the DO precedes *again* should have a repetitive and a restitutive reading because this sentence corresponds to three possible syntactic structures that result in different meanings. Conversely, a sentence where the DO follows *again* must have the repetitive interpretation. This is due to the fact that to precede the DO, *again* must attach to AgrOP where it has scope over the whole event. As we have seen, these predictions are consistent with the data.

2.2. The position of the DO in German

At this point we must discuss the crucial assumption that the DO moves overtly out of the VP. I will start with a short presentation of Webelhuth's (1989, 1992) account of the position of DOs in German. We will see that some of the data seem to undermine von Stechow's theory. Yet, I will provide a solution that will allow us to reconcile Webelhuth's observations on DOs with von Stechow's account for *again*. Moreover, I will show that the interpretations that are available for *again* depend on the definiteness of the following DO. This variation combined with facts about German word order offer further support for a structural account.

German word order is relatively free and objects can move almost anywhere. However, and this is problematic for a structural account of *again*, sometimes they do not seem to move at all. Well-established observations about unmarked German word order include the following: indirect objects usually precede direct objects, animate comes before inanimate and definite before indefinite (e.g. Abraham 1986; Heck 2001). Furthermore, definite

accusative objects seem to have a tendency to move out of the vP whereas their indefinite counterparts are preferred inside the vP. Consider for example the data in (19) and (20) from Webelhuth who uses *wohl* 'probably' to mark the edge of the vP. In contrast to indefinites (20), definite DOs can both follow (19a) or precede the adverb *wohl* (19b):

(19) a. weil er wohl das Buch gelesen hat
because he probably the book read has
'because he has probably read the book'
b. weil er *das Buch* wohl [$_{VP}$ t gelesen hat] (Webelhuth 1992:197, ex. 166-167)

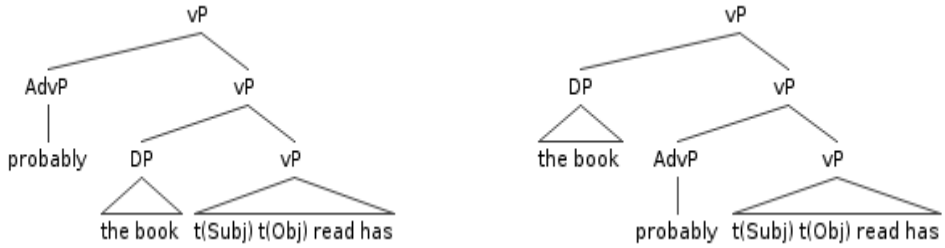
(20) a. weil er wohl ein Buch gelesen hat
because he probably a book read has
'because he has probably read a book'
b.*weil er *ein Buch* wohl [$_{VP}$ t gelesen hat] (Webelhuth 1992:197,198, ex. 168-169)

As Webelhuth points out, the scrambling of the indefinite DO becomes acceptable if a strong interpretation (in the sense of Diesing 1992) is possible. The sentence in (21) is fine but *a book* can only be understood in a generic way, e.g. a book in contrast to newspapers or journals. The best paraphrase of (21) is *If it were a book, he would probably read it*.

(21) weil er ein Buch wohl [$_{VP}$ t lesen würde]
because he a book probably read would
'because he would probably read a book' (Webelhuth 1992:198, ex. 170)

This observation can be carried over to examples with other sentential adverbs (e.g. *wahrscheinlich* 'probably', *ja doch* 'indeed') that are considered to mark the vP-boundary. If we now take another look at von Stechow's tree in (14), we see that this structure does not make the correct predictions anymore unless we assume that in sentences with *again* the definite DO always has to leave the vP. One way to resolve this issue is to assume that in (19a) as well as in (19b), the definite DO has moved outside the VP but not outside the vP. I propose that definite accusative objects always move out of VP and usually adjoin to the vP.[5] The variation in (19) is then due to the fact that the definite DO can attach to the vP either before or after sentential adverbs like *wohl* as illustrated in (22a) and (22b), respectively:

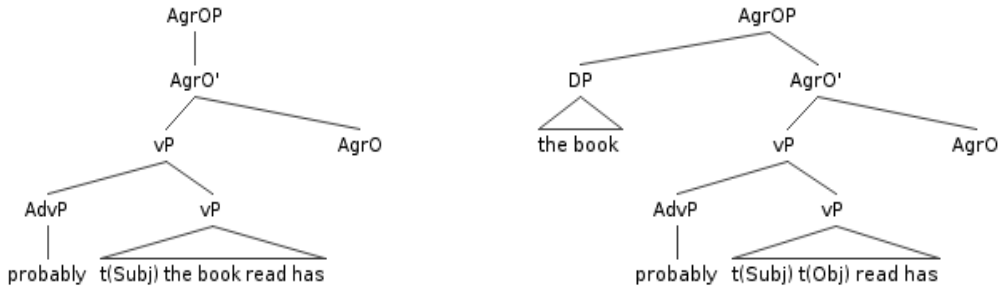
(22) a. b.



[5] At this point, I am impartial with respect to the question of whether there is an AgrOP above vP or not. Note that independent of the existence of AgrOP, Webelhuth's data are not conclusive with respect to the position of the DO. The variation in (19) could also result from two different attachment sites for sentential adverbs, i.e. AgrOP and vP, respectively.

In contrast to the analysis in (22), Webelhuth explains the variation in (19) by assuming that the definite DO is free to surface either inside or outside the VP (23):

(23) a. b.



Both structures, (22) as well as (23), account for the different word orders in (19). However, (22) has the advantage that it also allows us to maintain a structural account for *again*. Note that Webelhuth assumes that vP is the lowest attachment site for adverbials. Webelhuth determines the position of unscrambled and scrambled arguments by keeping the position of adverbs constant. Therefore, Webelhuth's analysis is incompatible with a decompositional approach because it does not allow *again* to attach to the result-state clause inside the vP. A theory under which *again* is polysemous (e.g. Fabricius-Hansen 2001) becomes then inevitable. Consequently, the correspondence between different word orders and readings remains a puzzle. If we try to reconcile the theories of Webelhuth and von Stechow by allowing *again* to adjoin to maximal projections below vP, we still end up with the wrong predictions. Remember that Webelhuth argues that the definite DO can remain in its base position which is inside the VP. Accordingly, it should be possible for *again* to adjoin to the VP, i.e. below the agent and the CAUSE operator, and still precede the DO. In this case, the sentence in (11) repeated here as (24) should be fine in any of the contexts given in (25).

(24) Clyde hat wieder seine Stiefel gesäubert.
Clyde has again his boots cleaned
'Clyde again cleaned his boots.'

(25) a. Clyde had cleaned his boots before.
b. Bonnie (but not Clyde) had cleaned his boots before.

However, native speakers of German only accept (24) if (25a) is true. The context given in (25b) is not enough to render (24) felicitous. By contrast, the structures proposed in (22) make the correct predictions. Here, the definite DO is always adjoined to the vP and thus above the CAUSE-operator. Remember that the crucial point for the decompositional account is that *again* that precedes the definite DO must be higher in the representation than CAUSE. This is achieved by the structures suggested in (22). At the same time, (22) allows *again* to follow the definite DO and be either above or below CAUSE. In conclusion, the data in (19) are compatible with both representations, the one in (22) as well as the one in (23), but only the structure in (22) allows a syntactic account for *again*.

One further qualification concerns indefinite DOs. As the data in (20) and (21) show, we have no reason to assume that an indefinite DO adjoins to the vP unless it has a strong interpretation (e.g. generic or partitive). Therefore, I will assume with Webelhuth that the indefinite DO remains inside the VP. This means that it will be below v, i.e. the CAUSE-

operator. Support for this assumption comes from the contrast between the two sentences in (26a) and (26b):

(26) a. Dido klebte Aeneas wieder die Nase ins Gesicht. (REP/#REST)
Dido glued Aeneas again the nose in-the face
'Dido glued the nose on Aeneas' face again.'
b. Dido klebte Aeneas wieder eine Nase ins Gesicht. (REP/REST)
Dido glued Aeneas again a nose in-the face
'Dido glued a nose on Aeneas' face again.'

As stated earlier, if *wieder* precedes a definite DO, only the repetitive reading is available. Accordingly, (26a) requires a context where Dido has glued the nose on Aeneas' face at a previous occasion. This contrasts with (26b) which is ambiguous between a repetitive and a restitutive reading. Hence, (26b) is still adequate if Aeneas lost his nose for the first time. Note that this disparity is exactly what is predicted by a structural account of *again*. Under the assumption that indefinites do not move overtly out of VP, they can remain not only below the higher *again* that is attached above CAUSE but also below an *again* inside vP that triggers a restitutive reading. Therefore, the contrast between the two sentences in (26) is another compelling argument in favor of a structural account. Moreover, it is in accordance with the commonly held belief that in German definite DOs are structurally higher than indefinites. Note that the contrast between (26a) and (26b) poses a serious problem for a semantic theory of *again*. The only observation that is not in accordance with the claim that indefinites remain inside the VP is the intuition of German speakers that an indefinite preceding *again* always has a specific interpretation. That is, the sentence in (27) only has the reading in (27a):

(27) Dido klebte Aeneas eine Nase wieder ins Gesicht.
Dido glued Aeneas a nose again in-the face
'Dido glued a nose on Aeneas' face again.'
a. 'Dido glued one of the noses onto Aeneas' face again.'
b. #'Dido glued some nose on Aeneas' face again.'

This means that the DO *'a nose'* has only a partitive reading. Hence, (27) triggers the presupposition that there is more than one relevant nose in the discourse context. According to Diesing (1992), indefinites that are interpreted inside the vP can have either a strong (= presuppositional) or a weak (= cardinal) reading. By contrast, indefinites that are interpreted outside the vP can only receive a strong interpretation. This follows from Diesing's claim that existential closure applies to vPs. Only indefinites without free variables are allowed to be outside the scope of existential closure. Consequently, only indefinites with a quantifier are interpretable outside the vP. Relevant for this paper is Diesing's proposal with respect to indefinite DOs. Since I argued that indefinites can surface inside the vP and still precede *again*, one might expect that these indefinites are ambiguous between a weak and a strong reading. The fact that they only have a strong interpretation does not contradict my proposal but it requires an explanation. To understand why the weak reading is unavailable, we first have to clarify what (27) would mean if the DO would have a weak reading. A DO with a weak or existential interpretation introduces a new variable *x* in the discourse context. We learn that *x* is a nose and that Dido put x onto Aeneas' face. The problem is that *again* requires that we now presuppose something about this unknown discourse referent, namely that it was in Aeneas' face at a previous time. However, if we accommodate our discourse

context and make the presupposition that x refers to a nose that was on Aeneas' face at a previous occasion, it is no longer enough to think of x as a variable that refers to a set of noses with the cardinality one. Instead, we have to think of x as the nose (or one of the noses) that was on Aeneas' face before. Consequently, the presupposition of *again* in (27) evokes a 'specific' or 'strong' interpretation of the indefinite DO.

In this section, I showed how German word order together with the two interpretations of *wieder* 'again' can be taken as an argument in favor of lexical decomposition. We saw that the advantage of von Stechow's approach is that it makes the correct predictions with respect to the data in German. However, von Stechow mostly looked at sentences with definite DOs. For the remainder of this paper, I will focus on indefinite DOs in sentences with restitutive *again* and show what they tell us about the representation of lexical causatives.

3. Lexical causatives and the position of the indefinite DO

In the previous section, I proposed that the surface position of the definite DO in German is always outside the VP, presumably at the edge of vP. With respect to the indefinite DO, the data indicate that it remains inside the VP. However, in a decomposed structure this is consistent with two possible surface positions. On the one hand, the indefinite DO could surface in SpecVP. On the other hand, it could also be in the specifier of the result-state clause (SpecAP or SpecPP, respectively). Moreover, the DO could be base generated inside the result-state clause and then move into SpecVP. At this point, we have no way of deciding between these options.

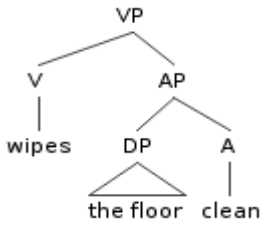
In this section, I will first introduce two alternative theories with respect to the structure of a decomposed VP. Subsequently, I will demonstrate how the interaction between the adverb *again* and the indefinite DO (i.e., the existential operator) can shed light on the position of the indefinite. As a next step, I will present data which indicate that the existing analyses are not sufficient to account for the pattern found in German and English, respectively.

3.1. The base position of the DO: two competing analyses

When it comes to lexical causatives and resultative constructions, various kinds of theories can be found in the literature. Relevant for this paper are the proposals that have been made with respect to the position of the DO. One type of analysis argues that the DO is selected by the result-state predicate. I will summarize these approaches as small-clause analyses. The second type proposes that the DO is an argument of the causing predicate.

The theories that take the result state of a verb to form a small clause (SC) together with the argument (e.g. von Stechow 1996) go back to Hoekstra's (1988) analysis for resultative constructions. Under this view, the result state forms a SC together with the accusative DP (28). This structure accounts for the restitutive reading of *again* because the adverbial can modify the result state without the event.

(28) SC analysis



The disadvantage of this structure is that the accusative DP is a direct argument of the adjective, that is, of the result state but not of the verb. However, as Tomioka (2006) points out, a sentence like (29) is true if and only if the agent manipulates two windows.

(29) Dave pushed two windows open. (Tomioka 2006:55, ex. 34)

In a context where one window is already open and Dave pushes open a second window, (29) is false even though the truth conditions for the result state ('two windows are open') are fulfilled. Unfortunately, it is questionable how much this example really tells us. The truth conditions of the result state do not equal the truth conditions of the whole sentence. In the given context, Dave's actions cannot be considered the direct cause of two open windows but only of one. However, it has always been pointed out that lexical causatives require direct causation. Consequently, I consider this observation an important but not a conclusive argument against SC analyses. However, there is structural evidence that further supports the intuition that the DO is the argument of the action as much as of the result state. Beck & Johnson (2004) show that the DO in a construction like (30a) differs considerably from the DO in a construction like (30b).

(30) a. Zeus presents the box to Pandora. (DP+PP frame)
b. Zeus presents Pandora the box. (Double object frame)

While *the box* in (30a) behaves like an argument of *present*, *Pandora* in (30b) behaves like the subject of a SC. The latter observation goes back to Kayne (1984) who noted that subjects of SCs but not DOs are islands for extraction:

(31) a.*What$_i$ did Hera present Zeus [evidence against t_i]? (Double object frame)
b. What$_i$ did Hera present [evidence against t_i] to Zeus? (DP+PP frame)

Moreover, when a verb embedding a SC undergoes nominalization, the SC can no longer be realized (32). Since *the box* in (33) behaves like a true argument of *present*, *'the box to Pandora'* cannot constitute a SC.

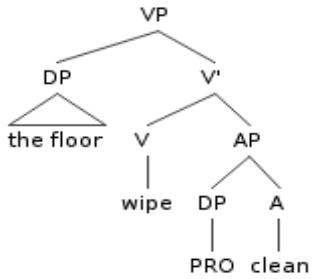
(32) present Pandora the box (Double object frame)
* the presentation of Pandora the box
* Pandora's presentation of the box

(33) present the box to Pandora (DP+PP frame)
the presentation of the box to Pandora
the box's presentation to Pandora

Based on these observations, Beck & Johnson propose that the DP of the DP+PP frame is not a SC-subject but an argument of the verb. Furthermore, Beck & Johnson assume that the PP contains a PRO-subject. Since objects of verbs like *paint* are not islands for extraction either (34), they argue that the same analysis should apply to resultative constructions (35).

(34) a. What house$_i$ did Helios paint [a window of t_i] yellow?
b. Which restaurant$_i$ did Heracles wipe [the tables of t_i] clean?

(35) PRO-analysis



Similar analyses have been proposed by Nissenbaum (2006) and von Stechow (2007).

In conclusion, we have two proposals that differ insofar as one makes the assumption that the DO is an argument selected by the head of the result-state clause whereas the other proposal assumes that the DO is selected by the head of the VP. In the following section, I will demonstrate how the interaction of the adverb *again* with the existential operator can help us to decide between the two analyses.

3.2. Interaction between 'again' and the existential operator

Some indefinite arguments can be semantically represented by an existential operator. In English, this operator can typically be interpreted either as in the scope of or as having scope over other operators in the sentence. The latter phenomenon is known as quantifier raising (e.g. May 1977, 1985). Now remember that *again* triggers a presupposition that depends on the property of the argument with which *again* is combined. If the sister of *again* contains an existential operator, then the existential can either be a part of the presupposition (narrow scope) or it can be interpreted outside the presupposition (wide scope). Consequently, the sentence in (36) below is expected to have two different readings depending on the position in which the existential quantifier is interpreted.

(36) Someone is stumbling over this block again.
a. again [∃x.x is stumbling over this block]
b. ∃x [x is stumbling over this block again]

If *again* takes wider scope than the existential, the existential is part of the presupposition (36a). Consequently, what is repeated is that someone is stumbling over this block. At some previous time, there existed a person who stumbled over this block, and now once more there exists a person who is stumbling over this block. On the other hand, if the existential is interpreted with wide scope (36b), it is no longer a part of the presupposition. In this case, (36) can be understood as follows: There exists a person, this person stumbled over this block before and now the same person is stumbling over this block again. So whereas in one reading

the block can be regarded as a hazard to the general public, in the other reading there is just one specific person who should learn to lift his feet.

As mentioned earlier in this paper, German contrasts with English in that it usually rejects the inverse scope reading. Let me illustrate this fact with the sentences in (37) and (38) below. If the subject *jemand* 'somebody' is overt inside the vP and thus below repetitive *again* (37a), it is interpreted inside the presupposition triggered by *again* (37b). Consequently, the sentence in (37a) is used to express that what is happening once more is that somebody is sleeping. Somebody is sleeping now and there was somebody (else) sleeping at a previous occasion.

(37) a. Es schläft wieder jemand.
It sleeps again somebody
'Somebody is sleeping again.'
b. again [∃x.x sleeps]

This contrasts with (38a) below where the subject *jemand* moved overtly into SpecCP. Since it is now preceding the adverb, it is interpreted outside the presupposition of *again* (38b). Therefore, (38a) suggests that we are dealing with the same person in both events:

(38) a. Jemand schläft wieder.
Somebody sleeps again
'Somebody is sleeping again.'
b. ∃x [x is sleeping again]

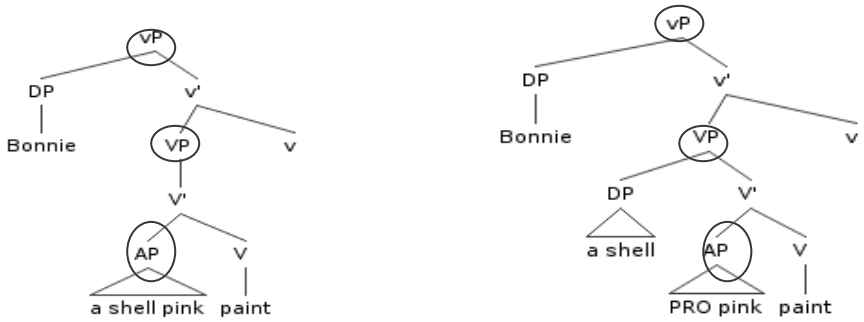
This difference between English and German will become crucial in the next section. In German, the word order reflects the structural hierarchy. If *again* follows the DO, it must be adjoined below the surface position of the DO because adverbs are adjoined on the left side. This is not true for English where sentence-final *again* can be adjoined above or below the surface position of the DO. At the same time, English typically allows for reconstruction. Therefore, English is the better language to look at if we want to know where the DO was base generated. In English, it should still be possible to interpret a quantifier in its original position even if the DO moved before spell-out. It is important to keep these differences between English and German in mind when looking at the data in the subsequent sections.

3.3. Existentials, restitutive 'again', and the result-state clause

In this section, I will go back to the two alternative analyses for VPs that I introduced in section 3.1. This time, I will use the interaction between *again* and an existential operator to compare the SC analysis with the structure that contains PRO.

SC analyses differ from PRO analyses in one crucial respect, i.e., the position where the DO is base generated. According to SC analyses, the DO originates inside the result-state clause (39a). This contrasts with proposals that take SpecVP as base position of the DO and assume that the specifier position of the result-state clause is filled by PRO (39b):

(39) a. SC b. PRO



Both structures in (39) have three different attachment sites for *again*. Similar to what we discussed in section 2.1, one possibility is that *again* is adjoined to vP. In this case, we expect a repetitive reading that includes the agent as in (40a) below. The second available attachment site is the VP. This corresponds to an interpretation where the change of state as such has occurred previously but with a different causer (40b). Finally, *again* can adjoin to AP. This results in a purely restitutive reading where the only part that must have held before is the result state itself (40c).

(40) Bonnie hat wieder eine Muschel rosa angemalt…
Bonnie has again a shell pink painted
'Bonnie painted a shell pink again.'
a. …and she had done so previously.
b. …and a shell has been painted pink previously.
c. …and a shell was pink previously.

The crucial difference between (39a) and (39b) is that only the SC analysis predicts that the existential operator can be interpreted inside the result-state clause, i.e., inside the presupposition triggered by restitutive *again*. Consequently, (39a) predicts that (40) has among other readings the interpretation presented in (41):

(41) again [∃x.x is a shell and x is pink]
→ There is a pink shell and there was a (potentially different) pink shell before.

If the structure in (39b) is correct, the prediction for German as well as for English is that the existential will always be outside the presupposition of restitutive *again* as illustrated in (42):

(42) ∃x.x is a shell and again [x is pink]
→ There is a shell, this shell is pink and it was pink before.

Since the DO in (39b) does not originate inside the result-state clause, it can never be interpreted in this position. This is a strong prediction and I will illustrate what this means with the following context. Let's assume that Clyde goes to the beach and collects a couple of white shells and one pink shell. Thus, we know that a pink shell exists. However, one day Bonnie breaks the pink shell. Hence, there is a certain period in which no pink shell exists. If Bonnie takes one of the white shells and paints it pink, then a pink shell exists again. Therefore, the state in which a pink shell exists is restored. The PRO-analysis predicts that this cannot be expressed with restitutive *again*, even if all the requirements by its

presupposition are met. As Nissenbaum (2006) points out, this prediction is consistent with the data. Consider the sentence in (43) in the given context:

(43) Context: *Clyde goes to the beach and collects a couple of white shells and one pink shell. When Bonnie cleans the house, she accidentally breaks the pink shell. Hoping that Clyde will not notice the mishap,…*

#	Bonnie	malt	wieder	eine	Muschel	rosa	an.
	Bonnie	paints	again	a	shell	pink	on

'Bonnie is painting a shell pink again.'

Note that the sentence in (43) is fine in a scenario where Bonnie painted a shell before. However, this is the repetitive reading which is not relevant for the discussion at hand. In addition, the sentence in (43) is acceptable, if the shell that is painted by Bonnie in this event was pink at a previous time.[6] This would be a restitutive interpretation but it would be the reading where the existential is interpreted outside the presupposition triggered by *again*. Yet again, this is a reading that is irrelevant for the matter at hand. What is crucial for our discussion is that it holds for English and German alike that the indefinite DO cannot be interpreted inside the result state clause. This means that the interpretation in (41) that is predicted by the SC structure in (39a) is not available. The sentence in (43) cannot mean that Bonnie was the agent of an event that restored the state in which a pink shell exists. The same can be observed with other lexical causatives (44):

(44) Context: *Sally owns one brown mouse and a great number of white mice. While she is gone, Harry takes care of them and the brown mouse dies. Harry is freaked out and wants to cover up the loss...*

#	Er	färbt	wieder	eine	Maus	braun.
	he	dyes	again	a	mouse	brown

'He dyes a mouse brown again.'

The context in (44) makes it clear: there used to be a brown mouse, then there was a period where there was no brown mouse and finally, there is a brown mouse again. What is crucial is that the brown mouse that lives now is not the same as the one that lived before. In addition, the current brown mouse was not brown at a previous stage of its life. Hence, the only thing that is repeated is the fact that there is a brown mouse in the discourse context. Therefore, this context is only compatible with the presupposition that there was a (different) brown mouse before. This corresponds to the interpretation provided in (45):

(45) again [∃x.x is a mouse and x is **brown**]
→ There is a brown mouse and there was a (different) brown mouse before.

However, apart from a repetitive interpretation, the sentence in (44) has only one interpretation, namely the interpretation in (46):

[6] This interpretation is only available for the English sentence in (43) but not for its German counterpart.

(46) again [∃x.x is a mouse and x is **dyed brown**]
→ A mouse is (being) dyed brown and at a previous time, there was a (different) mouse that was (being) dyed brown.

Note that this is the intermediate reading that corresponds to attachment of *again* to the VP. The fact that the purely restitutive interpretation is excluded for (44) whereas (46) is available, supports the assumption that this intermediate level indeed exists (see also Nissenbaum 2006). Another example that is similar to (43) and (44) is the one in (47) below. As discussed above, the problem with this sentence is not that it is ungrammatical. The sentence in (47) is fine, in English as well as in German. However, it is not acceptable in a context in which the existential must be interpreted inside the presupposition triggered by restitutive *again*.

(47) Context: *Yesterday, Sally visited a popsicle factory. There she had the opportunity to taste the popsicle mixture before it was frozen. She really loved it.*

Daheim angekommen hat Sally wieder ein Eis am Stiel geschmolzen.
At-home arrived has Sally again a popsicle melted
'Once she was at home, Sally melted a popsicle again.'

In conclusion, the word order in German corresponds to different readings of *again* as presented in Table 1:

Word order (German)	Repetitive reading	Restitutive reading
wieder > indef. DO	✓	#
indef. DO > *wieder*	✓	✓

Table 1

The data in this section strongly support a structure where the DO originates outside the AP as proposed by the PRO-analysis (39b). Note that the SC structure is also consistent with the data if we assume that the DO moves overtly into SpecVP. However, in this case we would expect reconstruction in English. As discussed in section 3.2, English typically allows a quantifier to be interpreted in its base position. Since this is not consistent with the data in this section, the SC proposal requires the additional assumption that something blocks reconstruction in English. Note that this possibility cannot be excluded. Yet as long as this additional assumption is a mere stipulation, the structure with PRO should be preferred.

3.4. Two classes of predicates

In the previous section, I presented some data that showed that the existential operator cannot be interpreted inside the presupposition of restitutive *again*. This is consistent with a syntactic structure where the indefinite DO originates (or at least surfaces) outside the result-state clause. However, once we propose such an analysis, we make the prediction that the existential operator can never be inside the scope of restitutive *again*. As it turns out, this prediction is not born out by the facts. Consider the example in (48):

(48) Context: *Until about 200 years ago, bears used to live in the Alps.*

Gestern	haben	Biologen	wieder	Bären	in den	Alpen	angesiedelt
Yesterday	have	scientists	again	bears	in the	Alps	settled

'Yesterday, scientists put bears in the Alps again.'

We know from the context that at some point in time, there were bears in the Alps. Then there was a certain period when no bears lived there. Now, scientists made it happen that once more, there are bears in the Alps. It is crucial that there was no previous putting event. Neither did the scientists put bears anywhere else before, nor did these specific bears undergo some previous putting-event. The only thing that is repeated is the fact that bears exist in the Alps. This means that the presupposition of *again* only contains the result state. Moreover, the bears that come to live in the Alps as a result of this event have not lived there before. Consequently, the existential operator is interpreted inside the presupposition, i.e. the result-state clause. The example in (48) is no exception. The situation in (49) is similar. A mountain used to exist and now there is a mountain again. Crucially, we can exclude the possibility that the previous mountain was man-made. It was already there before the first settlers arrived. Furthermore, the people involved never constructed a mountain before.

(49) Context: *The island had a mountain that practically disappeared in the course of an earthquake.*

Die	Bewohner	der	Insel	haben	wieder	einen	Berg	errichtet.
The	inhabitants	of-the	island	have	again	a	mountain	erected

'The inhabitants constructed a mountain again.'

As in the examples in the previous section, the judgments are the same for English and German. However, in German the difference in scope corresponds to a difference in word order. The contrast between the two readings is particularly striking in the examples in (50) and (51):[7]

(50) Context: *Niki loses his left ear in an accident. Fortunately, the hospital has enough donor ears.*

a.

Die	Ärzte	haben	Niki	wieder	ein	Ohr	angenäht.
The	surgeons	have	Niki	again	an	ear	sewed

'The surgeons gave Niki an ear again.'

b. # Die Ärzte haben Niki ein Ohr wieder angenäht.

(51) Context: *Niki loses his ears in an accident. Unfortunately, only one of them can be retrieved, the other one is lost for good.*

a. #

Die	Ärzte	haben	Niki	wieder	ein	Ohr	angenäht.
The	surgeons	have	Niki	again	an	ear	sewed

'The surgeons gave Niki an ear again.'

b. Die Ärzte haben Niki ein Ohr wieder angenäht.

[7] I am indebted to Bernhard Schwarz (p.c.) for theses examples.

In (50a) and (51a), the existential operator is interpreted inside the presupposition, i.e., it is again the case that he has an ear. In (50b) and (51b), the existential is interpreted outside the presupposition, i.e., there exists an ear such that he had it before and now he has it again. Consequently, these sentences are not acceptable in the same context.

To conclude, in section 3.4 I presented data that implied that the existential can be interpreted inside the presupposition of restitutive *again*. Therefore, an analysis must allow the DO to surface inside the result-state clause. This is consistent with a SC analysis where the DO originates in the AP. At the same time, it contradicts a structure that does not allow the DO to surface below restitutive *again*. Yet we must not forget the data we have seen in section 3.3. These data indicated that the structure with PRO makes the correct predictions, whereas the SC approach requires the stipulation that the DO has to move overtly to SpecVP and also that reconstruction is blocked in English.

In conclusion, in section 3 we have seen two different sets of data that point in opposite directions (Table 2). Therefore, we need an analysis that explains this contrast and makes the correct predictions with respect to all of the data. In the final part of this paper, I will outline such an analysis.

wieder > existential	Group A	✓REPETITIVE	#RESTITUTIVE
	Group B	✓REPETITIVE	✓RESTITUTIVE

Table 2

4. Proposal

4.1. Changing state vs. changing place

Before we try to account for the data in the previous section, we have to look what differentiates one set of data from the other. The sentences that were not acceptable in a context where restitutive *again* had wider scope than the existential operator contained the predicates *schmelzen* 'melt', *rosa anmalen* 'paint pink' and *braun färben* 'dye brown'. These are causative-inchoatives and resultative constructions. Other predicates that fall into this group are *öffnen* 'open', *leeren* 'empty', *kühlen* 'cool', etc. (52):

(52) Group A: #restitutive *again* > existential operator
a. *melt*, *freeze*, *cool*, *warm*, *empty*, *fill*, *open*, *close*, …
b. *paint pink*, *dye brown*, *color blue*, *hammer flat*, *open wide*, …

In contrast, the sentences with the predicates *ansiedeln* 'settle, put' and *errichten* 'construct' were fine in a context which required that the existential operator was interpreted below restitutive *again*. The same can be observed with verbs like *place*, *donate*, *build*, etc. (53):

(53) Group B: ✓restitutive *again* > existential operator
put, *place*, *donate*, *construct*, *build*, …

At a first glance, it looks as if we were dealing with a contrast between causative-inchoative verbs on the one hand (52) and the rest of the verbs on the other hand (53). However, note that

ansiedeln 'settle, put', which falls into Group B (53), displays the causative-inchoative alternation in German (54):[8]

(54) a. Die Biologen siedeln Bären in den Alpen an.
The scientists settle bears in the Alps on
'Scientists are putting bears in the Alps.'
b. Bären siedeln sich in den Alpen an.
Bears settle themselves in the Alps on
'Bears are settling in the Alps.'

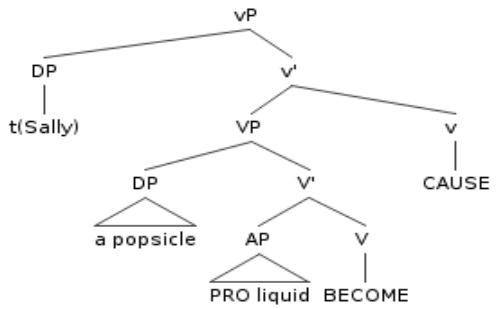
Therefore, I conclude that the difference between Group A and Group B is independent of this alternation. The real contrast between these groups is that Group A only contains predicates that describe a change of state whereas the predicates in Group B refer to a change of location or change of existence in a location.

Let us first look at Group A. No matter if an object is emptied, painted pink or closed, it undergoes a change of state.[9] An object that is manipulated in this way does not have exactly the same properties afterwards as it had before. I propose that this transition from one state to the next is what is represented in the structure by the operator BECOME (55):

(55) ||BECOME||(p)(x)(e) = T iff e is the smallest event s.t. p is not T of the pre-state of e but p is T of the target state of e and x is the theme of p.
(adapted from von Stechow 1996; Beck & Johnson 2004)

BECOME denotes a property of events. This means more or less that BECOME tells us that there is an event and that the property of this event is that it changes the truth value with respect to an object being empty, pink or closed, etc. (depending on the AP that is the sister of the V node that hosts BECOME). Furthermore, I assume that the structure in (56), based on the proposal by Beck & Johnson, is the correct analysis for the predicates of Group A:

(56)



As discussed above, since the DO originates outside the result-state clause, this structure predicts that the existential operator cannot be interpreted inside the presupposition of restitutive *again*. This is exactly what we find for the verbs in Group A.

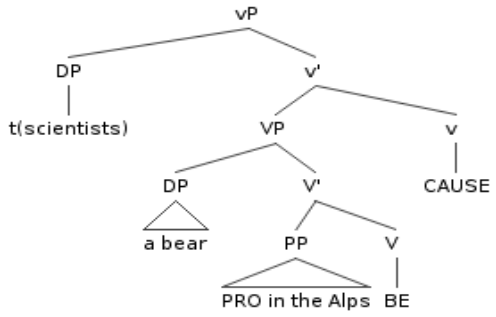
[8] In German, inchoatives require the insertion of a reflexive pronoun.

[9] One might argue that a window does not undergo a change of state in the process of closing. Yet if we think of an old castle where window refers to a hole in the wall that was planned by the architect, then closing it in winter with blankets or boards does change its state.

As far as the predicates in Group B are concerned, I propose that they are referring to a change of location or more precisely, to a change of existence in a certain location. For example, when scientists put bears in the Alps, the bears do not undergo a change of state. What does change is the location in which they are found. The scientists cause the bears to exist in a different place. I propose that this change in existence is represented in the structure by a different operator than a change of state. Instead of a BECOME operator, these predicates have a BE operator (57). All this operator does is anchor a state in time (e.g. Rothstein 1999).[10] The sentence in (48) that contains the predicate *ansiedeln* 'settle, put' then receives the structural representation in (58).

(57) ||BE ||(p)(x)(e) = T iff p is T in e and x is the theme of p.

(58)



The crucial difference between this structure and the structure in (56) is that the VP in (56) is eventive due to the BECOME operator whereas the VP in (58) is stative as a result of the BE operator. If *again* adjoins to VP in (56), it scopes over parts of the event (BECOME liquid). Consequently, it cannot have an interpretation that is adequate in a purely restitutive context. Instead of triggering the presupposition that *x was liquid before*, it will trigger the presupposition that *x turned liquid before*. If the indefinite DO is interpreted in SpecVP, it is inside this presupposition and the reading can be represented as in (59a). If the indefinite DO is interpreted outside the VP, the expected reading is the one in (59b).

(59) a. [$_{VP}$ again [$_{VP}$ ∃x.x is a popsicle and x becomes liquid]]
b. ∃x.x is a popsicle and [$_{VP}$ again [$_{VP}$ x becomes liquid]]

A purely restitutive interpretation of *again* is only possible in (56) if *again* adjoins to the AP. However, in this case it is below the base position of the DO and cannot have the existential operator inside the presupposition, regardless of whether this operator is interpreted inside or outside the VP. Consequently, we can only get the reading in (60):

(60) ∃x.x is a popsicle and again [$_{AP}$ x is liquid]

In contrast to the structure in (56), the structure in (58) allows what I will call a *high-restitutive* reading. Even if *again* adjoins to the VP, the interpretation is restitutive because the VP in (58) is stative. If *again* adjoins to this stative VP, it only triggers the presupposition that bears existed in the Alps before. As illustrated in (61), the existential operator can either be outside (61a) or inside (61b) this presupposition, depending whether the DO is interpreted

[10] I assume that the CAUSE-operator can be combined with eventualities of any kind.

outside or inside the VP. As far as attachment to the PP is concerned (62), it results in a similar interpretation as attachment to the VP. However, an existential operator will always be outside the presupposition because this attachment site is below the base position of the DO.

(61) a. ∃x.x is a bear and [$_{VP}$ again [$_{VP}$ x is in the Alps]]
b. [$_{VP}$ again [$_{VP}$ ∃x.x is a bear and x is in the Alps]]

(62) ∃x.x is a bear and [$_{PP}$ again [$_{PP}$ x is in the Alps]]

In conclusion, the operators BECOME and BE represent the contrast between a change of state and a change of (existence in a) location. Therefore, this proposal predicts that verbs that denote a change of state but not verbs that denote a change of location, always have a BECOME operator and thus lack the reading where an existential is interpreted inside the presupposition of restitutive *again*. The difference between the two groups of predicates follows from the proposal that only VPs with the BE operator, but not VPs with a BECOME operator, are stative. Accordingly, only VPs with BE provide an attachment site above the base position of DOs where *again* receives a restitutive interpretation.

What is interesting is that verbs of creation seem to pattern with change-of-location verbs. Unfortunately, this is difficult to test because most creation verbs do not allow for contexts that block a repetitive interpretation. It is hard to imagine a book that has not been written before or a house that has not been built before. An attempt at such a scenario is (63):[11]

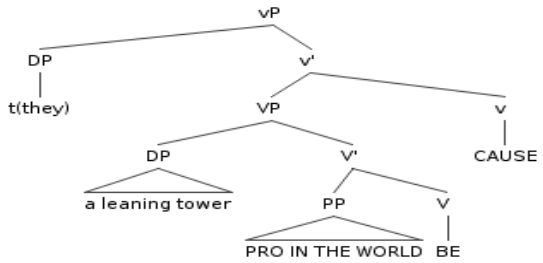
(63) Context: *In a small town in Italy, they built a straight tower that over the centuries started to lean to one side. This tower became a tourist attraction. Thus when it finally collapsed, the town feared a major loss of income.*

Consequently, they built a leaning tower again.

Together with the example in (49), (63) suggests that verbs of creation allow the existential operator to be interpreted inside the presupposition of restitutive *again*. If this is indeed the case, then I propose that what happens in the case of creating something is that we cause an object to exist in some place. According to my analysis, *constructing a tower* does not describe a change of state with respect to the tower but a change of existence. Before the constructing-event, it is not the case that a tower exists; afterwards it is true that there is a tower. For a tower to be able to undergo changes, it has to exist first, at least partially. A non-existent tower cannot be altered, i.e., change its properties. What can change is the truth value with respect to its existence. Accordingly, verbs that describe a change of location as well as verbs of creation cause an object to exist in some place. The only difference between the two groups is that in the case of creation verbs the goal argument can be implicit. When the goal argument of a creation verb is not specified, I assume that we are dealing with a silent PP that is maximally uninformative (e.g. *in the world*) as illustrated in (64) for the sentence in (63) above:

[11] The credits for this example go to Jonathan Bobaljik (p.c).

(64)



4.2. Discussion

The proposal made in section 4.1 is an attempt to account for the contrast between two groups of predicates as illustrated in Table 3:

		Repetitive reading	Restitutive reading
Group A: Change of state	*again* > existential	✓	#
	existential > *again*	✓	✓
Group B: Change of location	*again* > existential	✓	✓
	existential > *again*	✓	✓

Table 3

In my analysis, I have focused on the fact that the predicates belonging to Group A are change-of-state verbs in contrast to the predicates in Group B which could be summarized as verbs that refer to a change of location or existence in a location. However, there are alternative ways of seeing this distinction. Note that the result-state clause of Group A predicates is always an AP, but the result-state clause of Group B predicates is never an AP. In conclusion, the two groups differ from each other in more than one respect and only future research can show which one of these characteristics is the decisive factor. The crucial point is that verbs that involve causation do not constitute a homogeneous class. This observation raises the question of how other causative predicates like double-object verbs (e.g. *give*, *send*,…) fit into the picture. Following Green (1974), Beck & Johnson propose that double-object verbs contain a HAVE-clause. This accounts for the peculiar fact that while the NP-PP frame allows the goal argument to be non-animate (65a), the goal-argument of the double-object construction has to be able to possess something (compare 65b with 65c).

(65) a. Zeus gave the box to Pandora/Athens.
b.*Zeus gave Athens the box.
c. Zeus gave Pandora the box.

Minimal pairs like (65b,c) indicate that whereas the operator BE can account for the data with the NP-PP frame (65a), it fails to make the correct predictions with respect to the double-object frame (65b,c). This suggests that there are even more categories of causatives than the two classes established in section 3. As far as *give* is concerned, this problem can be solved by adapting Beck & Johnson's HAVE-operator. A more interesting challenge comes from the

verb *send*. Closer examination reveals that it does not seem to have a real restitutive reading at all. Consider the sentence in (66) in the given context:

(66) Context: *Dido from Carthage visits Pandora in Athens and buys a map. When Dido leaves, she forgets the map at Pandora's place.*

Pandora sends Dido the map again.

The example in (66) shows that modification with *again* is not felicitous if repetition of the event is excluded by the context.[12] Interestingly, we can modify the seemingly missing result state of *send* with *for*-adverbials as illustrated in (67):

(67) Dido sent Aeneas her map for three weeks.

Hence, whereas (66) indicates that *send* does not have an available result state, (67) suggests the opposite. That is, (67) suggests that there is a result-state clause in the representation of *send* that can be modified. Since a result state as such seems to be available, the challenge is to propose an analysis that accounts for the data with *again* as well as for the data with *for*. Unfortunately, this exceeds the scope of this paper and I will have to leave this problem open for future research.

5. Conclusion

In section 2 of this paper, I summarized von Stechow's structural account for *wieder* 'again'. I demonstrated that the interaction between word order and interpretation is indeed a compelling argument for a structural analysis of *again*. Moreover, I showed that such an account is compatible with established assumptions about the position of DOs in German (e.g. Webelhuth 1989, 1992; Diesing 1992). In section 3, I first illustrated how the interaction between restitutive *again* and an existential operator in object position can be used as a tool to investigate the internal structure of VPs (e.g. Nissenbaum 2006). Subsequently, I presented new data from German that provided us with evidence that lexical causatives do not constitute a homogeneous class. Instead, they must be divided into two groups. This follows from the observation that the existential operator can be interpreted inside the presupposition triggered by restitutive *again* with some predicates but not with others. I argued that this contrast is reflected in the representation of these predicates by the operators BECOME and BE. Future investigations will show whether this analysis can be extended to other causatives as well.

[12] Jon Nissenbaum (p.c.) points out that (66) improves if Dido did not buy the map but if instead the map 'came to her'. He suggests the following scenario: 'When Dido visits Pandora, a map falls out of a passing helicopter into Dido's hands. When Dido leaves, she forgets the map at Pandora's place. Hence, Pandora sends Dido the map again.' This way, the sentence improves considerably for native speakers of English. I assume that what happens here is that we get a low repetitive reading. What is repeated is that the map comes into Dido's possession and not that Dido is in possession of the map.

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Eva Dobler
McGill University
eva.dobler@mail.mcgill.ca

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On ellipsis features and Right Node Raising

Seungwan Ha

In this paper, I propose that Right Node Raising (RNR) is an ellipsis phenomenon and licensed by a variant of the E(llipsis) feature (i.e. E_{RNR}). The E_{RNR} feature imposes syntactic, semantic and phonological requirements that must be fulfilled for RNR to be licensed. Following Merchant (2001), I will argue that i) the E_{RNR} feature enters the derivation with a focused lexical element and checked by the focus feature of C in syntax, ii) the feature instructs PF to unpronounce the RNR target, and iii) as the semantic requirement, e-GIVENness must be satisfied.

1. Introduction

Right Node Raising (RNR) refers to a coordination construction in which parts of the first conjunct are missing. For instance, the object DP *a piece of furniture* in the first conjunct is RNRed in (1).

(1) Bill MADE, and Jon SOLD – a piece of furniture.

VP ellipsis in (2) and RNR in (3) are similar in that both can target some part of the embedded clause for deletion.

(2) a. John liked the opera, but Mary didn't <~~like the opera~~>.
b. John thought Mary was going to donate his car to the charity, and Mary thought John was going to <~~donate his car to the charity~~>

(3) a. John LIKED <~~the opera~~>, but Mary HATED – the opera.
b. John thought Mary was trying to SELL <~~his car to the charity~~>, and Mary thought John was trying to DONATE – his car to the charity.

On the other hand, RNR also has several unique properties, some of which are discussed in the following. Only constituents can undergo VP ellipsis, but even non-constituents can undergo RNR. The object DP *a large amount of money* and the VP adjunct *from the bank* do not form a constituent, yet RNR is allowed in (4).

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(4) John [BORROWED [<~~a large amount of money>] <from the bank~~>], and Bill [STOLE – [a large amount of money] [from the bank]].

RNR can also target expressions below the word-level. The part of the word *generation* is elided in the first conjunct in (5a), and a similar case in German is observed in (5b), due to Hartmann (2000).

(5) a. This analysis suffers from both UNDER-<~~generation~~> and OVER-generation.
b. Frühlings~~blumen~~ und Herbstblumen
Springtime ~~flowers~~ and autumn flowers

(Hartmann 2000: 57)

For RNR to be licensed, there must be a contrastive focus just prior to the RNR target (Hartmann 2000). In (6a), the verb *likes* as the pre-RNR element is contrastively focused, contrasted with *dislikes* in the second conjunct. If there is no contrast, the sentence is degraded in (6b).

(6) a. Bill LIKES <~~the TV show~~>, but Mary DISLIKES – the TV show.
b. *Bill likes <~~the TV show~~>, and Mary likes – the TV show.

RNR affects the entire right edge of the first conjunct. Once RNR starts left to right following the contrastively focused constituent in the first conjunct, pronunciation cannot resume until the coordinator is reached (at least, in English). Thus, (7) is ungrammatical, since the VP adjunct in the first conjunct remains pronounced.

(7) *John [BORROWED [<~~a large amount of money~~>] from the bank], and Bill [STOLE – [a large amount of money] [from the bank]].

RNR exhibits many ellipsis properties, such as Vehicle Change effects, lack of morphological identity, and sloppy identity. Ha (2006, 2007) argues that the PF-based accounts – Strict Phonological Deletion (Hartmann 2000, Abels 2004, a.o) and Multiple Dominance (Wilder 1999, a.o) – have difficulty capturing those flexibilities. However, crucially, these empirical phenomena also arise in standard ellipsis, thus weigh in favor of the ellipsis account of RNR.

In VP ellipsis context, it has been shown that Principle C violations can be avoided. Let us examine (8a-b). In (8a), if the elided copy were phonologically identical to its antecedent, we would expect a Principle C violation to occur since the subject of the main clause binds the R-expression in the second conjunct. Similarly, in (8b), a Principle A violation would be expected since the reflexive is not bound within its binding domain.

(8) a. Mary loves John$_i$, and he$_i$ thinks Sally does <~~love John$_i$~~>, too.
b. Josh$_i$ didn't vote for **himself$_i$**, but Mary did <~~vote for **himself$_i$**~~>.

(Fiengo & May 1994:220)

Fiengo & May (1994) argue that (8) is grammatical because reconstruction of elided material is not sensitive to the value of the feature ([±pronoun]) that differentiates proper names and pronouns. Thus, a proper name can be reconstructed as a pronoun in the ellipsis site. Fiengo & May (1994) dubbed this Vehicle Change (9).

(9) Vehicle Change (simplified version, Fiengo & May 1994)
As long as indices remain constant, proper names and their pronominal correlates are considered equivalent.

Fiengo & May (1994) also propose that pronouns and reflexives are nondistinct, assuming that reflexives are composed by a pronoun and *–self* which only has a syntactic function. Under their proposal, *himself* and *him* are the same argument for reconstruction. Therefore, the ellipsis sites in (8a-b) are reconstructed as in (10a-b). The proper name is converted into a pronoun by Vehicle Change which bleeds the Principle C violation in (10a), and the reflexive is shifted into the pronoun, so that the Principle A violation is avoided.

(10) a. Mary loves John$_i$, and he$_i$ thinks Sally does <~~love **him**$_i$~~>, too
b. Josh$_i$ didn't vote for **himself$_i$**, but Mary did <~~vote for **him**$_i$~~>.

We observe similar Vehicle Change effects in RNR constructions (11). The acceptability of (11a) indicates that no Principle C violation has occurred, and that the proper name has been shifted into a reflexive. Similarly, the pronoun in (11b) must have been shifted into a reflexive in (11b) to avoid a Principle B violation.

(11) a. Mary heard that John$_i$ SUBMITTED <~~the article about **himself$_i$** for the magazine~~>, but Sue said that Bill actually WROTE – the article about **John$_i$** for the magazine.
b. John$_i$ COULDN'T <~~nominate **himself**~~>, so I nominated him$_i$

On the other hand, under the PF-based approaches, Vehicle Change effects are unexpected since the phonological form between the RNRed material and its antecedent would not exactly match each other. In (11b), for example, the RNRed VP *nominate himself* differs phonologically from its antecedent VP *nominated him*.

In the ellipsis literature, it has been observed that verbal morphology need not match between conjuncts (Warner 1986, Lasnik 1999, Lightfoot 1999). There is a tense mismatch in (12a) between *met* and *meet*, and the tense mismatch for main verbs seems to be tolerable. For some reason when *be/have* is involved, it must be overtly present in the ellipsis clause, so (12b) is acceptable with the copula is pronounced, and (12c) is not with the ellipsis of the copula.

(12) a. Bill met Prof. Smith yesterday, and I will <~~meet Prof. Smith~~> this afternoon.
b. Jane was here, and I will be <~~here~~>, too.
c. *Jane was here, and I will <~~be here~~>, too.

RNR shows the same patterns (Bošković 1997, 2004). In (13a), the verbal morphology of the antecedent clause does not match that of the RNRed clause. In addition, whatever the cause of the restriction on *be* and *have* in VP ellipsis, (13b-c) behave the same way. *Be* and *have* must be realized in the RNRed clause.

(13) a. John WILL <~~sleep in her house~~>, and Peter already HAS – slept in her house.
b. John MUST have been <~~hassled by the police~~>, and Peter COULD have been – hassled by the police.
c. ?*John MUST <~~have been hassled by the police~~>, and Peter COULD – have been hassled by the police.

(Bošković 1997: (8), (11))

This distributional similarity between RNR and ellipsis is unexpected on the other non-movement analyses. In particular, under the PF accounts, the restrictions for *be* and *have* in the RNRed clause would be puzzling. Under the phonological deletion view, it is not clear why phonological identity should make morpho-syntactic distinctions with respect to *be* and *have*. The Multiple Dominance account has nothing to say about the size of the RNR target unless the conjuncts can be linearized. Since the size of the RNR target is unconstrained and (13c) does not yield conflicts in linear order, the Multiple Dominance account predicts (13c) to be linearizable, yet the sentence is ungrammatical. Those accounts need additional assumptions to exclude *be* and *have* from RNR, whereas the ellipsis account does not.

Ellipsis is well-known to allow some interpretations that are not available when the elided part is overtly pronounced. Such an example is the availability of sloppy identity in VP ellipsis (Sag 1976, Williams 1977, Reinhart 1983). The pronoun *his* in the ellipsis site can serve as a referential or a bound variable in (14), and the sloppy reading arises when the elided pronoun is bound by the subject of the second conjunct.

(14) John likes his father, but Bill doesn't <~~like his father~~>.
a. John likes John's father, but Bill doesn't like Bill's father. (Sloppy reading)
b. John likes John's father, but Bill doesn't like John's father. (Strict reading)

Interestingly, RNR also allows sloppy identity. The RNR target *his father* can be interpreted as *John's father* (sloppy reading) as well as *Bill's father* (strict reading) in (15). Under the MD account, the availability of sloppy reading is not predicted in (15) since the MD assumes a shared constituent as the RNR target, which is only one occurrence of the RNR target. Notice that the RNR target contains a pronoun *his* in (15). To get the sloppy reading, the pronoun needs to be a bound variable and must be simultaneously bound by two different operators.

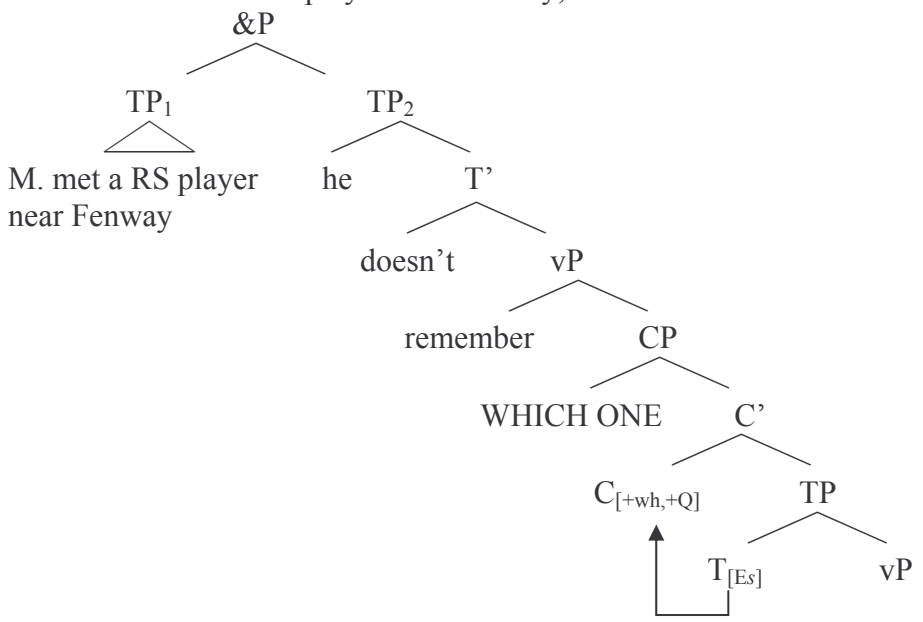
(15) John_i LIKES, but Bill_j HATES – $\text{his}_{i/j}$ father.
a. John likes John's father, but Bill hates Bill's father. (Sloppy reading)
b. John likes Bill's father, but Bill hates Bill's father. (Strict reading)

Given the empirical similarities between ellipsis and RNR reviewed above, there are good reasons to believe that RNR is also a type of ellipsis. The next question to ask is what licenses RNR, and moreover whether RNR obeys the same licensing conditions of the other types of ellipsis. I will propose semantic licensing conditions for RNR, based on mutual entailment relationships between focus alternatives of the conjuncts, and formalize RNR licensing in principled ways within the Minimalist Program. More specifically, I will address the syntactic, semantic, and phonological aspects of RNR licensing conditions by introducing an E(llipsis) feature for RNR, extending the concept of E features introduced by Merchant (2001, 2004).

2. Ellipsis features

Merchant (2001) proposes that sluicing is licensed by an ellipsis feature, which he labels E_S. The presence of the E_S feature imposes syntactic, semantic and phonological requirements that must be fulfilled for sluicing to be licensed. Let us first consider the syntactic requirements on the English sentence in (16). Merchant (2001) proposes that E_S is [wh*, Q*] and is a feature of T. E_S is a strong feature that needs to be checked during the syntactic derivation. When the C head bears the [+wh, +Q] feature, it checks E_S. Then, T moves to C, as illustrated in the tree structure (16).

(16) Matthew met a Red Sox player near Fenway, but he doesn't remember WHICH ONE.



Second, the E_S feature now attached to C as part of T is interpreted at PF as an instruction not to pronounce its complement. Therefore, the TP of the second conjunct is required to be unpronounced in (17).

(17) …and [$_{TP}$ he doesn't remember [$_{CP}$ WHICH ONE $C_{[Es]}$ <~~[$_{TP}$ Matthew met t near Fenway]~~>

Third, as the semantic requirement for the inclusion of E_S, e-GIVENness must be met, which can be defined as (18).

(18) e-GIVEN
An expression E is e-GIVEN iff there is an antecedent A which entails E and which is entailed by E, modulo ∃-type-shifting.

(Merchant 2001)

Let us examine how the e-GIVENness of the example (16) is satisfied. The antecedent is the first conjunct, *Matthew met a Red Sox player near Fenway* and the corresponding elided clause is the embedded CP of the second conjunct, *WHICH ONE Matthew met t near Fenway*. By ∃-type shifting, the first conjunct yields *∃x. Matthew met x near Fenway* (E-clo (A)).

Given that the fronted wh-phrase is focused, it would be also existentially closed by F-closure.[1] As a result, F-clo (E) is the same as E-clo (A). All the calculations are summarized in (3). Since A entails F-clo (E) and E entails E-clo (A), e-GIVEN is satisfied.

(19) e-GIVENness of (16)
a. A = Matthew met a Red Sox player near Fenway.
b. E = He met WHICH ONE near Fenway.
c. F-clo (E) = ∃x. he met x near Fenway.
d. E-clo (A) = ∃x. he met x near Fenway.

Since the syntactic, phonological and semantic licensing conditions are satisfied, sluicing in (16) is licensed. Merchant (2004) claims that fragment answers to wh-questions are also derived by ellipsis, and licensed by an ellipsis feature, E_f. Let us take (20). Following Rizzi's (1997) proposal concerning the upper portion of the clausal structure, Merchant assumes that there is a FocusP in the left periphery, so that the fragment answer can undergo focus movement to the specifier of FocusP. In the answer part to the wh-question (20), the object DP, *The syntax of silence*, undergoes focus movement, and the focus head bears E_f, which instructs PF not to pronounce its complement. Regarding semantic licensing conditions of E_f, it is clear that F-closure of the answer and E-closure of the question are the same: *∃x. John read x last night*. Then, e-GIVENness condition is satisfied given that the question entails F-closure of the answer and the answer entails E-closure of the question.

(20) Q: What did John read last night?
A: [$_{FocusP}$ [$_{DP}$ The syntax of silence] Focus$_{[Ef]}$ <~~$_{TP}$ John read t last night~~>].

Merchant (2004) argues that E_f should reside on a head lower than the focus head in C since, if it were as high as Focus, it would erroneously predict that examples like (21) would be grammatical, given that ellipsis should have repaired the island violation that occurs within TP.[2]

(21) Q: Does Abby speak the same Balkan language that *Ben* speaks?
A: *No, [$_{FocusP}$ [$_{DP}$ Charlie] Focus$_{[E]}$ <~~[$_{TP}$ Abby speaks the same Balkan language that t speaks]~~>.

If the C head bear E_f, there still remains a defective intermediate trace *t'* undeleted and crashes, as shown in (22).[3]

(22) A: [$_{FocusP}$ [$_{DP}$ Charlie] [$_{CP}$ t' C$_{[E]}$ [$_{TP}$ <~~Abby speaks the same Balkan language that t speaks~~>]]].

(Merchant 2004: 708, (166))

[1] F-closure (F-clo) refers to an existential closure of focused constituents.

[2] Merchant does not specify what this lower head is. He just names it as C and the higher focus head as F.

[3] However, in his later work, Merchant (2006) argues that a focus head can bear an E feature. He assumes that psuedogapping is derived by focus movement of the object DP to the intermediate position between TP and vP in the second conjunct, followed by the deletion of vP. Let us take (i).

(i) John brought roses, and the others did [$_{FocP}$ lilies$_i$ Foc$_{[E]}$ <[$_{vP}$ ~~brought t$_i$~~]>].

Therefore, the manipulation made in (22) remains problematic since it is unknown why the focus head merged to vP can, but the one in the CP cannot bear the ellipsis feature.

2.1. The E_{RNR} feature

Following Merchant (2004), I assume that the focus head can bear an E feature. The focused pre-RNR element enters the syntactic derivation bearing E, and instructs PF to leave the RNRed element unpronounced.

(23) Ellipsis feature of Right Node Raising (*the first pass*)
a. A focused constituent in the first conjunct can bear E in syntax.
b. E instructs the PF-interface not to pronounce its complement.
c. The e-GIVENness condition must be satisfied by the conjuncts.

With the assumptions in (23), let us examine examples in (24). RNR and VP ellipsis are compared in (24). In (24a-b), there is a contrast in polarity between the conjuncts, and both constructions are grammatical. On the other hand, without any contrast, as (24c-d) indicate, RNR is degraded, but VP ellipsis is not affected by the lack of contrast. This indicates that a certain type of contrast between the two conjuncts is required to license RNR, but not necessarily ellipsis.

(24)	a. John likes Mary, but Bill doesn't.	(Ellipsis – contrast in polarity)
	b. John DOES, but Bill DOESN'T – like Mary.	(RNR – contrast in polarity)
	c. John likes Mary, and Bill does, too.	(Ellipsis – no contrast)
	d.*John DOES, and Bill LIKES Mary, too.	(RNR – no contrast)

I propose that not just any focused constituent licenses RNR: Only *contrastive* focus can contain an E feature (henceforth, E_{RNR}) and license RNR. In (24d), RNR is not licensed since the focus on the pre-RNR element is not contrastive.

The E_{RNR} feature enters the derivation with a contrastively focused lexical item. Note that in the analyses proposed by Merchant (2001, 2004, 2006), the E feature enters the derivation with a functional head – T for sluicing, and Focus for pseudogapping and fragment answers (but see footnote 2). I argue that the differences could be understood in terms of the differences between specifier and complement positions that arise under the *Multiple Spellout hypothesis* (Uriagereka 1999, Bartos 2001, Johnson 2002, among others). According to the Multiple Spellout hypothesis, a specifier position, like an adjunct, enters the derivation having already been fully spelled-out, meaning that no further alteration is possible – in particular, movement is not possible out of such a constituent. The complement position, on the other hand, is different, in that nothing prevents agreement or movement from the complement position. Therefore, the constituent in the complement position can undergo movement later in the derivation, whereas such possibility is blocked for the constituent in the specifier position. Assuming a Boolean Phrase analysis of coordinate structure (Munn 1993), the RNR target to be elided would always be part of the *specifier* position of &P. This means that there should be no further syntactic derivation in the first conjunct at the point that it is merged to the specifier position of &P. The only possible options for the computational system would be limited to PF-effects, such as phonological deletion (Bartos 2001). Therefore, E_{RNR} must instruct phonology to unpronounce the RNR target.

A question might arise how PF and LF can interpret an E feature if the feature enters the derivation with the lexical item. The Y-model of the Minimalist Program assumes that syntactic derivation guides PF or LF interpretations, so if there is no status of the E_{RNR} feature in syntax, the interface would come out of nowhere. I assume that syntax also acknowledges

syntactic features which lexical items bring in. As shown in (25), the syntactic head, in which a lexical item with the E_{RNR} feature enters $\alpha_{[ERNR]}$, is endowed with the feature. In other words, the feature is transmitted to the syntactic head from the lexical item.

(25) E feature transmission from a lexical item to a syntactic head

The *syntactic* feature E_{RNR} is now subject to be checked by the focus feature of the C head by agreement.[4] Let us consider (26). Where two clauses are coordinated in English, I assume that it forms a TP coordination structure. As an RNR construction, the verb in each conjunct is contrastively focused in (26), and the one in the first conjunct can bear the E_{RNR} feature. When the C head is merged to the coordinate structure, it agrees with E_{RNR}, licening ellipsis of the object DP.[5]

(26) [$_{CP}$ $C_{[focus]}$ [$_{\&P}$ John $MADE_{[ERNR]}$ <~~the spaghetti~~>, and BILL ATE – the spaghetti.]

A question arises here why a sentence like (27) would not be available. Notice that (27) differs from (26), in that the deletion occurs in the second conjunct. Given that the verb in the second conjunct is also contrastively focused, it is reasonable to assume that it could bear an ellipsis feature.

(27) *JOHN MADE the spaghetti, and BILL $ATE_{[ERNR]}$ <~~the spaghetti~~>.

Traditionally, the ungrammaticality of (27) has been taken to follow from Lobeck's (1995) generalization, which can be briefly summarized as: Only a functional head can license (forward) ellipsis. Since V is a lexical head, its complement – the object DP – cannot be elided. Reanalyzing Lobeck's hypothesis within the Minimalist Program, Merchant (2001) recasts this functional head requirement in ellipsis into a feature-checking analysis. Following Merchant, I argue that the difference between (26) and (27) follows from the locality requirements on feature checking. In (27), the E feature cannot be checked by the focus feature of C since there is always E_{RNR} in the first conjunct, which is closer to the C head,

[4] I assume that unlike movement, a feature outside the coordinate structure can agree with a feature in the first conjunct.

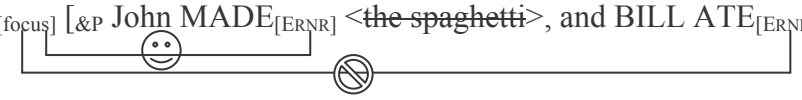
[5] An interesting question arises what prevents a sentence like (i). If it is supposed that the wh-word generates a set of alternatives that is directly comparable to those generated by the focused constituent (see also Beck 2006), the F-closure of the first and the second conjunct both would be $\exists x.\exists R.$ *x R-ed the book*. Then, the antecedent entails F-clo (E) and the elided clause entails F-clo (A), satisfying e-GIVENness. Therefore, it would seem that (i) is predicted to be grammatical, contrary to fact.

(i) *JOHN SOLD and WHO BOUGHT the book?

I will speculate that the solution is provided by the different clause-types in the conjuncts. Assuming that [clause-type] is an uninterpretable feature on the C head, it needs to be valued by merging to TP (Cheng 1991). Since the second conjunct is interrogative, C would be valued as [clause-type: interrogative]. There would be two scenarios at this point. First, the first conjunct, merged to the specifier position of &P, bear a mismatching clause type, which is declarative, so that the derivation would crash. Alternatively, we can assume that the type mismatches do not matter, but the wh-word in-situ fails to check its wh-feature in C.

which is illustrated in (28) (*Closeness*, Chomsky 1995). The focus feature in C *always* agrees with the closer E_{RNR}, so only (26) is licensed.[6]

(28) [$_{CP}$ C$_{[focus]}$ [$_{\&P}$ John MADE$_{[ERNR]}$ <~~the spaghetti~~>, and BILL ATE$_{[ERNR]}$ – the spaghetti.]



While it is true that no further movement is possible in the first conjunct, it is sometimes allowed in cases where movement in the first conjunct is independently motivated *before* merging to &P. I argue that (29) is such a case where the focus movement of the adverb inside the first conjunct is motivated. I assume that there is a focus phrase between vP and VP and the focused VP adverb *BEST* in the first conjunct can undergo focus movement to the SpecFocusP.[7] Given that the adverb is contrastively focused, it is eligible to bear the E_{RNR} feature. Therefore, the VP in the first conjunct can be elided. On the surface, (29) looks similar to Heavy NP Shift, but here I suppose that no movement is involved.

(29) Every American [$_{vP}$ loves [$_{FocusP}$ BEST$_{[ERNR]}$ <~~[$_{VP}$ t his president t]~~>], but every German loves LEAST – his president.

Note that the VP adverb in the second conjunct also has to move to the SpecFocusP position. If it does not, the sentence is degraded, as shown in (30). One might challenge this claim that this type of focus movement is forced by syntactic parallelism, which is a reasonable question, on the grounds that the movement to the focus position would not have truth-conditional consequences.

(30) ?*Every American loves BEST, but every German his president LEAST.

I propose that this movement is not enforced by syntactic parallelism, but rather by an independent rule imposed by information structure or discourse coherence. In other words, there is nothing wrong with (30) syntactically, but the unacceptability is attributed to the non-parallel focus structure when focus movement occurs only in the first conjunct. This proposal can be easily supported by the comparison between (31) and (32), neither of which involves ellipsis at all. The sentences in (31) are well-formed since the focus structure is parallel. In (31a), the contrastively focused vP adjunct is located at the end of each conjunct, and a Heavy NP shift appear to operate in (31b), so that the vP adjunct in each conjunct is followed by the dislocated object DP. On the other hand, the sentences in (32) are ill-formed, since they have non-parallel focus structures. Note that each conjunct by itself is fully grammatical in (32a-b), so that the ungrammaticality is not due to syntax. It is rather a failure of coherent information structure.

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[6] Attaching E_{RNR} to a lexical item is optional, so that a sentence like (i) is possible without RNR.

(i) John MADE the spaghetti, and Bill ATE the spaghetti.

If this is true, then a crucial question arises whether it is possible for only the verb in the second conjunct to bear the E_{RNR} feature, as illustrated in (ii). If this were possible, the locality-based explanation of the ungrammaticality of (11) would not extend to (ii).

(ii) *John MADE$_{[ø]}$ the spaghetti, and Bill ATE$_{[ERNR]}$ <~~the spaghetti~~>.

[7] I assume that FocusP can be merged to any XP, including VP. However, Movement to this FocusP position is not forced. It only occurs when it influences in overt or covert syntax (Chomsky 1993, Fox 1995) and it obeys every grammatical constraint.

(31) a. John loves every new Red Sox player in this season BEST, and his friend loves every new Red Sox player in this season LEAST.
b. John loves BEST every new Red Sox player in this season, and his friend loves LEAST every new Red Sox player in this season.

(32) a. ?*John loves every new Red Sox player in this season BEST, and his friend loves LEAST every new Red Sox player in this season.
b. ?*John loves BEST every new Red Sox player in this season, and his friend loves every new Red Sox player in this season LEAST.

This type of failure cannot be repaired by deletion, so (30) is not well-formed, in which the DP in the first conjunct is RNRed in (32b). On the other hand, the deletion would be licensed if RNR occurs in (31b), which is shown in (33). This indicates that the coherent information structure is an independent factor in focus-related constructions.

(33) John loves BEST$_{[ERNR]}$ <~~every new Red Sox player in this season~~>, and his friend loves LEAST – every new Red Sox player in this season.

Therefore, we can conclude that the focused constituent must undergo movement in the second conjunct if there is a focus movement in the first conjunct to satisfy the parallel focus structure in (34).

(34) Parallel focus structure in coordination
Focus structure must be parallel in the coordinate structure. If there is a focus movement in the first conjunct, the second conjunct must also undergo focus movement.

(34) accounts for why backwards gapping is not available in English. Note that RNR itself is licensed by E_{RNR}, attached to the contrastively focused object DP in the first conjunct. However, it forces focus movement of the DP in the second conjunct, which is not possible in English. Therefore, (35) is ruled out.

(35) *Sue [$_{FocusP}$ THE CAR$_{[ERNR]}$ <[~~$_{vP}$ bought t~~]>], but John THE BIKE bought.

Compare (35) with Korean (36). Backwards gapping in Korean is acceptable since parallel focus structure can be constructed on the surface. Again, the grammaticality is considerably degraded if the object in the second conjunct undergoes scrambling, making the focus structure no longer parallel (36).

(36) SUE-NUN CHA-LUL$_{[ERNR]}$ <~~sa-ss-ta~~>, kuliko JOHN-UN CACENKE-LUL sa-ass-ta
S.- TOP car- ACC bought, and J.- TOP bike-ACC bought
'Sue bought the car, and John bought the bike.'

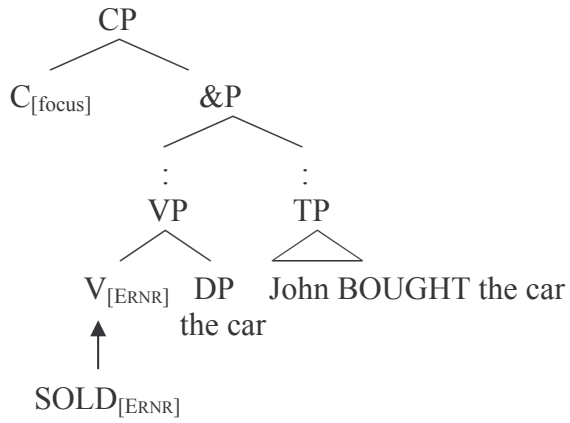
(37) ?*SUE-NUN CHA-LUL$_{[ERNR]}$, kuliko CACENKE-LUL JOHN-UN t sa-ass-ta
S.-TOP car-ACC and bike- ACC J.-TOP bought
'Sue bought the car, and John bought the bike.'

If this is true, we can further predict that the grammaticality would be improved if the object DPs in both conjuncts undergo scrambling, so that the parallel focus structure can be established. As shown in (38), the prediction is borne out.

(38) CHA-LUL$_{[ERNR]}$ SUE-KA t kuliko CACENKE-LUL JOHN-I t sa-ass-ta
Car-ACC S.-NOM and bike-ACC J.-NOM bought
'Sue bought the car, and John bought the bike.'

To summarize so far, the E_{RNR} feature enters the derivation with a contrastively focused lexical item and the syntactic head is endowed with the feature. When C is merged to the coordinate structure, the E_{RNR} feature agrees with the focus feature of C. We also saw that focus movement is independently motivated to ensure a coherent discourse structure. The E_{RNR} feature in interpreted independently at PF and LF. At PF, the E_{RNR} feature is interpreted as a signal for deletion of the RNR target, and at LF, it forces a mutual entailment relationship between the conjuncts. The feature can be formalized in (39) with an example, *Mary SOLD, and John BOUGHT the car*.

(39) E_{RNR} (*Revised*)
a. Syntax of E_{RNR}



b. Phonology of E_{RNR}
XP → Ø/ E_{RNR} ____ $]_{TP1}$.
c. Semantics of E_{RNR}: e-GIVEN must be observed in RNR.
i) Mary sold the car → F-clo (E) = ∃x.∃R. x *R-ed* the car
ii) John bought the car → F-clo (A) = ∃x.∃R. x *R-ed* the car

The focused verb *SOLD* is merged to the derivation, bearing the E_{RNR} feature in syntax in (39a). E_{RNR} is an uninterpretable feature, which must be checked by a focus feature from C. E_{RNR} instructs PF to leave the RNR target unpronounced in (39b). Note that the RNR target is not necessarily a constituent; it is everything "left" in the conjunct after the E_{RNR} feature is encountered by PF. Therefore, the phonological rule of E_{RNR} is such that any XP can be elided, following the feature, to the end of the first conjunct. Finally, e-GIVEN must be observed in RNR in (39c).

2.2. Consequences of E_{RNR}

In this section, I will lay out consequences of the ellipsis feature analysis for RNR. First, the ellipsis properties, found in RNR, such as sloppy identity, Vehicle Change effects, and morphological mismatches will be reanalyzed in terms of E_{RNR}. Second, we will see different predictions of licensing RNR between double object constructions and dative constructions. Finally, the E_{RNR} analysis will be able to predict cases where the RNR target is larger than what is actually left unpronounced.

2.2.1. Ellipsis properties

The semantic licensing condition of E_{RNR}, i.e. e-GIVENness, requires that the two conjuncts mutually entail each other, after F-closure. For example, in (40), the F-closure of the antecedent and the elided clause is identical, *∃x.∃R. x R-ed his father*, and the antecedent or the elided clause entails *∃x.∃R. x R-ed his father*. To account for how sloppy identity arises, we need to assume that the pronoun serves as a bound variable.[8] As Merchant (2001) proposes for cases of sluicing, I assume that the antecedent would be *Bill λx. x hates x' father* and the RNR clause would be *John λy. y likes <y's father>*. The result of F-closure of the antecedent and the elided clause would be still identical, *∃x.∃R. x R-ed x's father*. Given that the antecedent entails F-clo (E) in (40a), and the elided clause entails F-clo (A) in (40b), e-GIVENness is satisfied. Therefore, we predict that sloppy identity in RNR is available.[9]

(40) JOHN$_i$ LIKES$_{[E_{RNR}]}$ <his$_i$ father>, but BILL$_j$ HATES his$_j$ father.
a. *Bill λx. x hates x' father* entails *∃y.∃R. y R-ed y's father.*
b. *John λy. y likes y's father* entails *∃x.∃R. x R-ed x's father*

Vehicle Change effects (Fiengo & May 1994) can be derived in a the similar manner. Let us take (41). The E_{RNR} feature is linked to the contrastively focused verb *SUBMITTED* in the first conjunct and licenses the ellipsis of the object DP. The e-GIVENness conditions are satisfied, on the grounds that the deleted DP *the article about himself$_8$ for the magazine* satisfies the Focus conditions just in case the pronoun refers to *John*, since the following formula $[[\text{ John}_8]]^g = [[\text{ himself}_8]]^g$ is established for any g (cf. Merchant 2006). An RNR configuration is possible with (41), but only under relatively limited conditions. Since there are some conditions under which the RNR configuration is possible, the sentence in (41) is grammatical and interpretable. However, for RNR to have been licensed, we require that the e-GIVENness conditions be met: the antecedent must entail the F-closure of the elided clause and vice-versa. Since *John* is not focused (clearly neither is *him*, given that it is not pronounced), the entailment will only go through if *him* and *John* are co-referential. This means that the only coherent interpretation for the sentence in (41) uses the pronoun as if it were a name,

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[8] Sloppy identity has been argued to be insensitive to phi-features in VP ellipsis, but it is not the case for RNR. Let us compare VP ellipsis (i) with RNR (ii):

(i) John$_i$ think he$_i$'s going to win the race, and Mary$_j$ does <think she$_j$'s going to win the race>, too.

(ii) *John$_i$ believed <that he$_i$ could win the race>, but Mary$_j$ almost knew that she$_j$ would win the race.

If RNR is ellipsis, it is reasonable to ask why only RNR is sensitive to phi-features in sloppy identity. I do not have a principled reason why they differ in this matter, but it seems that the requirement of contrastive focus in RNR constructions is relevant here. Notice that phi-feature mismatches in the sloppy reading are as hard in VP ellipsis in (iii) as they are in RNR (ii) when the two conjuncts stand in contrast with one another.

(iii) ??John$_i$ thinks he$_i$'s going to win the race, but Mary$_j$ doesn't <think she$_j$'s going to win the race>.

[9] The strict reading is predicted to arise in RNR when the pronoun is interpreted as referential.

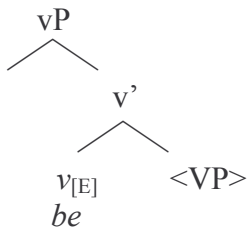
constantly referring to *John* regardless of the assignment function. Therefore, the R-expression can license the deletion of the pronoun.

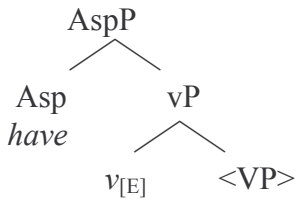
(41) Mary heard that John$_8$ SUBMITTED$_{[ERNR]}$ <~~the article about **himself$_8$** for the magazine~~>, but Sue said that Bill actually WROTE – the article about **John$_8$** for the magazine.
a. *Bill wrote the article about John$_8$ for the magazine* entails *∃x.∃R x R-ed the article about himself$_8$ for the magazine*.
b. *John submitted the article about himself$_8$ for the magazine* entails *∃x.∃R x R-ed the article about John$_8$ for the magazine*.

The E_{RNR} analysis predicts that RNR would not require morphological identity, just as VP ellipsis does not. As noted earlier, when the copula *be* is involved in RNR, it must be overtly realized. Let us first consider (42a). Although the verb in the antecedent is a form of participle, the bare form of the verb can be deleted in the first conjunct. Now let us compare (42b) with (42c). The contrastive focus is assigned on the modal in the first conjunct, and the copula in the second, meaning that the location of the E_{RNR} feature is on the modal, not on the auxiliary. By hypothesis, the target for deletion in RNR is the string immediately following the word with the E_{RNR} feature. As in (42c), the RNR target is predicted to be *be settled with this non-sense negotiation*, where the copula is included in the target. Surprisingly, the deletion of the full RNR target results in ungrammaticality, as shown in (42c). In fact, the grammatical (42b) indicates that the copula must be pronounced even if they are within the RNR target by virtue of the fact that the E_{RNR} feature is on the modal.

(42) a. John WON'T$_{[ERNR]}$ <~~**negotiate** her salary~~>, but Mary has ALREADY – **negotiated** her salary with the company.
b. John WON'T$_{[ERNR]}$ **be** <~~settled with this non-sense negotiation~~>, but MARY **IS** – settled with this non-sense negotiation.
c. *John WON'T$_{[ERNR]}$ <~~be settled with this non-sense negotiation~~>, but MARY **IS** – settled with this non-sense negotiation.

There are several possible ways to approach this mismatch between the RNR target and the unpronounced string. First, we might assume what we observe in (42b) is VP ellipsis in the first conjunct. In the context of VP-ellipsis, Merchant (2006) argues that *v* is capable of bearing the E feature, thereby forcing VP to be elided. Indeed, it captures impossibility of morphological mismatches for *be* and *have* in VP ellipsis, if one assumes that the auxiliaries are merged at least as high as *v*, as illustrated in (43a-b).[10] They are not within the domain of VP ellipsis.

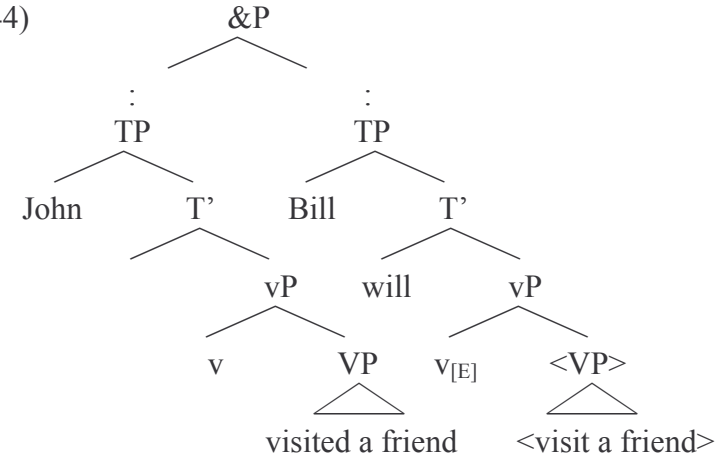
(43) a.


b.


[10] For concreteness, here I suppose that *have* heads an Aspectual phrase and *be* is generated in *v*.

On the other hand, a lexical verb stays in V and is subject to be elided in VP ellipsis whether or not its morphology matches the antecedent, as shown in (44).[11]

(44)



However, as we observed in (24), contrastive focus is a key factor in licensing RNR. Thus, the E_{RNR} feature cannot be linked to the copula in (42b) since *be* and *is* are not contrastively focused. Therefore, Merchant's approach for the morphological mismatches may not be applicable to RNR.

Second, Lasnik (1999) proposes that lexical verbs and the auxiliaries in English are numerated in different ways. He argues that lexical verbs enter the derivation as a bare form, and affixes are realized in verbs at PF. In VP ellipsis, the bare form of the verb can be elided under strict identity with any other form of verb. Let us take (45), for example. The elided vP finds an identical vP in the antecedent, on the grounds that the bare form of the verb *stop* exists in syntax (45b).

(45) a. John stopped by my office, and Mary will, too.
b. John –ED **stop by my office**, and Mary will <~~**stop by my office**~~> too.

On the other hand, *be* and *have* are numerated as fully inflected. Note that, in (46), the copula is inflected with the past tense morpheme, and the one in the elided vP must be its bare form. Since the copula enters the derivation fully inflected, the morpheme in the copula must match. Matching inflection would yield ungrammaticality as shown in (46a). By hypothesis, the copula cannot be divided into an affix and its bare form, so *be* must be realized as shown in (46b). Therefore, the only possibility is to realize be in the second conjunct as in (47).

(46) *John was asleep, and Mary will, too.
a. *John was asleep, and Mary will <~~was asleep~~>, too.
b. *John -PAST be asleep, and Mary will <~~be asleep~~>, too.

(47) John was asleep, and Mary will be <~~asleep~~>, too.

Lasnik (1999) argues that the same holds for the auxiliary *have*. In (48a), the morphology of *have* is mismatched between the conjuncts, so it should be overtly realized in the second

[11] Following Merchant (2006), I assume that there is no V-to-v movement.

conjunct. (48b) indicates that the phonological identity is not enough. The bare form of *have* needs to be realized even if it can find the identical phonological string in the first conjunct.

(48) a. Mary has left the room earlier, and Bill could *(have).
b. The boys have called their mother, but the girls shouldn't *(have).

Lasnik's (1999) analysis appears to be applicable to RNR. The morphology of the lexical verb does not have to match in RNR in (42a), on the grounds that the bare form of the verb in the second conjunct matches the one in the RNR clause, as shown in (49a). On the other hand, the copula needs to be realized in the second conjunct if it is not identical to the first conjunct. As shown in (49b), the fully inflected copula in the RNRed target would cause the derivation to crash. The only way to save this RNR structure would be to pronounce the copula, as in (49c), so that the deletion does not include the copula. The same holds for the auxiliary *have* (50a-b).

(49) a. John WON'T$_{[ERNR]}$ <~~**negotiate** her salary with the company~~>, but Mary has ALREADY -ED – [**negotiate** her salary with the company].
b. *John WON'T$_{[ERNR]}$ <~~IS settled with this non-sense negotiation~~>, but MARY – **IS** settled with this non-sense negotiation.
c. John WON'T$_{[ERNR]}$ **be** <~~settled with this non-sense negotiation~~>, but MARY **IS** – settled with this non-sense negotiation.

(50) a. The women SHOULDN'T$_{[ERNR]}$ *(have) <left>, but THE MEN HAVE – left.
b. Mary SHOULDN'T$_{[ERNR]}$ *(have) <had a driver's license>, but JOHN HAS – a driver's license.

The way described here for (49c) raises an interesting question, namely whether the RNR target, imposed by the E_{RNR} feature, includes *be* and *have* in (49c) and (50a-b). In section 2.2.3, I will argue that they are inside the RNR target, but undeletable for independent reasons. This analysis can be understood as following from the MaxElide constraint (Fiengo & May 1994, Kennedy 2002, Takahashi & Fox 2005, Merchant to appear), in the sense that the RNR target, defined by the placement of the E_{RNR} feature, might be different from the deletable target, due to independent factors. Also, I will propose that the deletion process operates right-to-left, and stops prior to *be* and *have* in cases of (49c) and (50a-b).

2.2.2. Double object constructions vs. Dative structures

Double object constructions differ from dative constructions with respect to the availability of RNR. Let us consider the contrast in (51a-b). It appears that in a dative structure (51a), RNR can occur even when not targeting the right-most position in the first conjunct. On the other hand, such a possibility is not available in double object construction (51b). Under the system I have been developing, appearances must be deceiving in (51a), because the ellipsis triggered by an E_{RNR} feature will leave the entire remainder of the conjunct unpronounced. Therefore, we are forced to assume that the apparent remnant is actually to the left of the E_{RNR} feature, either because a movement that would normally have left it at the end does not happen, which I will suggest shortly, or because the remnant moves past the head on which the E_{RNR} feature is found.

(51) a. Mommy gave <~~an interesting book~~> to MARY, and Daddy gave to BILL – an interesting book.
b. *John gave ~~Mary~~ a BOOK, and Bill gave Mary a PRESENT.

This discrepancy can be understood if we assume that dative constructions are derived from the theme DP, originally base-generated below the goal PP, undergoing movement to its surface position (Dryer 1987, Aoun and Li 1993, Pesetsky 1995, Takano 1998, Sauerland 2000, and Sauerland and Elbourne 2002). Under this view, we can assume that the underlying structure of the first conjunct in (51a) is (52a), and the linear order is derived by movement of the object DP *an interesting book*, passing the PP, as shown in (52b).

(52) a. Mommy gave to Mary an interesting book.
b. Mommy gave an interesting book to Mary t.

I propose that E_{RNR} is attached to the PP *to MARY* in the base position of the first conjunct, and license the ellipsis of the object DP *an interesting book* in (53). To maintain parallel focus structure, the object DP in the second conjunct does not undergo movement. If it undergoes movement, the well-formedness of this sentence is degraded in (54), for the same reason (32) is not acceptable.

(53) Mommy gave to $\text{MARY}_{[E_{RNR}]}$ <~~an interesting book~~>, and Daddy gave to BILL – an interesting book.

(54) *Mommy gave to MARY, and Daddy gave an interesting book to BILL t.

On the other hand, the double object construction is base-generated exactly as shown in the surface structure of (51b). One type of evidence comes from NPI licensing. Larson (1988, 1990), Aoun and Li (1989, 1993), and Marantz (1993) argue that the NPI licensing possibilities indicate that the indirect object asymmetrically c-commands the direct object position in (55). In particular, the ungrammaticality of (55b) tells us that *anyone* is not below the direct object at any time of the derivation.

(55) a. John gave nobody any valuable present.
b. *John gave anyone nothing.

With this, let us return to (55b). The direct object in each conjunct is contrastively focused, hence eligible to bear E_{RNR}. Since the direct object cannot move, there is no way for E_{RNR} to license the elision of the indirect object in the first conjunct. Thus, (55b) is ruled out.

2.2.3 Focus and agreement in the C head

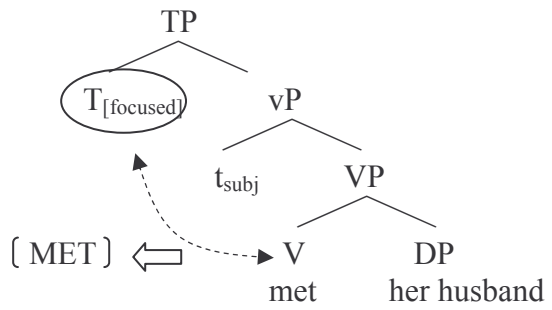
There are some RNR cases in which the RNR target in the first conjunct and its antecedent mismatch. Let us consider (56). Note that the RNR target is *her husband at the train station*, but the antecedent should include the verb, assuming that the corresponding antecedent is determined as word strings immediately following the focused constituent, *DIDN'T* in (56).

Therefore, it seems to be puzzling since the conjuncts would generate different sets of alternatives, as shown in (56a-b).

(56) Cathy MET, but Mary DIDN'T – meet her husband at the train station.
a. {Cathy met her husband at the station, Mary met her husband at the station, Cathy called her husband at the station, Mary called her husband at the station, Cathy found her husband at the station, Mary found her husband at the station…}
b. {Mary did meet her husband at the station, Cathy did meet her husband at the station, Mary didn't meet her husband at the train station, Cathy didn't meet her husband at the train station…}

To get around this problem, I argue that it is the null T (cf. [Verum Focus]), not the verb in the first conjunct, that is focused.[12] Since focus features must be phonetically realized but cannot be realized on the null T, the verb picks up the focus pronunciation, as in (57), in the same way that the main verbs pick up tense morphology (c.f., Halle & Marantz 1993).

(57)

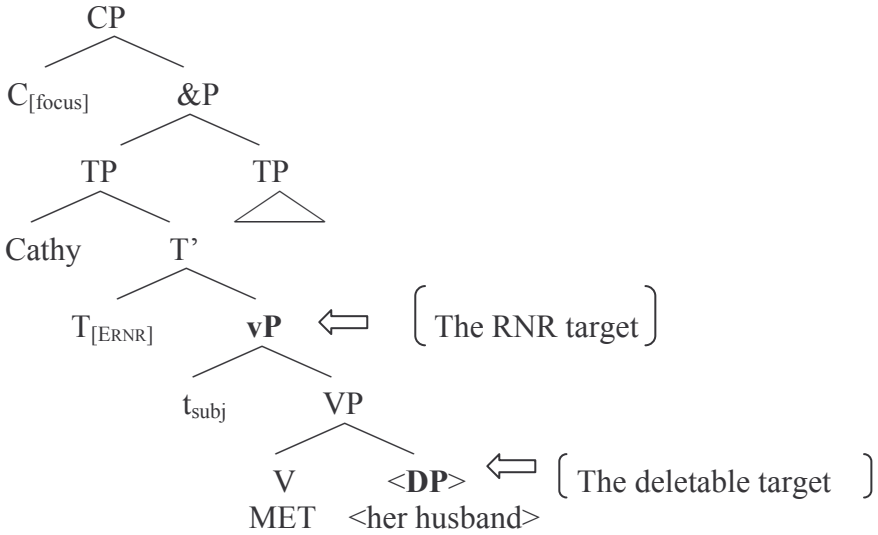


The reasoning above indicates that T is contrastively focused, so it is the null T that bears E_{RNR}. Therefore, the vP in the first conjunct is eligible to be RNRed. When the coordinate structure is merged to CP, the focus feature in C agrees with E_{RNR} in the null T, and licenses the elision of the RNR target, which is the vP in the first conjunct. However, the whole vP cannot be elided since there is an intervening focused verb, so only the object DP is deletable in (58) (MaxElide, Takahashi & Fox 2005).[13]

[12] While [Verum Focus] pertains to polarity differences, what T can care about is rather broad given that modals and auxiliaries, including polarity, land at T in the end. Therefore, these two assumptions make different predictions when sets of alternatives are calculated with respect to e-GIVEN.

[13] Takahashi & Fox (2005) argue that the target of ellipsis must be the largest within some Parallelism Domain (PD). An elided clause is considered a PD when it is semantically identical to an antecedent clause. It is important to notice that the target of ellipsis within PD may differ from the actual deletable target due to independent factors. Takahashi & Fox (2005) discuss this is in the context of re-binding phenomena of ellipsis.

(58)



I assume that the focus feature in T generates the same sets of alternatives that the focused dummy *do* does. Therefore, at LF, both conjuncts yield the same sets of alternatives as in (59a-b).

(59) Cathy $T_{[ERNR]}$ <MET her husband at the train station>, but Mary DIDN'T – [meet her husband at the train station].
  a. Cathy {Auxiliaries, Modals, dummy do, including polarity} met her husband at the train station.
  b. Mary {DIDN'T, Auxiliaries, Modals, dummy do, including polarity} meet her husband at the train station.

I further assume that polarity is within the set of alternatives on the grounds that the negativity in English moves along with modals and auxiliaries. For example, the negative clitic *n't* is taken to adjoin to T in the second conjunct in (59).

Now let us consider cases where the negation is separated from the modals and pronounced in a different position in the tree. In (60), the modals are constrastive, so E_{RNR} is linked to *COULD*. Also, the negation should be focused since the polarity is also contrastive. In such a case, I argue that E_{RNR} is transmitted to the negation.[14]

(60) Mike [COULD$_{[\ ]}$ NOT]$_{[ERNR]}$ <~~drive his car~~>, so Mary SHOULD – [drive his car].

[14] I argue the same thing happens to VP ellipsis as well. Let us assume that T bears the E feature for VP ellipsis, in the line with Lobeck (1995), contra Merchant (2006). Assuming that dummy *do* is merged to T and the negation is merged to its own projection, as in (i), a question arises how VP is elided skipping the intervening negation.

(i) John likes candies, but Bill does$_{[E]}$ not <~~like candies~~>.

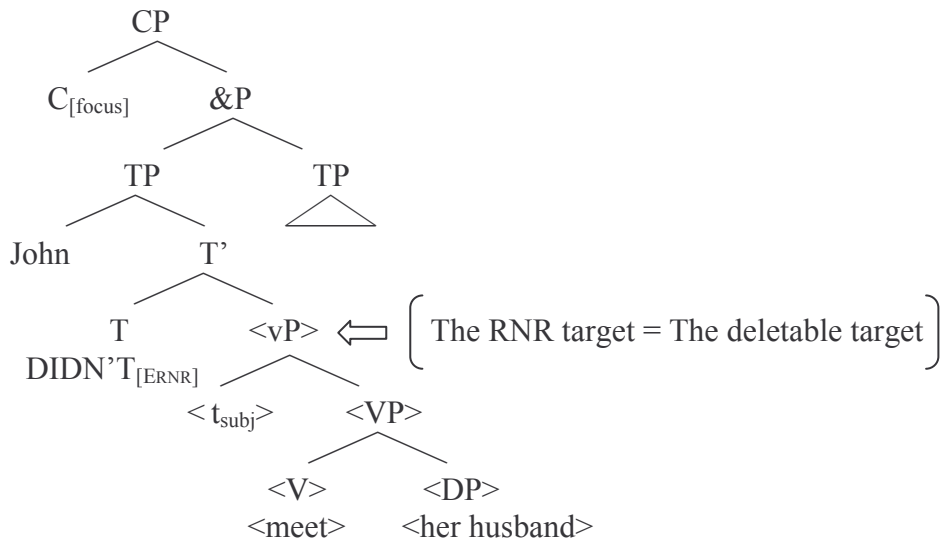
I assume that the E feature is transmitted to the negation as in (ii). The modal-auxiliary combination in section 2.2.1 can be understood in the same way that the E feature is merged to the modal and transmitted to the auxiliary in (iii)

(ii) John likes candies, but Bill does not$_{[E]}$ <~~like candies~~>.

(iii) John wasn't working hard, but he should have been$_{[E]}$ <~~working hard~~>

If either a modal or an auxiliary exists, it picks up the focus pronunciation, since it is closer to T than the verb, shown in (61). E_{RNR} is checked by the focus feature from C, and licenses the deletion of VP. Note that here the RNR target is the same as the deletable target.

(61)



As assumed, all the modals and auxiliaries create the same sets of alternatives, so RNR is predicted to be licensed. That prediction is borne out in (62-65).

(62) Jane LOVES, but she SHOULDN'T love – her friend's husband.

(63) Jane DOES, but she SHOULDN'T love – her friend's husband.

(64) Joe GAVE, but Mary COULDN'T give – a present to her teacher.

(65) Joe DID, but Mary COULDN'T give – a present to her teacher.

The possibility that the RNR target can differ from the deletable target provides an important theoretical implication: The deletion must occur right-to-left. Only that way can we predict the deletion in (58) to be available. If the deletion occured left-to-right after the E_{RNR} feature, the deletion would be immediately blocked by the focused verb *MET*, leaving the rest of the RNR target, *her husband at the train station*, pronounced. As far as I know, there has been no prior proposal for the directionality of the deletion process in the literature on RNR and ellipsis.[15] In forward ellipsis, either direction seems to give us the right result, as shown in (66).

(66) a. Jon gave the movie ticket to Mike, but Mary wanted to$_{[E]}$ <~~give the movie ticket to Mike~~>, too.
b. John finished writing his dissertation on Tuesday, but Bill did$_{[E]}$ <~~finish writing his dissertation~~> on Friday.
c. I met somebody at the party, but I don't remember WHO$_{[E]}$ <~~I met~~>.

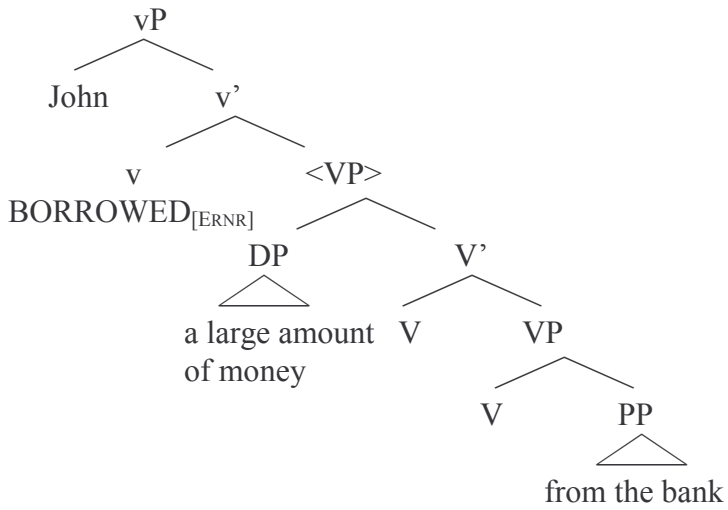
[15] However, in some sense, the definition of MaxElide implies a right-to-left deletion process since it means deletion may occur up to an intervening factor.

Alternatively, it might be possible to suppose that once the ellipsis begins after the E_{RNR} feature, strings can be unpronounced as soon as possible. In the case of (58), the deletion cannot start right away, due to the focused verb *MET*. Once passing *MET*, the deletion starts leaving things unpronounced. It would give us the same result. However, in the next section, I will show that this alternative cannot be right. I will provide evidence that this alternative account would fail to capture, and that the deletion at PF must operate from right to left. I will also revisit constituency in RNR and propose that RNR obeys constituency.

3. Non-constituency in RNR revisited

In the first section, we observed there is evidence that non-pronunciation under RNR is not constrained by constituent structure, although this seems incongruent with forward ellipsis, which has been argued to target only constituents. We also noted that we would be able to reanalyze non-constituent RNR cases under Larson's VP shell structure. For example, in (67), the object DP and the vP adjunct would form a constituent if the adjunct is merged to the complement position of the lower VP, as shown in the tree structure.

(67) John [BORROWED [<~~a large amount of money>~~] <~~from the bank~~>], and Bill [STOLE – [a large amount of money] [from the bank]].



However, the Larsonian VP shell construction does not much help for some RNR cases found in SOV (68a) or V2 languages (68b), where part of the matrix clause along with part with the embedded clause are elided through RNR. In the Korean example (68a), the verb of the embedded clause and vP of the matrix clause are elided, and in the German example (68b), the NP *Katzen* 'cats' and the verb inside the relative clause and the verb of the matrix clause are elided. Those elements do not form constituents at any time during the derivation even under a VP shell analysis.

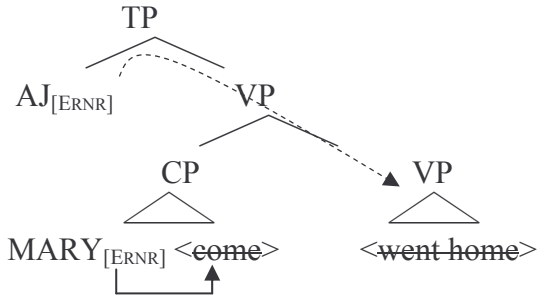
(68) a. [$_{TP}$ AJ-nun [$_{CP}$ MARY-ka <~~wa-seo~~>] <~~cip-e ka-ess-ta~~>], kuliko
AJ-TOP M.-NOM come-because home-to go-PAST-DEC CONJ
[$_{TP}$ SUE-nun [$_{CP}$ JOHN-i wa-seo] cip-e kas-ess-ta.]
S.-TOP J.-nom come-because home-to go-PAST-DEC.
'AJ went home because Mary came, and Sue went home because John came.'
(Korean, Ha 2007)

b. [$_{CP}$ Ich habe einen Mann, [$_{CP}$ der DREI <~~Katzen besitzt~~>], <~~gekannt~~>], und
I have a man who three cats owns knows and
[$_{CP}$ Sie hat eine Frau, [$_{CP}$ die VIER Katzen besitzt], gekannt.]
she has a woman who four cats owns knows
'I have known a man who owns three cats, and she has known a woman who owns four cats.'

(German, Wilder 1997)

One possible solution would be to suppose that there are multiple E_{RNR} features in the first conjunct. Notice that the subject of the matrix and embedded clause are each contrastively focused in (68a). Let us assume that each subject can bear E_{RNR}. In the first conjunct of (68a), there are two independent deletion processes, as shown in (69). The lower E_{RNR} feature in *MARY* licenses elision of its complement, so only the embedded verb is elided. The upper E_{RNR} feature in the matrix subject *AJ* elides the matrix VP. In other words, the entire embedded clause including *Mary* is the target of RNR for the upper E_{RNR} feature, and the post-*Mary* material is the target of RNR for the lower E_{RNR} feature. The lower E_{RNR} feature actually has no effect, since the embedded verb has been scheduled to be unpronounced by the upper E_{RNR} feature. Given that the deletion goes from right to left at PF, it begins from the strings of the matrix VP and then proceeds into the embedded VP. The deletion, however, has to stop prior to *Mary*, which has focus stress, and is thus unable to be deleted.

(69) [$_{TP}$ AJ-nun$_{[ERNR]}$ [$_{CP}$ MARY-ka$_{[ERNR]}$ <~~wa-seo~~>] <~~cip-e ka-ess-ta~~>]…
AJ-TOP M.-NOM come-because home-to go-PAST-DEC CONJ



If this is correct, we can predict that any unfocused material between the upper and the lower E_{RNR} feature would survive. The prediction seems to be borne out in (70). The adverb *ilccik* 'early' between the E_{RNR} features in the first conjunct cannot be deleted.

(70) [$_{TP}$ AJ-nun [$_{CP}$ **ilccik** MARY-ka <~~wa-seo~~>] <~~cip-e kaya hay-ss-ta~~>], kuliko
AJ-TOP early M.-NOM come-because home-to go must-PAST-DEC CONJ
[$_{TP}$ SUE-nun [$_{CP}$ **ppali** JOHN-i wa-seo] cip-e kaya hay-ss-ta.]
S.-TOP early J.-nom come-because home-to go must-PAST-DEC.
'AJ had to go home because Mary came early, and Sue had to go home because John came early.'

The non-deletion of the adverb provides us with two important theoretical implications; First, it supports the claim that the deletion at PF operates from right to left. The upper E_{RNR} feature would be able to delete the adverb if the deletion worked the other way around. Second, the deletion stops when it encounters any undeletable material and goes no further, so the adverb is not deleted.

Let us consider the German case (68b). Here the object DP *MANN* 'man' and the numeral in the relative clause are contrastively focused, so let us assume that they can bear the E_{RNR} feature, as in (71). By hypothesis, the RNR target is determined by the upper E_{RNR} feature, the matrix vP and the relative clause are included in the RNR target. First, the upper E_{RNR} feature licenses the elision of its constituent from right to left. Therefore, the matrix verb *gekannt* 'know' is elided first and then the relative clause. The lower E_{RNR} feature in the numeral quantifier *DREI* 'three' would delete the NP, but it has no effect, since it is contained by the complement of the upper E_{RNR} feature. The deletion stops prior to the focused numeral quantifier, so that the relative pronoun is pronounced.

(71) [$_{TP}$ Ich habe einen MANN$_{[ERNR]}$, [$_{CP}$ der DREI$_{[ERNR]}$ <~~Katzen besitzt~~>], <~~gekannt~~>]…
I have a man who three cats owns knows

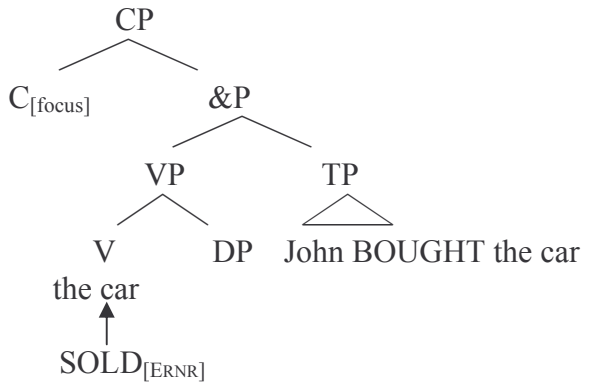
To summarize this section, my central proposal, regarding constituency in RNR, is that at the level of syntax, the E_{RNR} feature licenses the deletion of its complement. That is how the matrix verb in (68a-b) can be elided. If there were no E_{RNR} in the matrix subject (68a), the whole RNR would not be licensed, due to a violation of the Right Edge Restriction (RER) (Sabbagh 2007). The RER states that the right edge of the first conjunct must be unpronounced in RNR. Therefore, if there is no upper E_{RNR} feature, (72) would result. Since the subject in the embedded clause only licenses the deletion of its complement, nothing can delete the matrix verb. The pronunciation of the matrix verb violates the RER.

(72) *[$_{TP}$ Subject$_{[ø]}$ [$_{CP}$ Subject$_{[ERNR]}$ <~~verb~~>] verb] and …

In addition, at PF, the deletion needs to obey other rules, such as MaxElide. Therefore, a gap between syntactic licensing and phonological deletion could arise. We observe such a case in (70). The upper E_{RNR} feature licenses the larger RNR target, but the deletable target is smaller due to an intervening focus. All in all, the final version of E_{RNR} is proposed in (73).

(73) E_{RNR} (*The final version*)

a. Syntax of E_{RNR}: The E_{RNR} feature enters the derivation with contrastively focused lexical item, checked by focus feature of the C head. E_{RNR} determines the categorical domain of the RNR target.



b. Phonology of E_{RNR}: The deletion at PF operates from the end of the first conjunct up to any focus intervener.

XP → Ø/ E_{RNR} ____]$_{TP1}$.

c. Semantics of E_{RNR}: e-GIVEN must be observed in RNR. (e.g. E → F-clo (A), A → F-clo (E).

i) Mary sold the car → F-clo (E) = ∃x.∃R. x *R-ed* the car
ii) John bought the car → F-clo (A) = ∃x.∃R. x *R-ed* the car

4. Conclusion

In this paper, I have argued that RNR is an ellipsis phenomenon and licensed by semantic identity. Then, I proposed an ellipsis feature for RNR, a variant of the E feature proposed by Merchant (2001). That is, the E_{RNR} feature imposes syntactic, semantic and phonological requirements. I suggested that the point of the entrance of E in RNR in syntax differs from in the other ellipsis, on the grounds that the E_{RNR} feature enters derivation along with contrastively focused lexical item in the first conjunct in syntax, and that it must be checked by a focus feature from the C head. Crucially, during the syntactic derivation, the RNR target is categorically determined, with which we maintain the view that only constituents can be elided, including RNR. Also, the semantic licensing conditions, i.e. e-GIVENness, must be satisfied: After F-closure, the conjuncts must mutually entail each other. At PF, then, the syntactically licensed the E_{RNR} feature is interpreted as an instruction to leave the RNR target unpronounced to the maximum extent possible, by deleting material in the target from right to left.

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Seungwan Ha
Boston University
seungwan@bu.edu

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Copies

Kyle Johnson

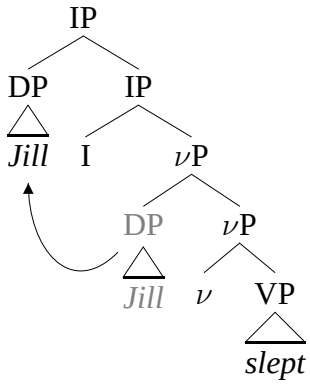
After offering a slight modification of the version of the copy theory of movement in Fox (2002), I investigate how that theory would deal with semantically vacuous movement. It can't. I conclude that semantically vacuous movement cannot involve the same operation that produces copies. Instead, I propose that it is a perversion of the linearization algorithm that translates syntactic representations into strings, and I formulate that perversion.

1. *Introduction*

Let's start with the assumption that the movement relation in syntax creates copies of the term that is moved. There are a variety of ways to work how how this is achieved. I don't think it will matter for what follows which of those is chosen. I will express the copy theory of movement with the use of shading. Movement of the subject DP in (1) from Specifier of νP to Specifier of IP will create the representation shown in (1b), where the shaded *Jill* is an unspoken copy.

(1) a. Jill slept.

b.



Expressing movement in terms of copies allows for an articulated control over how movement interacts with the semantic interpretation. It provides for the possibility of "reconstruction" effects, in which the item that is moved is either partly or wholly interpreted in its pre-moved

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position. At the same time it allows moved phrases to be semantically interpreted in their post-moved position. It does so, however, by producing syntactic representations in which a moved item is present in all of the positions it moves to or from and this leads to the expectation that a moved item will be interpreted in the same way in all of these positions. This is not what happens, however, and so the copy theory of movement must be wedded to a view of the syntax/semantics interface that allows for slight differences in how copies are interpreted.

The goal of this paper is to investigate the methods now in the literature for achieving this. I'll divide the cases we look at on the basis of where the copy that is spoken sits relative to the other copies. We'll begin by looking at those cases in which the lower copy is spoken. These are instances of "covert movement," where the term that is moved does not result in a change in the position that term is pronounced. Then we will look at those cases in which the copy that is spoken is higher than other copies. These are the classic examples of movement, in which the item that moves has had its spoken position changed thereby. I will argue that the first set of cases demand a way of thinking about the semantic interpretation of copies that the second set of cases cannot coexist with. We'll need a new theory of copies, I think, and so I'll sketch one to account for the second set of cases.

2. *First Case: a lower copy is pronounced*

The classic examples of this are instances of Quantifier Raising (QR)[1] and *wh*-in-situ[2]. I'll focus on the QR cases here. QR has several interesting features. It allows a quantifier to be interpreted in a position higher than where it is pronounced, as in (2), and it also allows a relative clause associated with a quantifier to be interpreted higher than where it is pronounced, as in (3).

(2) A syntactician [$_{\text{VP}}$ visited every philosopher].
= every philosopher $>$ a syntactician

(3) A syntactician [$_{\text{VP}}$ visited every philosopher that a phonologist did Δ].
Δ = visited x

We know that the relative clause in (3) is interpreted outside of the VP it stands in because that is required to resolve the ellipsis it contains.

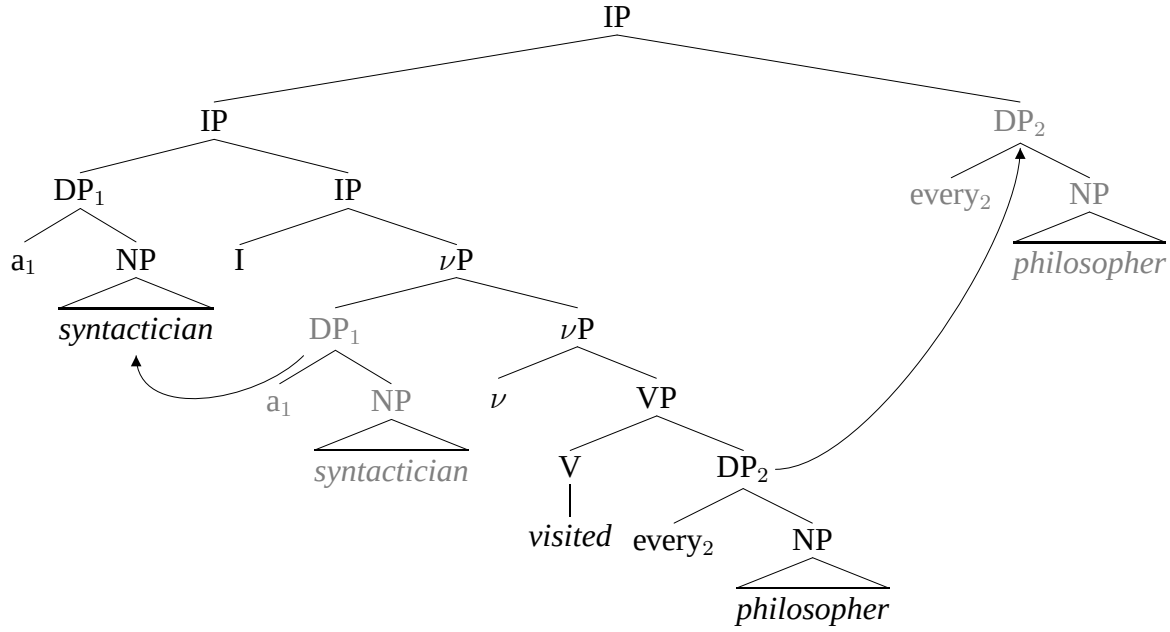
QR does not allow the NP associated with a quantifier to be interpreted higher than where it is pronounced, however. This can be seen by observing that material within that NP triggers Principle C effects with respect to the position it is spoken in.

(4) * She$_1$ [$_{\text{VP}}$ visited every friend of Mary's$_1$].

I'll adapt an account of this paradigm found in Fox & Nissenbaum (1999) and Fox (2002). The account employs the bottom-up derivations proposed in Chomsky (1995a), the copy theory of movement[3] and the single-output view of the syntax/semantics interface.[4] For (2), QR produces a representation like (5).

[1] See May (1977, 1985).
[2] See Chomsky (1977) and Huang (1982).
[3] See Chomsky (1995b).
[4] See, among others, Bobaljik (1995).

(5)



This representation treats referential indices as features that are brought into the derivation by determiners and are projected onto the phrases those determiners head. Indices play an important role in interpreting these structures. In Danny Fox's work, it is the interpretation of indices that plays the central role in determining how copies are interpreted differently. Let's start with the rules in (6); (6b) is from Fox (2003), with antecedents in Sauerland (1998).

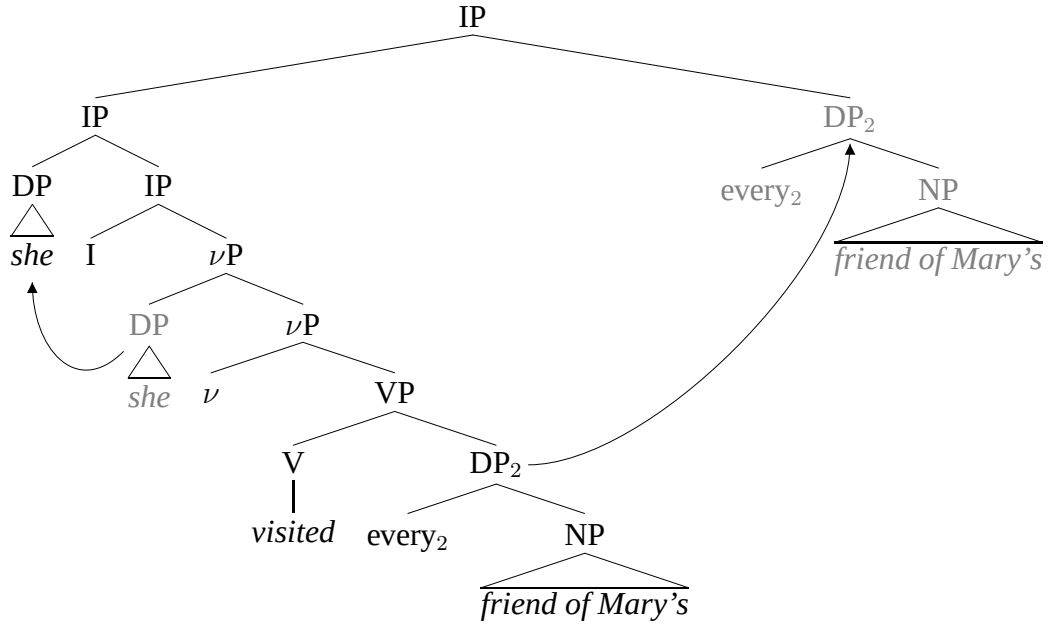
(6) a. Let { n, n′, . . . , n^m } be indices on the same projection line. Only one n needs to be semantically interpreted.

b. TRACE CONVERSION
For ϕ' (with YP$_n$ and ϕ), interpret ϕ as a function that maps an individual, x, to the meaning of ϕ[x/n].

ϕ[x/n] is the result of replacing the head of every constituent with the index n in ϕ with the head *the*$_x$, whose interpretation, $[\![\text{the}_x]\!]$, is. $\lambda P.\ [\![\text{the}]\!](\text{P} \cap \lambda y.y = x)$.

Fox sees (6b) as a version of Heim & Kratzer (1998)'s method of interpreting indices as lambda converters. It lets the index on a phrase turn that phrase into a binder, in the normal way, and makes the index on a determiner convert that determiner into a kind of restricted bound variable. In a simple example like (7), for example, it would deliver an interpretation that could be paraphrased with (8).

(7)



(8) every x: FRIEND-OF-MARY'S(x) is such that she visited the y: FRIEND-OF-MARY'S(y) & $y = x$.

Applied to (5), (6b) will deliver an interpretation in which *a* is interpreted within the scope of *every*, but at the same time it will preserve the Principle C effect in (7).

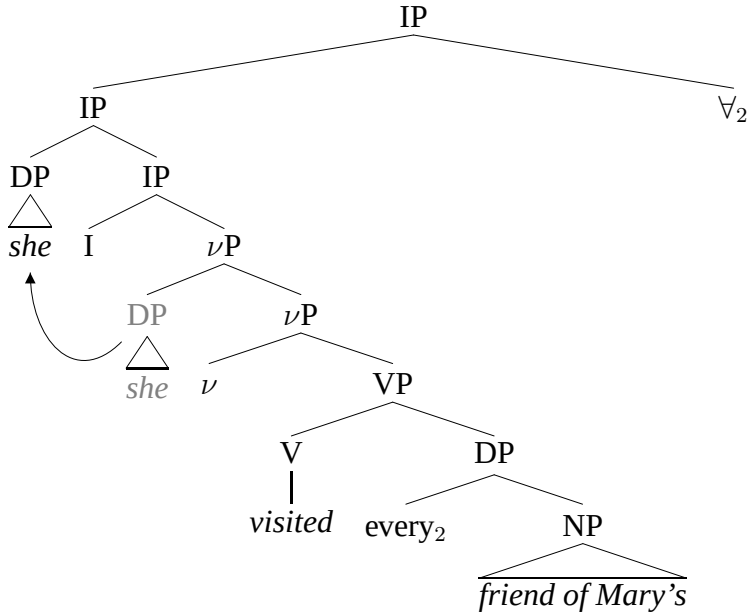
Fox's Trace Conversion rule bothers many. It has the nettlesome property of letting a whole class of lexical items — determiners — be ambiguous. And it resolves that ambiguity contextually by syntactic rule, something not seen elsewhere. So let me offer a variant of Fox's proposal that avoids these consequences before turning to explain the rest of the paradigm in (2)–(4).

This variant builds on ideas many have had about the syntax of quantification.[5] Perhaps it's closest to ideas in Beghelli (1993, 1995), Sportiche (2003), Butler (2004) and Adger & Ramchand (2005). Imagine, as in Matthewson (2001), that Quantificational expressions make use of two functional heads. One has the denotation of quantifiers,[6] and the other is a choice function that provides the domain for the quantification. For concreteness, we can assume this choice function to have just the meaning given to determiners by Fox's Trace Conversion rule. Unlike Matthewson, but like those cited above, let's separate these two functional heads, putting the term that expresses the quantification in the position where its scope is computed, while the choice function is in construction with the NP. The morphological form of the choice function varies depending on the quantificational term. Let's follow Kratzer (2005) and Adger & Ramchand (2005) and let this dependency be mediated by AGREE. AGREE will determine the morphological form of the choice function part, and make both heads share an index. This proposal would give to (4) the representation in (9) before the object QRs.

[5]See, e.g., Williams (1986, 1988), the papers in Szabolcsi (1997), Hallman (2000) and Kratzer (2005).

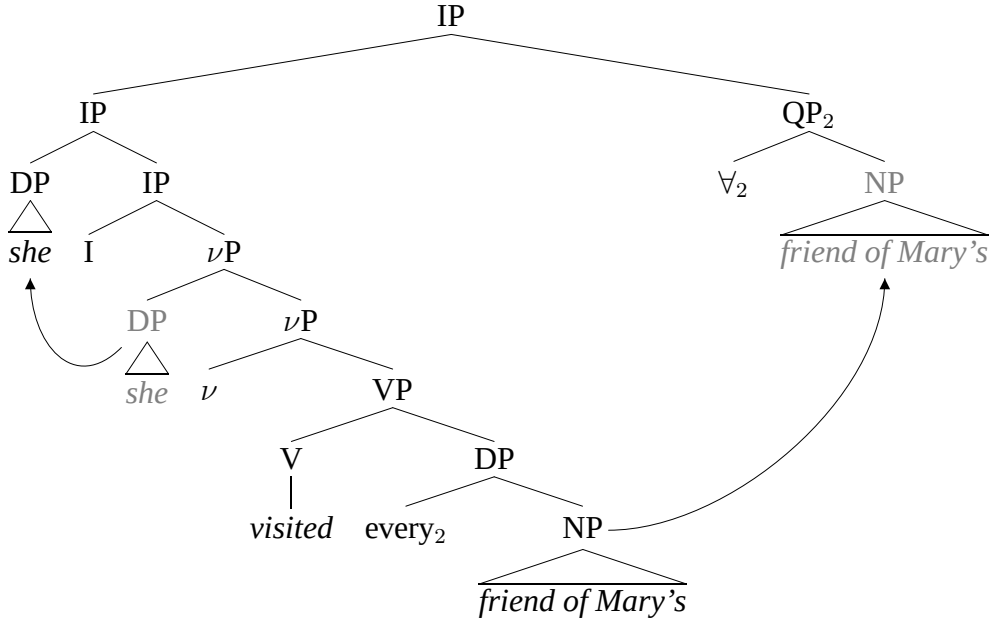
[6]In her syntax, quantifiers combine directly with the DP headed by the choice function, and so she adjusts the denotation of quantifiers to be of semantic type $\langle e, \langle\langle e,t\rangle,t\rangle\rangle$. My syntax will differ, allowing them to be of the more traditional $\langle\langle e,t\rangle,\langle\langle e,t\rangle,t\rangle\rangle$ type.

(9)



QR produces (10).

(10)



This variant of Fox's proposal preserves his syntax and semantics, but does not require a syntactic rule that rewrites the semantics of lexical items. It also straightforwardly derives the necessary (11).

(11) The restrictor for a quantifier must be interpreted within the scope of that quantifier.

Other semantic treatments are possible with only slight differences in the syntax. What I will say here fits a family of accounts, then.

Back to the paradigm in (2)–(4). The account of (2) vs. (4) requires that a spoken copy be interpreted semantically and this, in turn, requires that the relative clause holding the ellipsis in (3) not be pronounced within the VP that serves as the antecedent for the ellipsis.

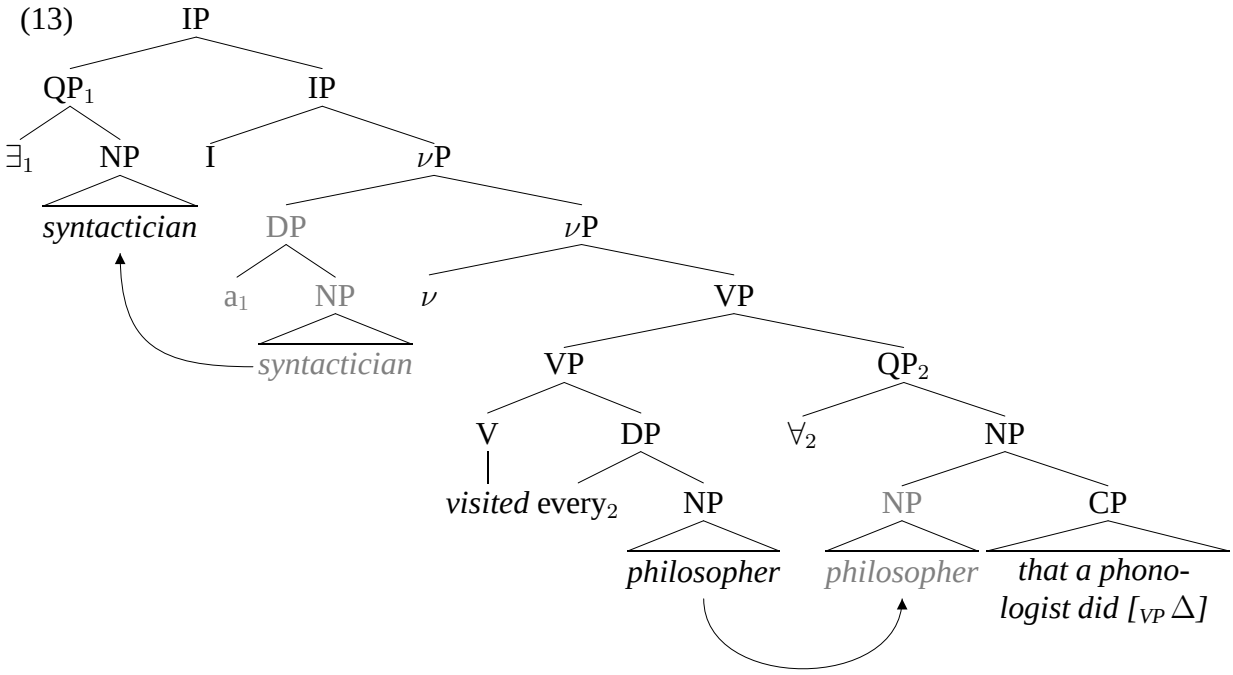
Fox & Nissenbaum (1999) argues that this is correct, producing an analysis that builds on Baltin (1987)'s proposal that extraposition produces the surface syntax which licenses antecedent contained deletions. There is independent support for this conjecture from alternations like those in (12) (originally from Tiedeman 1995).

(12) a. * I [$_{VP}$ said that everyone you did Δ arrived].
b. I [$_{VP}$ said that everyone arrived] that you did Δ.
(Fox 2002:(35b), (36b), 77)

The surface position of the relative clause in (12a) does not allow the ellipsis it contains to be outside the root VP, its antecedent, as required. By contrast, the surface position of the extraposed relative in (12b) is, conceivably, outside the root VP and as a consequence the ellipsis it contains can find a suitable antecedent.

On this account, then, the relative clause in (3) will have string-vacuously extraposed out of the VP that furnishes the antecedent for the ellipsis. Fox and Nissenbaum argue that relative clause extraposition arises by merging the relative clause to a QRd copy of the DP it modifies. Thus, (3) will have a representation like (13).

(13)



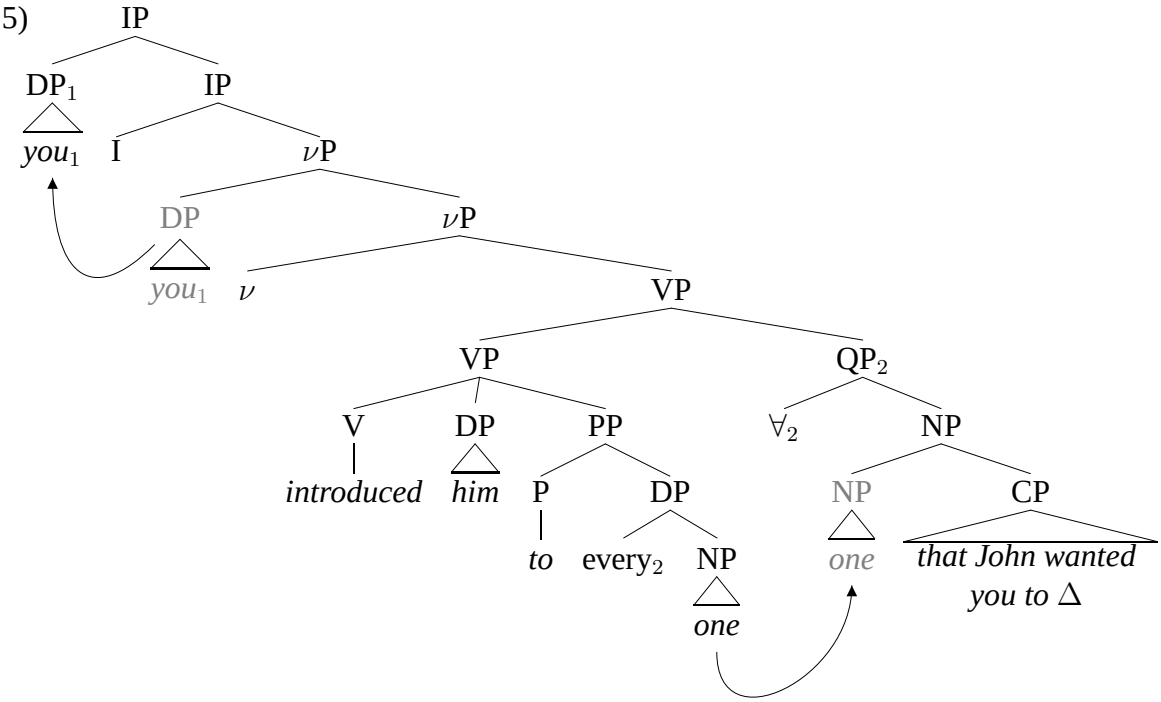
Our semantics gives this representation the right interpretation and correctly resolves the ellipsis.

As Fox notes, interesting confirmation for his account, and my variant of it, comes from the alternation in (14), discovered by Fiengo & May (1994).

(14) a. * You introduced him$_1$ to every friend of John's$_1$ that I wanted you to Δ.
b. * You introduced him$_1$ to everyone that John$_1$ wanted to you to introduce him to.
c. You introduced him$_1$ to everyone that John$_1$ wanted you to Δ.
d. ?? You introduced him$_1$ to everyone yesterday that John$_1$ wanted to you to introduce him to.

In (14a) we see the familiar Principle C effect for material within the NP, and in (14b) we see that it holds for names within the relative clause as well. In (14c,d) we find that the Principle C effect for material within the relative clause is lifted when that relative clause has an ellipsis to resolve, and that it is weakened when that relative clause extraposes. I don't know why there is a difference between (14c) and (14d), but that they should both fall on the side of grammaticality is expected on Fox's proposal. They will get a representation like (15), which does not produce a Principle C effect with *him* and *John* as they are not in a c-command relation.[7]

(15)



As the ungrammaticality of (14b) highlights, this account requires that we find a way of preventing string-vacuous extraposition of the relative clause unless an ellipsis requires it. We need to find something that generally prevents string-vacuous extraposition, and then something about ellipsis that overrides this prohibition. To prevent string-vacuous extraposition, I suggest a trans-derivational constraint which favors the "quickest" derivational path to a given Spell-Out, along the lines of Pesetsky (1989)'s Earliness Principle. I'll formulate the condition as follows.

(16) EARLINESS
Let D={ D_1, D_2,..., D_n } be the well-formed derivations from a fixed Numeration, N, to a fixed Spell Out, S, and let |D| be the number of applications of operations in D. Every D $\in D$ for which there is a D′ $\in D$ such that |D′| $<$ |D| is ungrammatical.

Earliness compares all the ways that the syntax can create the same string from a given set of terminals and throws out all those that take more steps than necessary. Because extraposing the relative clause in (14b) produces the same string that would be created by failing to extrapose the relative clause, Earliness will block the outcome that involves extraposition. Extraposition necessarily involves more steps.

[7]This VP, like many that follow, is artificially flat.

When the relative clause contains an ellipsis, however, Earliness must permit string-vacuous extraposition. What makes ellipsis special, I conjecture, is that it invokes an unusual requirement on Spell Out. To know whether a VP can be Spelt Out as silence, the denotation of that VP must be computed and matched with an antecedent. One might think of this in the same way that we think of the Spell Out of lexical items, where it is also necessary to access the denotation of some term to know what its phonological form is. Consider ellipsis to be a Spell Out instruction that arises when a particular semantic condition is met, a way of conceiving of ellipsis that can be found in Merchant (2001). We might do this by letting the syntax determine the placement of a feature on certain phrases, let's call this an "e-feature," which invokes a Spell Out along the lines of (17).

(17) Spell Out(XP_e) = silence and is defined only if ⟦XP⟧ has an ellipsis antecedent.

An e-feature on a phrase prevents Spell Out from interpreting that phrase in its normal way, and instead makes Spell Out render it as silence. It also makes Spell Out a partial function, requiring that XP to have an antecedent of the sort that is appropriate for elided phrases. This will allow a phrase with an e-feature to have a Spell Out only if its ellipsis is resolved. For (14c) this means that the relative clause must extrapose if it is to be spelled out, since that is the only way the ellipsis it contains can find an antecedent and become subject to (17). There is no way of spelling out (14c), then, that does not involve extraposition. This removes the shorter derivations which normally block string-vacuous extraposition. String-vacuous extraposition of relative clauses is possible, then, when doing so is needed to resolve an ellipsis.

This completes my review of those cases in which the lower copy of two (or more) copies is pronounced. These cases require a very particular view of how copies are interpreted semantically, as well as certain tenets about the syntax, such as Earliness, and the interpretation of ellipsis in (17). It also requires the following.

(18) THINGS NEEDED

a. A mechanism for producing copies of terms in syntactic representations. This could be achieved by letting merge fashion identical phrases that share an index, as in Chomsky (1995b), or by letting movement be understood as giving a single phrase more than one syntactic position, as in Engdahl (1986).

b. A principle that allows some copies to be ignored by the phonological interpretation of sentences. This requires a principle that forces certain copies to be silent. Perhaps a combination of Earliness with a phase-based timing of Spell Out, such as is proposed in Nissenbaum (2000), will do the trick.

c. A principle that forces all copies to be semantically interpreted.

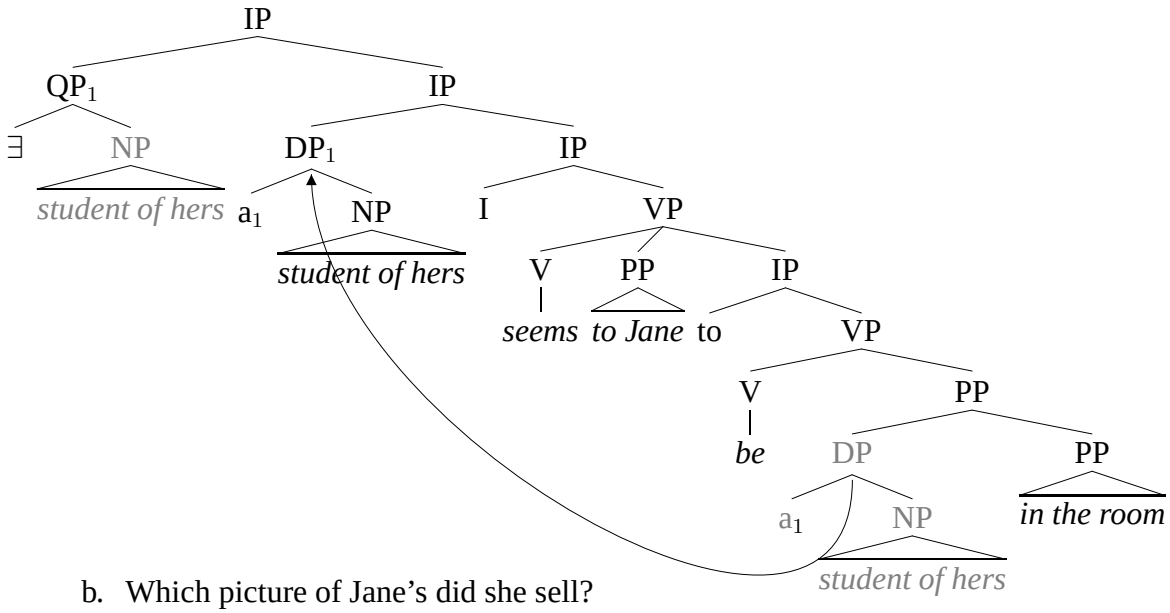
I will not have much to say about how these needs are satisfied. What I will try to show is that not all instances of movement can satisfy (18) with the semantics we have reviewed here.

3. *Second Case: a higher copy is pronounced*

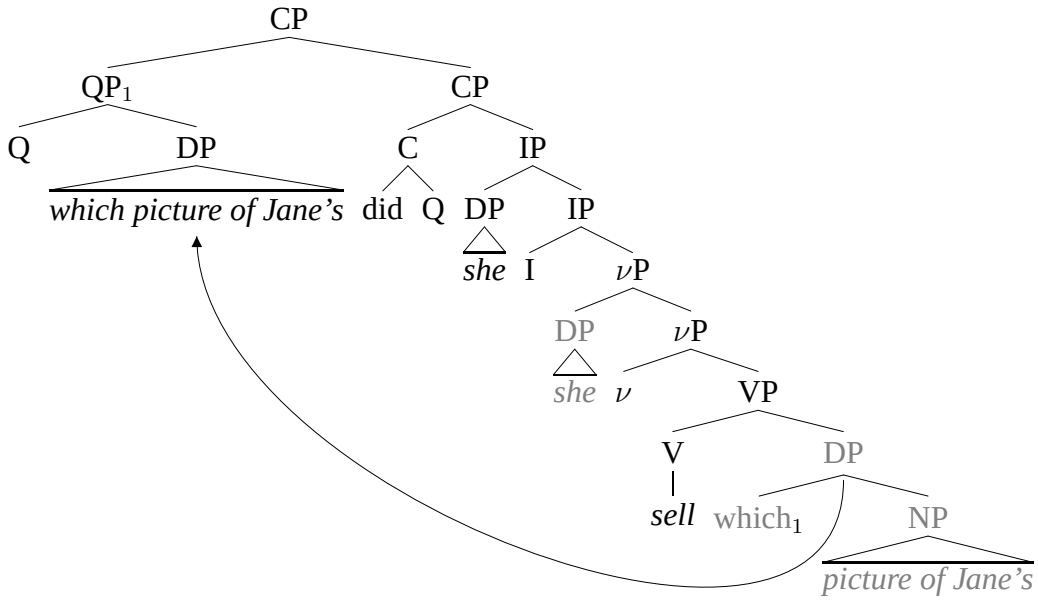
The system I've adopted works not only for all cases where a phrase is interpreted higher than where it is pronounced, but it also works for some cases where a phrase is interpreted lower

than where it is pronounced. The examples in (19), for instance, get the correct interpretations from the representations indicated.

(19) a. A student of hers seemed to Jane to be in the room.



b. Which picture of Jane's did she sell?



In (19a), a spoken copy of *a student of hers* is in the Specifier of the root IP, and binds a restricted variable within the infinitival clause. This is achieved by letting the index on the spoken copy be interpreted as a binder, and letting the lower, unspoken, copy get an interpretation like that we've given to the spoken copies in the previous section: the determiner is a kind of variable, and the NP a restriction. Interestingly, in this example, the spoken copy is also interpreted as a restricted variable, as it is the lower copy created by QR. In this example, then, we see how a copy can be interpreted as both binder and variable.

In (19b), *which picture of Jane's* has wide scope, but the restriction on its variable provided by the unspoken copy induces a Principle C effect between *her* and *Jane*. We will have to see questions like (19b) as having a syntax along the lines that we developed for quantifiers in the previous section. But the semantics will have to be slightly different. We cannot give the determiner *which* the same restricted-variable denotation that we have given other determiners. While doing so would be fine for those instances of *which* that are bound — like the unspoken copy of *which* in (19b) — it would screw things up for those instances of *which* that are not bound — like the spoken copy of *which* in (19b). We will have to find a denotation for *which* that allows it to be interpreted in both the bound and unbound positions. There are a variety of possibilities on the market. One would be to preserve the basic idea that determiners are restricted variables, or choice functions, and combine that with a denotation for the question quantifier, Q, in (19b) that binds off both the higher and lower instances of *which*. Another possibility would be to exploit an alternative semantics, and let *which* introduce (restricted) alternatives that are closed off by Q along the lines described by Kratzer & Shimoyama (2002) or Beck (2006). This is not the place to decide among these alternatives, and so I will remain vague about the semantics of questions. Nonetheless, I hope it is clear how the theory of copies developed in the first section on the basis of quantificational DPs might be extendable to cases of question DPs like (19b).

In these cases where a higher copy is pronounced, then, the account sketched in the first section applies correctly. But there are cases of a pronounced higher copy where these mechanisms fail to deliver the right interpretations. Here are a few.[8]

(20) a. Spätzle ißt Thilo regelmäßig.
spätzle eats Thilo regularly
'Thilo eats gobs of spaetzle.'

b. A student of hers seemed to every professor to be in the room.

c. A student of Jane's seemed to her to be in the room.

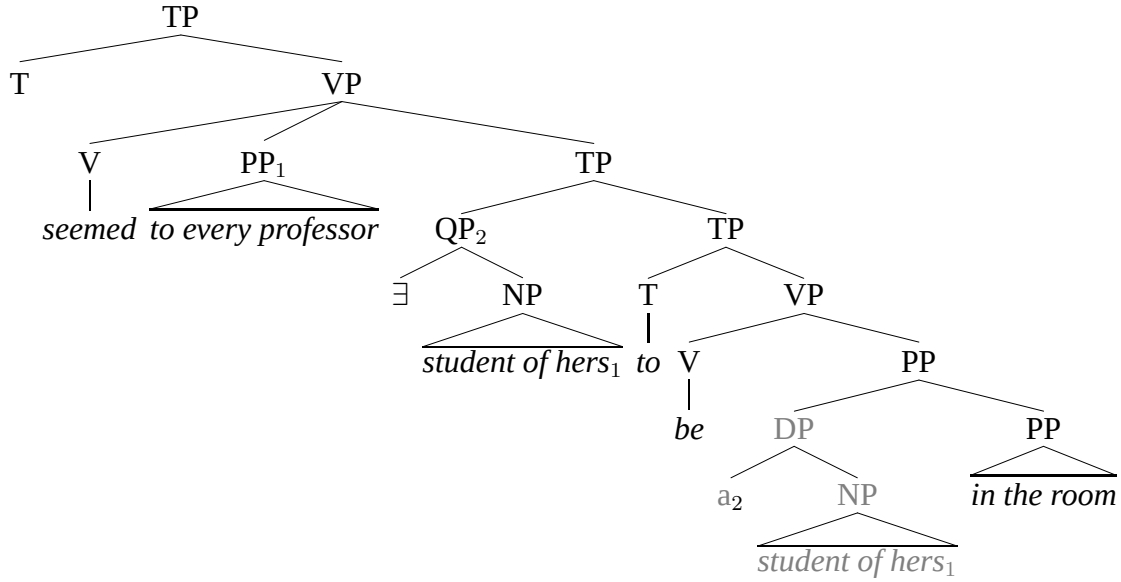
Each of these cases can get an interpretation in which the spoken copy is not semantically interpreted; only an unspoken copy is interpreted. In (20a), for example, the meaning of *ißt* is not computed at the position it is spoken. Only the copy of *ißt* in the underlying position is interpreted by the semantics. The same is possible in (20b) and (20c) too.

There are two interpretations of (20b) in which *a student of hers* is similarly not interpreted in its spoken position. On both of these interpretations, *her* is bound by *every professor* and the existential quantifier associated with *a* is interpreted within the scope of the universal quantifier associated with *every*. If the *student*-DP is interpreted inside the infinitival complement, for instance, what we require from our present system is a representation like (21).[9]

[8]The cases in (20b) and (20c) are discussed in Hornstein (1995), Fox (2002) and Sauerland & Elbourne (2002).

[9]I've assumed that the index '1' that *every* brings with it has projected up to the PP *to every professor*.

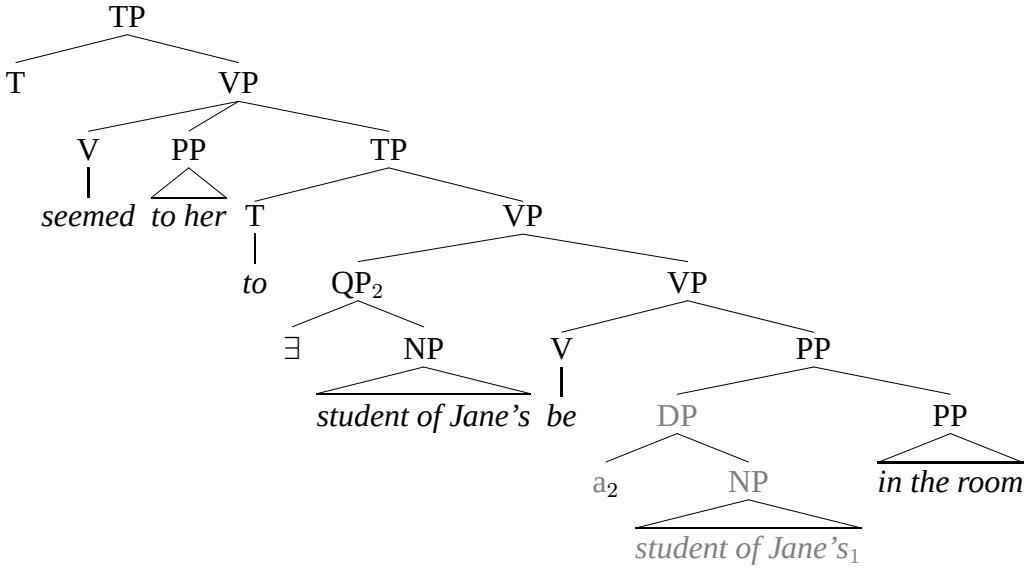
(21)



For *her* is bound by *every professor*, the present system requires a representation in which, like (21), there is no copy of *her* in the position that we actually speak it.

Similarly, (20c) has an interpretation in which the *student*-DP is interpreted within the infinitival complement: its world variable is bound by *seem*. On this interpretation *Jane* and *her* invoke a Principle C effect,[10] and the existential quantification associated with *a* has narrow scope. Our present system requires a syntactic representation like (22) for such a meaning.

(22)



As with (21), this representation does not put a copy in the position where one is spoken.

These are instances of "total reconstruction."[11] They flout (18c): the requirement that every copy be semantically interpreted. Without this requirement, we would lose the fact that QR does

[10] One issue I will dodge in this paper is why Principle C effects are not invoked in all cases of Argument Movement. On the wide scope interpretation of (20c), for instance, *Jane* and *her* may easily corefer. I think Takahashi (2006)'s proposal — that the NP of a DP may merge late — provides a plausible account.

[11] See May (1977) and Sauerland & Elbourne (2002).

not bleed Principle C effects, as we've seen in the previous section. We need to explain, then, why these cases are different. So far as I know, all the cases where copies are not semantically interpreted are ones in which they are spoken and higher. At a minimum, then, we should explain (23).

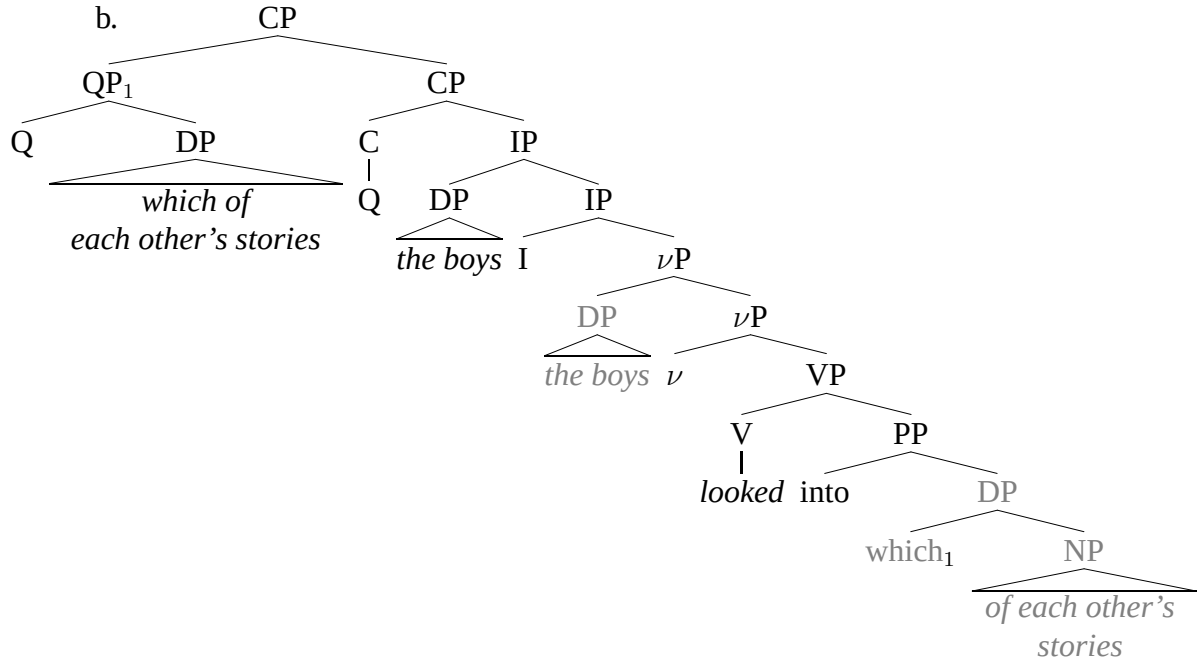
(23) If there are two or more copies of α, then the pronounced copy must be semantically interpreted unless it is the highest one.

The traditional account for (23) is to let movement create representations that are not semantically interpreted. The spoken copies in (20), for example, could be manufactured after the representations indicated above have gotten their final semantic interpretation. This was captured by the "Y" model of grammar, or its phase-based variants,[12] by allowing there to be a parse that feeds Spell Out but not the rules of semantic interpretation. The operation that produces this parse is something referred to as "PF movement."

Such an approach claims that a spoken copy will either be completely interpreted or completed ignored by the semantics. What we find instead, in cases of pied-piping, are that parts of a spoken copy can be ignored while other parts can be interpreted. For instance, we need to allow the sentence in (24) to have the representation (24b).

(24) a. The girls$_1$ asked into which of each other$_1$'s stories the boys$_2$ looked.

b.

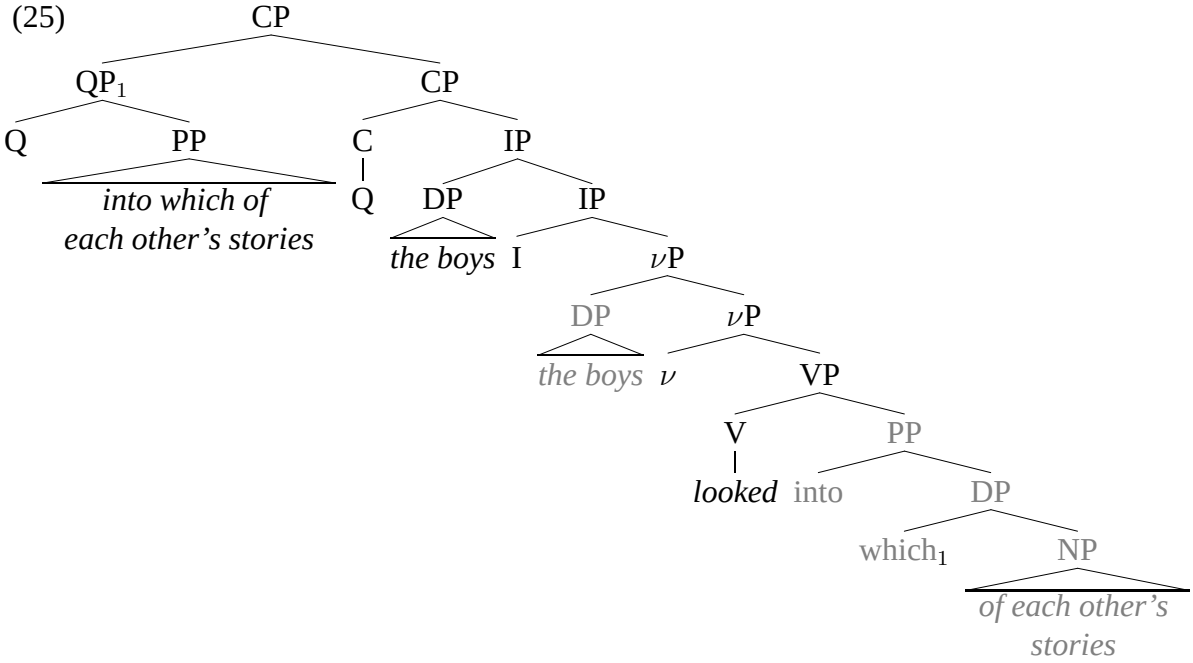


In (24a), *each other*, and so the NP containing it, must be interpreted in its spoken position. The locality condition on binding reciprocals will not allow it to be interpreted in just its unspoken position, as is indicated by the ungrammaticality of **The girls$_1$ asked that the boys$_2$ look into each other's$_1$ stories*.[13] On the other hand, the preposition can only be interpreted in its unspoken position. Our system would not be able to interpret (25), for instance.

[12] See Sauerland & Elbourne (2002), for instance.

[13] On the copy theory of movement, the locality condition on anaphors must be able to be satisfied by way of any of the copies of that anaphor. This too, I think, speaks on behalf of a multidominance view of copies.

(25)



Because only determiners are interpreted as variables, the variable in the lower copy is *which*$_1$, and this is associated with *each other's stories*. But the binder in (25) is the PP *into which of each other's stories*. As a consequence, the semantics that we've developed in section one would give (25) something like the interpretation sketched in (26) (the details will depend on how the semantics of wh-determiners are fleshed out).

(26) [into which of each other's stories] $\lambda x.$ [the boys looked into $[\![$the$]\!](\lambda y.$each-other's-stories$(y) \cap \lambda y.y = x)$]

The variable in the object position of *into* ranges over things that are 'each other's stories' and 'into each other's stories,' and that is quite wrong. The problem with (25), then, is that the lower copy of the PP cannot be interpreted as a variable and this makes the PP in Specifier of CP wrongly bind the DP.[14]

In pied-piping constructions like (24), then, it appears that parts of the moved phrase are interpreted in different positions. PF Movement cannot do that. We need something other than the normal mechanisms behind movement to explain (23).

I suggest that these instances of semantically vacuous "movement" are instead cases where the normal principles of linearizing a phrase marker are overrun by requirements of Spell Out. I'll sketch now a way to do that.

[14]Perhaps we should extend the theory reviewed in the first section so that things other than determiners can be interpreted as variables. Perhaps, for instance, we could generalize Fox's Trace Conversion rule so that it interprets some, presumably silent, term that selects PPs, and other moveable phrases, as a restricted variable in the way that this rule presently does just determiners. This would at least provide a way of allowing the silent PP in (25) to be interpreted as a variable and take us a step closer to understanding how to interpret it. (There would still be problems to overcome, however. We would have to find a way of ensuring that both copies of *each other's stories* picked out the same individuals, for instance.) While this direction may provide a solution, its invocation of silent variable-determiners wherever they seem to be needed seems to me *ad hoc*.

The Spell Out requirements that are relevant for the cases we've been examining are (27).[15]

(27) a. A C^0 with a [Q] feature must be right adjacent to the string whose [Q] feature it values.

b. An I^0 with a [+case] feature must be right adjacent to the string whose [+case] feature it values.[16]

These are intended merely to code the fact that the Specifiers of CP and IP have the phrases in them that C^0 and I^0 AGREE with. One can think of (27) as being a version of the "strong" agreement feature that a question C^0 or finite I^0 have, or, to use different terminology, the "EPP" feature that these heads have. Understand these to be well-formedness conditions on Spell Outs.

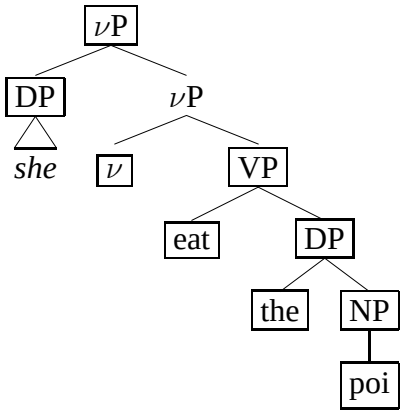
For the "normal" linearization of a phrase marker, I'll adopt Kayne (1994)'s Linear Correspondence Axiom, a slightly modified version of which is in (28).

(28) LINEAR CORRESPONDENCE AXIOM (LCA)

- If γ asymmetrically c-commands ρ, then $\lfloor \gamma, \rho \rfloor$.
- LCA($\lfloor A, B \rfloor$) = $\{ \langle \alpha, \beta \rangle : \alpha$ is dominated by A and β is dominated by $B \}$.
- $\langle x, y \rangle =_{\text{def.}} x$ precedes y.
- LIN(P) = LCA($\lfloor A, B \rfloor$) for all A and B in P that are maximal or minimal projections.

The LCA produces a set of ordered pairs whose transitive closure is a string which includes all of the terminals in some phrase marker. It translates "asymmetric c-command" into precedence. It will apply to the simple νP in (29), for example, to produce the ordering in (31). (I've boxed the maximal and minimal projections that enter into an asymmetric c-command relation.)

(29)



(30) asymmetric c-commanders in (29):

$$\left\{ \begin{array}{l} \lfloor \text{DP}_{\text{she}}, \nu \rfloor, \lfloor \text{DP}_{\text{she}}, \text{VP} \rfloor, \lfloor \text{DP}_{\text{she}}, \text{eat} \rfloor, \lfloor \text{DP}_{\text{she}}, \text{the} \rfloor, \lfloor \text{DP}_{\text{she}}, \text{NP} \rfloor, \lfloor \text{DP}_{\text{she}}, \text{poi} \rfloor \\ \lfloor \nu, \text{eat} \rfloor, \lfloor \nu, \text{DP}_{\text{the}} \rfloor, \lfloor \nu, \text{NP} \rfloor, \lfloor \nu, \text{the} \rfloor, \lfloor \nu, \text{poi} \rfloor \\ \lfloor \text{eat}, \text{the} \rfloor, \lfloor \text{eat}, \text{NP} \rfloor, \lfloor \text{eat}, \text{poi} \rfloor \\ \lfloor \text{the}, \text{poi} \rfloor \end{array} \right\}$$

[15] I ignore here those conditions relevant for forcing head movement.

[16] This is a better description of French than it is of English, as English lets adverbs intervene between the surface position of the subject and where we think I^0 is. The right account will make sense of this language variation. What matters here is only that the EPP, which this is an attempt to express, is a Spell Out condition.

(31) LIN(νP):

$$\left\{\begin{array}{llll} \langle \text{she}, \nu\rangle & \langle \text{she, eat}\rangle & \langle \text{eat, the}\rangle & \langle \text{the, poi}\rangle \\ (\nu, \text{eat}) & \langle \text{she, the}\rangle & \langle \text{eat, poi}\rangle & \\ \langle \nu, \text{the}\rangle & \langle \text{she, poi}\rangle & & \\ \langle \nu, \text{poi}\rangle & & & \end{array}\right\}$$

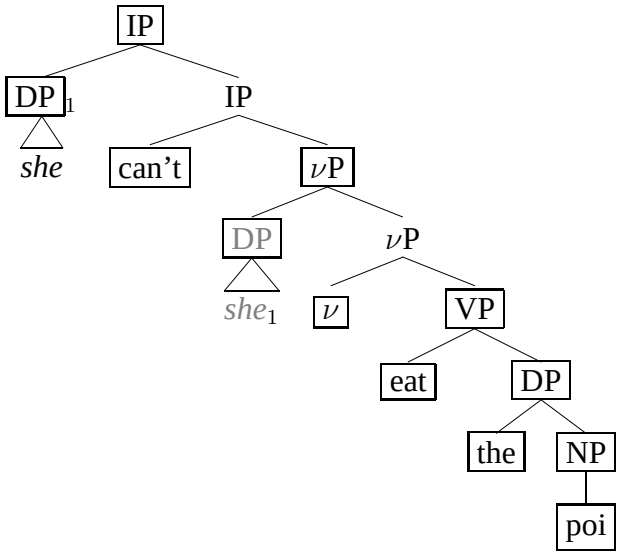
The string (31) corresponds to is *she ν eat the poi*, as desired.

When copies are involved, things get more complex. If we assume that copies can neither precede nor follow each other (=(32)),[17] then the LCA cannot be both complete and consistent in a phrase marker that has copies.[18]

(32) *$\langle x, y\rangle$, where x and y are copies.

For example, consider how the LCA would evaluate the full sentence that (29) fits into:

(33)



Because DP_{she} asymmetrically c-commands she_1, a complete linearization of this phrase marker will include $\langle$she, she$\rangle$, a violation of (32). Let's understand linearizations, then, to be as complete as possible. For any given phrase marker, let the LCA produce a set of linearizations that are as complete as (32) will allow them to be.

(34) Form all subsets, α, of the set generated by the LCA such that:

a. α makes a consistent linearization (e.g., obeys (32)) , and

b. α orders a copy of every terminal.

We can let the well-formedness conditions on Spell Out choose from these linearizations the correct one. So, for instance, the two consistent, complete linearizations of (33) are (35).

[17] This is easiest to derive on the view that copies are one phrase with several syntactic positions.

[18] See Nunes (1995).

(35) a. $\left\{ \begin{array}{lllll} \langle \text{she, can't} \rangle & \langle \text{she}, \nu \rangle & \langle \text{she, eat} \rangle & \langle \text{eat, the} \rangle & \langle \text{the, poi} \rangle \\ \langle \text{can't}, \nu \rangle & \langle \nu, \text{eat} \rangle & \langle \text{she, the} \rangle & \langle \text{eat, poi} \rangle & \\ \langle \text{can't, eat} \rangle & \langle \nu, \text{the} \rangle & \langle \text{she, poi} \rangle & & \\ \langle \text{can't, the} \rangle & \langle \nu, \text{poi} \rangle & & & \\ \langle \text{can't, poi} \rangle & & & & \end{array} \right\}$

= *she can't ν eat the poi*

b. $\left\{ \begin{array}{lllll} \langle \text{can't, she} \rangle & \langle \text{she}, \nu \rangle & \langle \text{she, eat} \rangle & \langle \text{eat, the} \rangle & \langle \text{the, poi} \rangle \\ \langle \text{can't}, \nu \rangle & \langle \nu, \text{eat} \rangle & \langle \text{she, the} \rangle & \langle \text{eat, poi} \rangle & \\ \langle \text{can't, eat} \rangle & \langle \nu, \text{the} \rangle & \langle \text{she, poi} \rangle & & \\ \langle \text{can't, the} \rangle & \langle \nu, \text{poi} \rangle & & & \\ \langle \text{can't, poi} \rangle & & & & \end{array} \right\}$

= *can't she ν eat the poi*

Only (35a) meets the Spell Out requirement in (27b), however, and so it's chosen.

This, then, is the normal linearization procedure. For the cases of semantically vacuous movement that we're interested in, I suggest there is a rule that adds linearization statements.

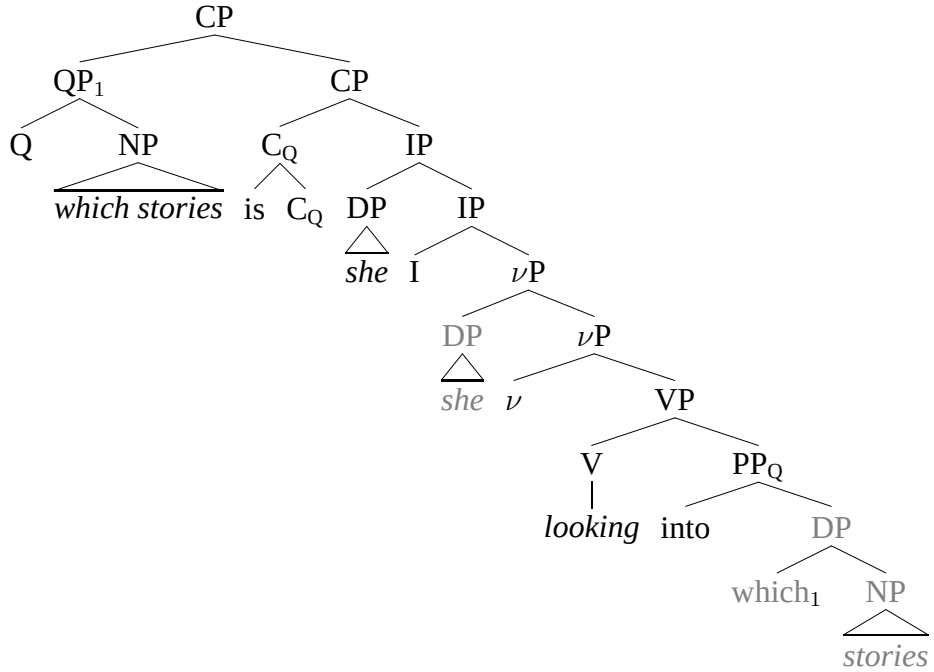
(36) move $=_{\text{def.}}$ add $\langle \alpha, \beta \rangle$, α, β terminals.

This rule will have the effect of giving positions to terminals that do not reflect their hierarchical position. It will create the illusion that these terminals have moved. Cases of semantically vacuous movement, then, will be situations where the semantics requires a syntactic representation that cannot be reconciled with its Spell Out requirements. In such cases, (36) will add linearization statements in order to produce a string that satisfies the Spell Out requirements. In this way, Spell Out requirements can force an unfaithful linearization of a syntactic representation required by the semantics.

Let's look at how this will work for a simplified version of (24).

(37) a. Into which stories is she looking?

b.



Let (37b) be the representation that is semantically interpreted. It correctly places the determiner *which*, interpreted as a restricted variable, in the scope of its binder (*Q which stories*), and puts *into* in a position that allows it to combine in the normal way with its selecting verb. Because the Q feature is on the PP, *into which stories*, the Spell Out requirements will be satisfied only if this PP immediately precedes C^0. This is not how (37b) would be normally linearized, however, and so (36) will be invoked to create the string in (37a).

An LCA-faithful linearization of (37b) is (38).

(38)
$$\left\{\begin{array}{lllll} \langle\text{which, stories}\rangle & \langle\text{stories, is}\rangle & \langle\text{is, she}\rangle & \langle\text{she, looking}\rangle & \langle\text{looking, into}\rangle \\ \langle\text{which, is}\rangle & \langle\text{stories, she}\rangle & \langle\text{is, looking}\rangle & \langle\text{she, into}\rangle & \\ \langle\text{which, she}\rangle & \langle\text{stories, looking}\rangle & \langle\text{is, into}\rangle & & \\ \langle\text{which, looking}\rangle & \langle\text{stories, into}\rangle & & & \\ \langle\text{which, into}\rangle & & & & \end{array}\right\}$$

= *which stories is she looking into*

This is formed by taking the subset of the ordered pairs that the LCA produces for (37) that omits the shaded terminals. This is a perfectly accurate linearization of (37b), but, as noted, it does not satisfy the Spell Out requirement on question complementizers in (27a), repeated here.

(27a) A C^0 with a [Q] feature must be right adjacent to the string whose [Q] feature it values.

In (37), the [Q] feature which C^0 values is on the PP headed by *into*. What (27a) requires, then, is that the C^0 be right adjacent to the string in (39).

(39)
$$\left\{\begin{array}{ll} \langle\text{into, which}\rangle & \langle\text{which, stories}\rangle \\ \langle\text{into, stories}\rangle & \end{array}\right\}$$

= *into which stories*

To satisfy (27a), the statements ⟨into, which⟩ and ⟨into, allegations⟩ need to be added to the linearization in (38). Adding those statements and leaving everything else in (38) will result in an inconsistent linearization. For instance, it will create a linearization that contains (40).

(40) { ⟨into, which⟩, ⟨which, into⟩ }

Indeed, there is no subset of (38)+⟨into, which⟩+⟨into, allegations⟩ that orders all copies of the terminals and is consistent. Movement, then, must do more than add the statements that provide satisfaction of (27a). It must add statements that do this and achieve a complete linearization. Movement will need to add the statements in (41).

(41) Add: { ⟨into, which⟩ ⟨into, stories⟩ ⟨into, is⟩ ⟨into, she⟩ ⟨into, looking⟩ }

Adding (41) to (38), and then taking a subset which orders all the terminals, is consistent and satisfies the Spell Out requirement in (27a) gives us:

(42)
$$\left\{\begin{array}{lllll} \langle\text{which, stories}\rangle & \langle\text{stories, is}\rangle & \langle\text{is, she}\rangle & \langle\text{she, looking}\rangle & \langle\text{into, looking}\rangle \\ \langle\text{which, is}\rangle & \langle\text{stories, she}\rangle & \langle\text{is, looking}\rangle & \langle\text{into, she}\rangle & \\ \langle\text{which, she}\rangle & \langle\text{stories, looking}\rangle & \langle\text{into, is}\rangle & & \\ \langle\text{which, looking}\rangle & \langle\text{into, stories}\rangle & & & \\ \langle\text{into, which}\rangle & & & & \end{array}\right\}$$

= *into which stories is she looking*

This is just the string that we are trying to achieve.

4. *Conclusion*

Semantically vacuous movement is "Add $\langle\alpha, \beta\rangle$." We are not free to add linearization statements at will, however, as Earliness (=(16)) insists that we produce a Spell Out that is as faithful to the syntactic representation as possible. Thus, we should expect to find semantically vacuous movement only in those situations where there are Spell Out requirements at odds with the semantics.

What's left to understand is why the movement produced by "Add $\langle\alpha, \beta\rangle$" obeys all of the constraints — islands, constituency, etc. — obeyed by producing copies.

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Kyle Johnson
University of Massachusetts at Amherst
kbj@linguist.umass.edu
http://www.umass.edu/linguist/people/faculty

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On the ditransitive construction in Korean

Lan Kim

This paper investigates the Korean ditransitive construction consisting of the Goal (IO), a dative-case marked NP *–ey(key),* and the Theme (DO), an accusative-case marked NP *–(l)ul*. I propose that [IO-DO] is the underlying order and [DO-IO] is derived by scrambling. I argue that the underlying order is an instantiation of the prepositional locative structure in which the Goal c-commands the Theme. This is a counterexample to Harley's (2002) typological generalization in which the Theme c-commands the Goal in the prepositional locative structure. As a further support for my proposal, I show that Korean has another locative structure in the form of a double subject construction.

1. Introduction

The ditransitive construction in English has received much attention among linguists (Larson 1988; Pesetsky 1995; Harley 1996, 2002). The following examples show that English has two different syntactic frames for argument realization associated with ditransitive verbs such as *send*.

(1) a. Tom sent Mary a letter. [Double Object Construction]
b. Tom sent a letter to Mary. [To-Dative Construction]

Example (1-a) is called a double object construction (DOC) and consists of two NPs: the Goal *Mary* as an indirect object (IO) precedes the Theme *a letter* as a direct object (DO). Example (1-b) is called a to-dative construction (to-DC) in which the Theme (DO) *a letter* precedes the Goal (IO) *to Mary*.

An important question regarding the two syntactic frames associated with ditransitive verbs is whether the frames, DOC and to-DC, are derived from the same underlying structure or whether each frame has its own underlying representation. The proposals in the literature on the derivation of the ditransitive construction can be divided into two main approaches. First, the Derivational Approach, which views the two frames as syntactically or semantically related, states that one frame represents the underlying order and the other frame is derived via syntactic operation (as argued in Larson 1988). The Alternative Projection Approach, on the other hand, states that DOC and to-DC are not syntactically or semantically related to each

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other. This approach views each frame as having its own underlying representation resulting in alternative projections (as argued in Pesetsky 1995; Harley 1996, 2002).

Korean has a ditransitive construction consisting of a dative NP and an accusative NP. For example, as shown in (2), the ditransitive construction is composed of a dative-case marked NP *–ey(key)*[1] and an accusative-case marked NP *–(l)ul*[2]: the dative NP, IO (Goal), can precede the accusative NP, DO (Theme), and vice-versa. I will refer to this type of ditransitive construction as dative construction.

(2) a. Mary-nun John-*eykey* senmwul-*ul* cwu-ess-ta. [IO-DO]
Mary-TOP John-DAT present-ACC give-PST-DEC
'Mary gave a present to John.'
b. Mary-nun senmwul-*ul* John-*eykey* cwu-ess-ta. [DO-IO]
Mary-TOP present-ACC John-DAT give-PST-DEC
'Mary gave a present to John.'

Another type of ditransitive construction attested in Korean contains two accusative-case marked NPs as in (2-c). I will refer to this type of ditransitive construction as double object construction.

(2) c. Mary-nun John-ul senmwul-ul cwu-ess-ta.
Mary-TOP John-ACC present-ACC give-PST-DEC
'Mary gave John a present.'

While all ditransitive verbs can occur in dative construction, only a small number of ditransitive verbs, such as *cwuta* 'give' can occur in double object construction, as shown in Jung and Miyagawa (2004). This paper is mainly concerned with the syntax of dative construction.

Unlike in English, in Korean, not much work can be found on the syntactic relationship between the dative construction with [IO-DO] and the one with [DO-IO]. There is only one previous study by Baek & Lee (2004). They propose that [IO-DO] and [DO-IO] are derived from the same underlying structure: [DO-IO] is the underlying structure and [IO-DO] is derived via scrambling, a syntactic operation that freely orders arguments.

This paper investigates the dative construction in Korean exemplified in (2) and addresses the following research question:

'In the two orders, [IO-DO] and [DO-IO], which one represents the underlying structure and which one represents the derived structure?'

In this paper, I propose that [IO-DO] ([Goal-Theme]) represents the underlying order as in (2-a) and [DO-IO] ([Theme-Goal]) as in (2-b) is derived from [IO-DO] by moving the DO across the IO. The derivation results from scrambling. Further, extending the ideas from Harley, I propose that the underlying order [IO-DO] is an instantiation of the prepositional locative structure in which the Goal c-commands the Theme.

[1] The allomorphs of the dative-case markers depend on the animacy of the complement NP: if the NP encodes an inanimate entity, -*ey* is used, while if the NP encodes an animate entity, -*eykey* is used.

[2] The allomorphs of the accusative-case markers are phonologically conditioned: if the NP ends with a consonant, -*ul* is used, while if the NP ends with a vowel, -*lul* is used.

This paper is organized as follows: In section 2, I provide a brief overview of the main approaches to English ditransitive constructions that have been proposed in the literature. In particular, I focus on Larson (1988) and Harley (1996, 2002). In section 3, I examine the Korean dative construction in which the Goal (IO) is marked with the dative-case *–ey(key)* and the Theme (DO) is marked with the accusative-case *–(l)ul*. I provide three supporting arguments for this proposal, the quantifier scope, the chain condition of *cakicasin* 'self', and idiomatic expressions in Korean to show that [IO-DO] is the underlying order and [DO-IO] is derived through scrambling. In section 4, I propose that the underlying order [IO-DO] is an instantiation of the prepositional locative structure headed by P_{loc}, similar to Harley's (1996, 2002) proposed structure for the to-dative construction in English. However, I show one major difference between Harley's structure and mine, which concerns the syntactic relationship between the Goal (IO) and the Theme (DO) argument. In contrast to Harley's proposal that in prepositional locative structure the Theme c-commands the Goal, I argue that in Korean prepositional locative structure the Goal (IO) c-commands the Theme (DO). I show that this creates a puzzle given Harley's cross-linguistic observation. In my analysis, Korean, thus, becomes a counterexample to Harley's typological generalization. As a further support for my proposal, I show that Korean has another locative structure in the form of a double subject construction and I propose that the syntactic relationship between the Location and the Theme in the double subject locative construction is replicated by the syntactic relationship between the Goal (IO) and the Theme (DO) in the dative construction. In section 5, I summarize and conclude this paper.

2. *Previous proposals*

I provide a brief overview of the main approaches to ditransitive constructions in English: Larson's Derivational Approach (1988) and Harley's Alternative Projection Approach (1996, 2002). They account for the two types of ditransitive construction, the double object construction and the to-dative construction in English. I will show that Harley's analysis is superior to Larson as the meaning difference between DOC and to-DC is accounted for in Harley.

2.1. Larson's derivational approach (1988)

Larson provides very influential analysis of ditransitive constructions. His main proposal is that DOC is derived from to-DC via a passive-like operation. The starting point of his analysis is the syntactic asymmetries observed in DOC: the Goal asymmetrically c-commands the Theme in DOC (Barss & Lasnik 1986).

(3) Anaphor binding
a. John showed Mary herself. [DOC]
b. *John showed herself Mary.

(4) NPI licensing
a. John sent no one anything. [DOC]
b. *John sent anyone nothing.

For example, in (3), the anaphor *herself* must be bound by a c-commanding antecedent *Mary*. Example (3-a) is grammatical because the Goal *Mary* c-commands the Theme *herself*. However, (3-b) is ungrammatical because the Goal *Mary* does not c-command the Theme *herself*. In (4), a negative polarity item (NPI) should appear in the scope of a negative constituent. The NPI *anything* should be c-commanded by the negative constituent *no one*. In (4-a), the Goal *no one* c-commands the Theme *anything*, hence the NPI licensing condition is met. In (4-b), the Theme *nothing* does not c-command the Goal *anyone*, hence the NPI is not licensed and the example is ungrammatical.

The asymmetries also occur with to-DC: the Theme asymmetrically c-commands the Goal, as illustrated in (5) and (6).

(5) Anaphor binding
a. I showed Mary to herself. [to-DC]
b. *I showed herself to Mary.

(6) NPI licensing
a. John sent no books to any of the students. [to-DC]
b. *John sent any of the books to none of the students.

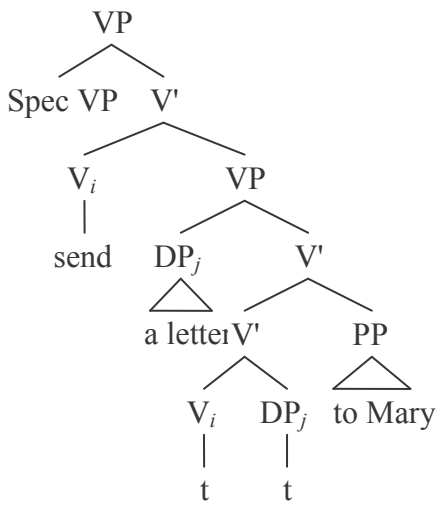
In order to capture the syntactic asymmetries attested in the two constructions, Larson proposes a VP shell of hierarchical structure in which one VP is embedded directly under the other. He argues that the creation of two VP shells is able to account for the asymmetrical c-commanding relationship between the Goal (IO) and the Theme (DO). Larson proposes (8-a) for the to-DC and (8-b) for DOC, as shown below. In (8-a), the DO asymmetrically c-commands the IO, accounting for (5) and (6). In (8-b), the IO asymmetrically c-commands the DO, accounting for (3) and (4).

An important argument to support Larson's VP shell analysis comes from 'Verb + Goal' idioms in English, so-called 'discontinuous idioms' found in to-DC. In 'Verb + Goal' idioms found in to-DC in English, according to Larson, the ditransitive verb and the Goal (IO) form a single constituent as an idiom excluding the Theme (DO). This is an idiom-as-constituents theory that stipulates that idioms form one constituent at some point in the syntactic derivation. The idiom is called discontinuous because the ditransitive verb initially forms a constituent with the Goal (IO) at some syntactic level and it later moves to the upper VP. For instance, in (7), *sent* forms a constituent with *to the showers*, excluding *Mary*, to build an idiom in D-structure and then moves to the upper VP. Larson argues that most idioms formed with a ditransitive verb in English are 'Verb + Goal' idioms that appear in to-DC.

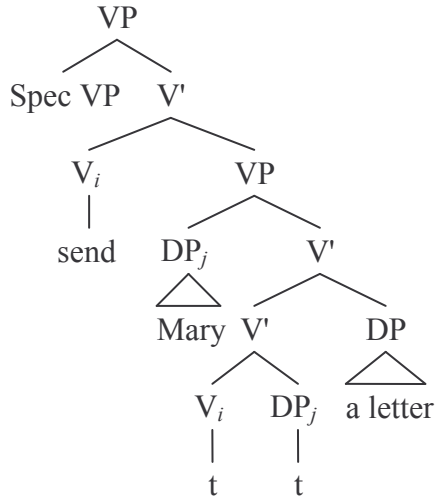
(7) The coach *sent* Mary *to the showers*. [to-DC]
[$_{VP}$ The coach [$_{V'}$ V empty [$_{VP}$ Mary [$_{V'}$ *sent* [$_{PP}$ *to the showers*]]]]
'The coach took Mary out of the game.'

Further, on the basis of the VP shell-approach, he argues that to-DC in (8-a) is the underlying structure from which DOC in (8-b) is derived. The transformation from to-DC to DOC is achieved by 'dative shift', a passive-like operation applied to the lower VP of the to-DC structure: this causes the Goal to move to the specifier position of the lower VP and the Theme to be generated in an adjunct position in DOC. The trees in (8) represent the two structures introduced by Larson.

(8) a. John sent a letter to Mary. [to-DC]



b. John sent Mary a letter. [DOC]



In (8-a), the Theme (DO) *a letter* is generated in the position of the specifier of the lower VP and the Goal (IO) *to Mary* in the complement of the lower VP. Once an operation similar to passivization is applied to the lower VP, the dative-case assigned to the IO *to Mary* is absorbed and the theta-role assigned to the DO *a letter* undergoes demotion. This syntactic operation generates DOC, as in (8-b): the Goal (IO) *Mary* moves to the specifier position of the lower VP and the Theme (DO) *a letter* is in the adjunct position of the lower VP. Larson calls this passive-like operation 'dative shift'.

An important argument to support Larson's transformational approach comes from his assumption that the IO and the DO in to-DC and DOC have the same theta role, and the Uniformity of Theta-Role Assignment Hypothesis (UTAH), initially proposed by Baker (1988). According to Baker, UTAH states that identical thematic relationships are represented by identical structural relationships between items at the level of D-structure. Larson extends Baker's UTAH and proposes Relativized UTAH. The Relativized UTAH states that identical thematic relations are represented by identical relative hierarchical relations between items at D-structure. In Larson's account of ditransitive structures, the Theme is hierarchically higher than the Goal in to-DC and equivalent thematic roles are assigned to the Goal (IO) and the Theme (DO) in DOC and to-DC. For example, in (9), according to Larson, the IO *John* in to-DC has the same thematic role as the IO *John* in DOC. Thus, because the two constructions have the same argument structure, DOC is transformed from to-DC via 'dative shift'.

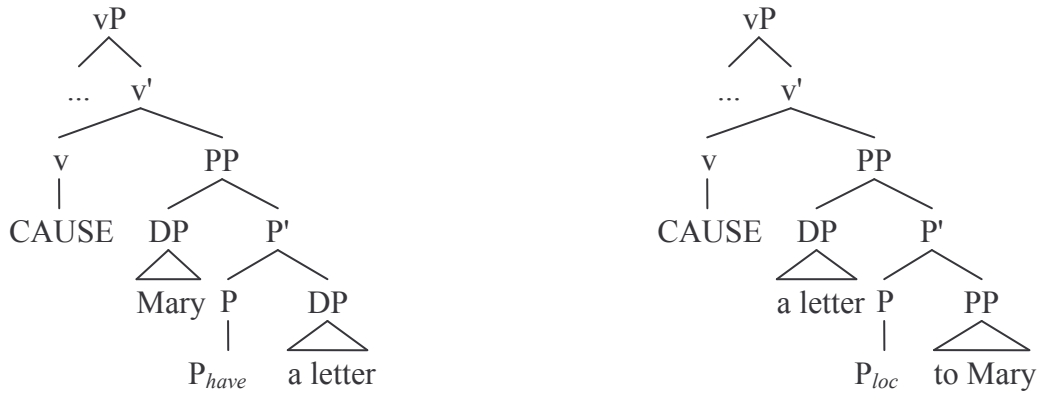
(9) a. Tom gave a book to John. [to-DC]
b. Tom gave John a book. [DOC]

In summary, Larson captures the hierarchical structure of the Goal and the Theme with the VP-shell analysis and proposes that DOC is derived from to-DC via 'dative shift' in English. He presents 'discontinuous idioms' as a supporting argument for the VP-shell analysis and motivates transformation of DOC from to-DC by appealing to Relativized UTAH.

2.2. Harley's alternative projection approach (1996, 2002)

Harley proposes that DOC and to-DC have alternative projections. DOC has a possessive prepositional structure headed by an abstract possessive preposition, P_{have}, and to-DC has a locative prepositional structure headed by an abstract locative preposition, P_{loc}. Harley argues that ditransitive verbs are decomposed into little v_{cause} + P_{have} in DOC and little v_{cause} + P_{loc} in to-DC. In (10-a), the DOC is projected from P_{have}: the IO *Mary* encodes the meaning of possessor and the DO *a letter* encodes the meaning of possessee. This P_{have} moves to the little v that contributes the causative meaning and little v_{cause} + P_{have} together is spelled out as a ditransitive verb such as *give*.

(10) a. 'John gave Mary a letter.' [DOC] b. 'John gave a letter to Mary.' [to-DC]



On the other hand, in (10-b), the to-DC is projected from P_{loc}: the IO *Mary* encodes the meaning of location and the DO *a letter* encodes the meaning of locatee. This P_{loc} is the head of the PP complement to the little v and combines with it to be spelled out as a ditransitive verb such as *give*. By postulating alternative projections for DOC and to-DC, Harley presents a base-generated analysis where DOC and to-DC have different underlying forms, in contrast to Larson's derivational analysis.

Harley accepts syntactic asymmetries between the IO and the DO noted by Larson (1988). However, she argues that Larson's derivational approach presents a problem. First, in Harley's view, in DOC, the IO is a possessor and the DO a possessee, whereas in to-DC the IO is a location and the DO a locatee. This is different from Larson who postulates identical thematic roles are for the IO and the DO in the two constructions.

An argument supporting Harley's idea comes from the animacy constraint observed in DOC but not in to-DC, known as Oehrle's generalization, as the following examples in (11) show.

(11) a. The editor sent the article to Sue. [to-DC]
b. The editor sent Sue the article. [DOC]
c. The editor sent the article to <u>Philadelphia</u>. [to-DC]
d. ??The editor sent <u>Philadelphia</u> the article. [DOC]
(Green 1974; Oehrle 1976)

(11-a) and (11-b) are grammatical in which the IO *Sue* is animate. However, when the IO is inanimate, as in (11-c) and (11-d), there is a contrast in grammaticality. While the to-DC in (11-c) is grammatical, the DOC in (11-d) is grammatical only when the Goal *Philadelphia* indicates a group of people or an organization. This animacy constraint in DOC can be

accounted for by Harley: the IO in DOC must be animate because it receives a possessor interpretation and has a possessor thematic role. (11-d), thus, can be construed as follows.

(12) The editor sent Philadelphia the article. [DOC]
'The editor CAUSED the group or organization in Philadelphia to HAVE the article.'

In contrast, in to-DC there is no animacy requirement on the Goal because it receives location meaning: either an animate or an inanimate IO can receive a location meaning and a locative thematic role. Thus, (11-c) can be construed as follows.

(13) The editor sent the article to Philadelphia. [to-DC]
'The editor CAUSED the article to be LOCATED in Philadelphia'.

A similar contrast in interpretation is attested in examples in (14). On a closer look, comparing (14-a) and (14-b), there is a much stronger implication that the students actually learned or acquired some French in (14-a) rather than in (14-b).

(14) a. John taught the students French. [DOC]
b. John taught French to the students. [to-DC]

This interpretational difference can be accounted for by Harley's proposal that the IO in DOC receives a possessor role and the IO in to-DC receives a locative role: the students HAVE the knowledge of French in DOC but not in to-DC. These examples show different thematic roles for the same NPs: a possessor relationship exists between the IO and the DO in DOC but not in to-DC. Thus, DOC cannot be derived from to-DC, contrary to Larson's derivational approach.

Further supporting argument for Harley's alternative projection approach comes from idioms. Harley observes that Larson incorrectly predicts that discontinuous idioms 'Verb + Goal' in to-DC can switch to DOC preserving the idiomatic interpretation because DOC is transformed via 'dative shift' from to-DC.

However, Harley shows that none of these idioms can be put into DOC. The 'discontinuous idiom' in to-DC cannot freely alternate with DOC while retaining the idiomatic meaning. Harley reanalyzes these idioms as 'P_{loc} + Goal' idioms. In other words, P_{loc} combines with the Goal to have an idiomatic meaning at some syntactic level as a single constituent and is spelled out as a lexical ditransitive verb such as *give* when it combines with the little v that contributes the causative meaning.

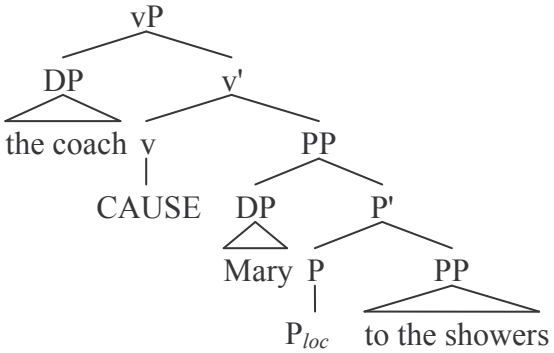
Further, Harley presents another form of idioms, 'Verb + Theme' idioms that appear in DOC, as shown in (15).

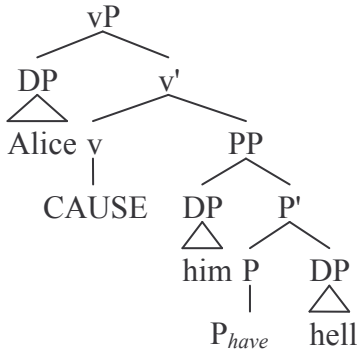
(15) a. Alice *gave* him *hell*. [DOC]
b.*Alice gave hell to him. [to-DC]

In (15-a), *give* forms a constituent with *hell* to produce an idiomatic interpretation in DOC: the idiomatic meaning cannot be preserved in to-DC, as in (15-b). She calls this idiom 'P_{have} + Theme' idiom. In other words, P_{have} combines with the Theme to create an idiomatic meaning at some syntactic level as a single constituent and is spelled out as a lexical ditransitive verb such as *give* when P_{have} combines with the little v that contributes the causative meaning.

In sum, Harley suggests that there are two types of idioms: 'Verb + Goal' which appears in to-DC and 'Verb + Theme' which appears in DOC. She accounts for the two different idiomatic forms, using the alternative projections, P_{have} and P_{loc} projections in replacement of Larson's lower VP shells. The two types of idioms are 'P_{loc} + Goal' in to-DC as in (16-a) and 'P_{have} + Theme' in DOC as in (16-b).

(16) a. 'The coach *sent* Mary *to the showers*.' b. 'Alice *gave* him *hell*.'





In Harley's analysis, the different semantic content of P_{have} and P_{loc} is the reason why an idiom cannot freely shift between DOC and to-DC. Further, 'Verb + Goal' idioms in to-DC cannot shift to DOC as 'P + Goal' do not form a constituent in DOC and 'Verb + Theme' idioms in DOC cannot shift to to-DC because [P + Theme] do not form a constituent to-DC.
On the basis of P_{have} and P_{loc} in her alternative projection approach in English, Harley formulates an interesting cross-linguistic generalization: across languages, in P_{loc} structure, the locate (Theme) c-commands the location (Goal), and if a language has P_{have} structure the possessor (Goal) c-commands the possessee (Theme).

Thus far, two main approaches in the literature on ditransitive construction were reviewed: Larson's Derivational Approach and Harley's Alternative-projection Approach. I attempted to show that Harley's work is superior to Larson in that while Harley correctly predicts animacy constraint on DOC and meaning difference between DOC and to-DC, Larson does not.

3. *[IO-DO] as underlying order*

Korean has a dative construction consisting of the Goal (IO) marked with the dative *-ey(key)* and the Theme (DO) marked with the accusative *-(l)ul***.** The IO and the DO can be ordered freely with respect to each other. For example, in (17-a), the Goal (IO) marked with the dative *-ey(key)* precedes the Theme (DO) marked with the accusative *-(l)ul* and in (17-b), the Theme (DO) marked with the accusative *-(l)ul* precedes the Goal (IO) marked with the dative *-ey(key)*.

(17) a. Mary-nun John-*eykey* senmwul-*ul* cwu-ess-ta. [IO-DO]
Mary-TOP John-DAT present-ACC give-PST-DEC
'Mary gave a present to John.'

b. Mary-nun senmwul-*ul* John-*eykey* cwu-ess-ta. [DO-IO]
Mary-TOP present-ACC John-DAT give-PST-DEC
'Mary gave a present to John.'

I propose that [IO-DO] ([Goal-Theme]), as in (17-a), is the underlying order and [DO-IO] ([Theme-Goal]), as in (17-b), is derived by moving the Theme over the Goal, through scrambling. This is in contrast to Baek & Lee's (2004) proposal that [DO-IO] represents the underlying order. I provide three supporting arguments for my proposal: quantifier scope, chain condition, and ditransitive idioms in Korean.

3.1 Quantifier scope

The first piece of evidence comes from quantifier scope in Korean. Before going into the discussion on how quantifier scope supports that [Goal-Theme] is the underlying order in Korean, it is important first to understand scope freezing, an interpretive property of quantifiers in Korean, distinct from English.

In English, as shown in (18), scope ambiguity is attested: *some* can take scope over *every* and vice-versa.

(18) Some student read every book. (some>every, every>some)

In contrast, in Korean, scope ambiguity does not occur in the corresponding double quantifier sentence, as in (19). This sentence has the canonical SOV order (Joo 1989; Ahn 1990; Sohn 1995; Hagstrom 1998).

(19) **etten** haksayng-I **motun** chayk-ul ilk-ess-ta.
some student-NOM every book-ACC read-PST-DEC
'Some student read every book.' (some>every, *every>some)

However, if the object precedes the subject through scrambling, scope ambiguity becomes available, as in (20).

(20) **etten** chayk –ul$_i$ **motun** haksayng-i t$_i$ ilk-ess-ta.
some book-ACC every student-NOM read-PST-DEC
'Every student read some book.' (some>every, every>some)

Thus, scope rigidity obtains in [Subj-Obj], a canonical word order in Korean, as in (19), but not in [Obj-Subj] a scrambled word order, as in (20). We call this the 'scope freezing effect': scope is frozen in a canonical word order, while it is flexible in a scrambled order: the trace of the scrambled object allows the inverse scope to be possible.

Now, let us see what scope ambiguity can tell us about the underlying order of the Korean dative construction. If [Goal-Theme] is the underlying order, then [IO-DO] sentence containing a quantified IO and a quantified DO should not have a flexible scope due to the 'scope freezing effect', whereas a corresponding [Theme-Goal] sentence should show a flexible scope. Indeed, this is borne out in (21): in (21-a) [Goal-Theme] ([IO-DO]) reveals rigid scope: only the reading in which *etten* 'some' takes scope over *motun* 'every' is available such that 'Tom gave all the books to a particular kid'. However, as shown in (21-b), the reverse order, [DO-IO] has a flexible scope: both the reading in which *etten* 'some' takes scope over *motun* 'every' and *motun* 'every' takes scope over *etten* 'some' are available.

(21) a. Tom-un **etten** ai-*eykey* **motun** chayk-*ul* cwu-ess-ta. [Goal-Theme]
Tom-TOP some kid-DAT every book-ACC give-PST-DEC
'Tom gave every book to some kid.' (some > every, *every > some)
b. Tom-un **etten** chayk-*ul*$_i$ **motun** ai-*eykey* t$_i$ cwu-ess-ta. [Theme-Goal]
Tom-TOP some book-ACC every kid-DAT give-PST-DEC
'Tom gave some book to every kid.' (some > every, every > some)

Thus, the properties of quantifier scope support that the underlying order of the dative construction between the Goal and the Theme in [DO-IO] is [Goal-Theme] and [Theme-Goal] is the derived order.

On the other hand, according to Miyagawa & Tsujioka (2004), in Japanese, quantifier scope between Goal and Theme [IO-DO] depends on the animacy of the Goal argument. This casts doubt on the derivational approach for the Japanese ditransitive construction. Thus, I consider the corresponding example in Korean and determine whether the animacy of the Goal makes a difference in the quantifier scope judgment in Korean.

In Japanese, there is no scope ambiguity when the Goal is animate as in (22-a) but if the Goal is inanimate as in (22-b), scope ambiguity appears. However, as the data in (23) show, the corresponding example with the inanimate Goal in Korean does not display scope ambiguity: *etten* 'some' can only take scope over *motun* 'every' and not vice-versa. Thus, regardless of the animacy of the Goal, scope ambiguity is not attested in [Goal-Theme] in Korean.

(22) a. Taoo-ga dareka-ni dono-nimotu-mo okutta. [IO-DO]
Taro-NOM someone-NI every-package sent
'Taro sent someone every package.' (some>every, *every>some)
b. Taroo-ga dokoka-ni dono-nimotu-mo okutta. [IO-DO]
Taro-NOM some place-NI every-package sent
'Taro sent every package to some place.' (some>every, every>some)
[Miyagawa & Tsujioka 2004]

(23) John-un etten cangso-*ey* motun senmwul-*ul* ponay-ess-ta. [IO-DO]
John-TOP some place-DAT every present-ACC send-PST-DEC
'John sent every package to some place.' (some>every, *every>some)

However, in contrast to my proposal, a recent discussion by Baek and lee (2004) argues that [DO-IO] is the underlying order and [IO-DO] is the derived order. This is because for Baek & Lee (2004), [DO-IO] does not reveal flexible scope but the reverse order [IO-DO] does.

The data in (24) are examples given by Baek & Lee (2004). They claim that [Goal-Theme] in (24-a) is ambiguous, while [Theme-Goal] in (24-b) is not.

(24) a. Sue-nun **motun** ai-*eykey* **etten** mwuncey-*lul* cwu-ess-ta. [Goal-Theme]
Sue-TOP every kid-DAT some problem-ACC give-PST-DEC
'Sue gave some problem to every kid.'
b. Sue-nun **motun** mwuncey-*lul* **etten** ai-*eykey* cwu-ess-ta. [Theme-Goal]
Sue-TOP every problem-ACC some kid-DAT give-PST-DEC
'Sue gave every problem to some kid.'

However, on a closer look, the data that they are using are not appropriate for testing scope ambiguity. In (24-a), the Goal is marked with a universal quantifier and the Theme with an

existential quantifier. This sentence has *motun* > *etten* 'every > some' reading: this covers both the situations in which 'each kid received the same problem' and the situation in which 'each kid received a different problem'. Hence, (24-a) illustrates an issue of vagueness, not ambiguity. Moreover, in (24-b), on a closer look, scope ambiguity does occur: in addition to the reading in which every problem is given to a different kid, the reading in which a particular kid got all the problems is available. The two readings occur because *motun* 'every' takes scope over *etten* 'some' and vice-versa.

Thus, on the basis of the 'scope freezing effect' in [Goal-Theme] regardless of the animacy of the Goal and scope ambiguity in [Theme-Goal], I conclude that [Goal-Theme] derives [Theme-Goal] in Korean.

3.2 Chain condition of cakicasin *'self'*

The next argument that supports that [IO-DO] represents the underlying order is provided by the chain condition of *cakicasin* 'self' in Korean. I show that the Korean anaphor *cakicasin* 'self' is sensitive to the chain condition and this sensitivity can be used to support the proposal that [IO-DO] ([Goal-Theme]) is the underlying structure in the dative construction in Korean.

Rizzi (1986) notes that when a DP, that is an R-expression moves over an anaphor, the trace of the moved R-expression and the anaphor form a chain. The chain condition states that the trace of the R-expression cannot be locally c-commanded by the anaphor in a chain. The violation of the chain condition usually results in ungrammaticality in Italian, as in (25).

(25) * Gianni$_i$ si$_i$ è stato affidato t$_i$
Gianni to-himself was entrusted
'Gianni was entrusted to himself.'

In (25), the R-expression 'Gianni' moves over the anaphor 'himself', leaving a trace (t). The anaphor *himself* and the trace (t) form a chain. In this chain, the trace (t) is c-commanded by the anaphor *himself*: this is a violation of chain condition, resulting in ungrammaticality.

A similar chain condition effect is observed in Korean with Korean reflexive anaphor *cakicasin* 'self'.

(26) a. *John-ul$_i$ cakicasin-i$_i$ t$_i$ po-ass-ta.
John-ACC self -NOM see-PST-DEC
'Self saw John.'
b. John-ul$_i$ cakicasin-uy$_i$ hyeng-I t$_i$ po-ass-ta.
John-ACC self -GEN brother-NOM see-PST-DEC
'Self's brother saw John.'

The example in (26-a) shows that the chain condition is in effect in Korean: in a chain formed by the anaphor *cakicasin* 'self' and the trace of the R-expression 'John', the anaphor locally c-commands the trace of the R-expression. In contrast, in (26-b), the chain condition is not violated: the anaphor is embedded within a DP and so it does not locally c-command the trace of the R-expression. In other words, (26-a) violates the chain condition in which the trace of *John* is c-commanded by the anaphor *cakicasin* 'self', resulting in ungrammaticality, whereas (26-b) does not violate the chain condition and so the example is grammatical.

I now turn to the data in dative construction. I predict that the chain condition effect should be observed with the anaphor *cakicasin* 'self' in [DO-IO], but not in [IO-DO]. If [DO-IO] is derived through scrambling of the DO over the IO, then there is a trace of the DO c-commanded by the IO. This then means that if the DO is an R-expression and the IO is an anaphor, the chain condition effect should be observed, resulting in ungrammaticality. This prediction is borne out. In (27-a), no chain condition effect is observed: the DO, the reflexive anaphor *cakicasin* 'self', is in a base-generated position and is c-commanded by the coreferential R-expression *John*. In contrast, a chain condition effect is observed in (27-b). The DO has moved over the IO, leaving a trace. This trace forms a chain with the anaphor *cakicasin* 'self' and is c-commanded by the anaphor, resulting in ungrammaticality.

(27) a. Sue-ka John-*eykey*$_i$ cakicasin-*ul*$_i$ poyecwu-ess-ta. [IO-DO]
Sue-NOM John-DAT self-ACC show-PST-DEC
'Sue showed self to John.'

b. *Sue-ka John-*ul*$_i$ cakicasin-*eykey*$_i$ t$_i$ poyecwu-ess-ta. [DO-IO]
Sue-NOM John –ACC self-DAT show-PST-DEC
'Sue showed John to self.'

In sum, the fact that the chain condition effect is observed in [Theme-Goal] supports my proposal that the Theme has scrambled over the Goal leaving a trace and that [Goal-Theme] is the underlying order.

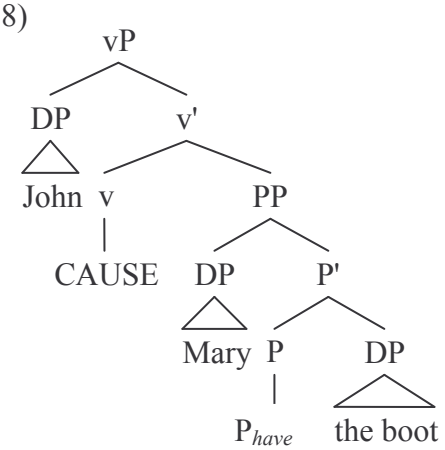
3.3 Theme (DO) + ditransitive verb idioms in Korean

Another supporting argument for the proposal that [IO-DO] ([Goal-Theme]) in Korean represents the underlying order is provided by the existence of idioms formed by ditransitive verbs and the Theme (DO) in Korean, to the exclusion of the Goal (IO).

It has been shown that the majority of idioms in the ditransitive construction forms a single constituent at some structural level (Richards 2001; Harley 2002). According to Harley (2002) in English, as was discussed in section, 2.2, there are two types of idioms in the ditransitive construction: [Verb + Theme] idioms that appear in DOC and [Verb + Goal] idioms that appear in to-DC. The each of two types of idioms forms a single constituent at some structural level.

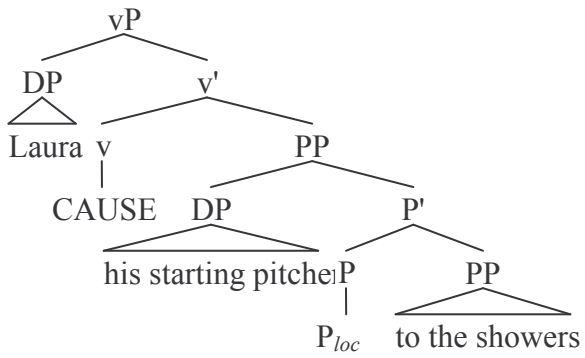
The two trees in (28) and (29) illustrate Harley's idioms. In (28), DOC headed by P_{have}, P_{have} combines with the Theme to build an idiomatic meaning as a single constituent and is spelled out as a lexically ditransitive verb when it move to the little v. Thus, an idiom of [Ditransitive Verb + Theme] is formed in DOC, to the exclusion of the IO, as in (28-a). In to-DC headed by P_{loc} in (29), this P_{loc} combines with the Goal to build an idiomatic expression and is spelled out as a lexically ditransitive verb when it moves to the little v. Thus, an idiom of [Ditransitive Verb + Goal] is formed in to-DC, to the exclusion of the DO, as in (29-a).

(28)



a. John *gave* Mary *the boot*.
b. *John gave the boot to Mary.

(29)



a. Laura *sent* his starting pitcher *to the showers*.
b. *Laura sent to the showers his starting pitcher.

Idioms in Korean also tend to form constituents to the exclusion of non-idiomatic elements. For example, in (30-a), the Theme, *olipalul* 'duck's foot' combined with a ditransitive verb *naymilessta* 'show' forms an idiom in [Goal-Theme]. In [Theme-Goal] in (30-b), while the lit eral reading 'Sue showed duck's foot to her mother.' is available, the sentence is degraded under the idiomatic interpretation. This may be due to discourse effects caused by scrambling. In general, scrambled phrase is associated with special discourse effects, such as focus, or topichood. If [Theme-Goal] is derived by scrambling of the Theme over the Goal, the Theme would be associated with a special discourse function that may clash with idiomatic interpretation.

(30) a. Sue-nun emma-*eykey* **olipal-*ul*** **naymil-ess-ta.** [Goal-Theme]
Sue-TOP mother-DAT duck's foot-ACC show-PST-DAT
'Sue lied to (her) mother.'
b. ??Sue-nun olipal-*ul* emma-*eykey* naymil-ess-ta. [Theme-Goal]
Sue-TOP duck's foot-ACC mother-DAT show-PST-DEC

More Korean idioms are given in (31) and (32).

(31) a. na-nun John-*eykey* **han** **tek-*ul*** **sso-ass-ta.** [Goal-Theme]
I-TOP John-DAT one tray.of.food-ACC shoot-PST-DEC
'I treated John.'
b. ??na-nun han tek-*ul* John-*eykey* sso-ass-ta. [Theme-Goal]
I-TOP one tray.of.food-ACC John-DAT shoot-PST-DEC

(32) a. Sue-nun Joe-*eykey* **uysim-*ul*** **sa-ss-ta.** [Goal-Theme]
Sue-TOP Joe-DAT doubt-ACC buy-PST-DEC
'Joe suspected Sue.'
b. ??Sue-nun uysim-*ul* Joe-*eykey* sa-ss-ta. [Theme-Goal]
Sue-TOP doubt-ACC Joe-DAT buy-PST-DEC

If the underlying order in the dative construction is [Goal-Theme], then most idioms in the ditransitive construction should be [Theme + Ditransitive Verb] type, as the Theme and the

ditransitive verb form a constituent at some structural level. Hong's (1998) analysis of the Korean idioms supports this prediction. According to Hong, Korean idiomatic expressions are usually formed as [Theme + Verb].

Using a dictionary of Korean idiomatic expressions that includes approximately 3,300 idioms, Hong classifies [Verb + argument] idioms according to the theta-role of the argument. The results are summarized in Table 1.

Theta-roles	**Verb**
Agent	0.5 %
Beneficiary	0%
Theme	78 %
Location	10%

Table 1 Types of theta-roles combining with a verb in Korean idioms

Table 1 shows that the majority of [Argument + Verb] idioms has a Theme argument.

Restricting to idioms formed with a ditransitive verb, Hong also found that most idioms contain a Theme argument. Her findings are summarized in Table 2.

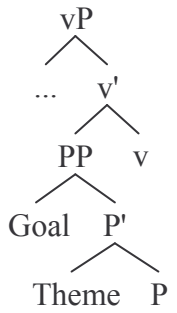
Theta-roles	**Number of idioms in ditransitive construction**
Agent	0
Theme	214
Location	45
Theme + Location	30
Agent + Theme +Location	0
	289

Table 2 Types of theta-roles in ditransitive verbs in Korean idioms

According to her classification, there are 289 idioms that are formed with a ditransitive verb, and the majority of them contain a Theme argument.

[Table 1] and [Table 2] show that most idioms containing a ditransitive verb are formed with a Theme argument. This supports the structure in (33) for the Korean ditransitive construction. The fact that most idioms containing a ditransitive verb are formed with a Theme argument supports the structure in (33) for the Korean dative construction.

(33) [Theme + Ditransitive Verb] in Korean



In (33), the Theme and 'P' form a constituent. At the P' level, the idiomatic meaning is established for [Theme + Ditransitive Verb] idioms. When P moves to the little v, the ditransitive verb is spelled out.

At this point, a question arises concerning the idioms formed with the Location argument. As shown in [Table 2], the number of idioms in the ditransitive construction containing Location is 45. The presence of these idioms goes against the idiom as constituency theory, as ditransitive verb and Goal do not form a constituent. However, across languages, the majority of idioms generally respect constituency in which idiomatic elements function together as a single unit, to the exclusion of non-idiomatic elements. This general tendency of idioms is observed in Korean too, as most idioms in ditransitive construction is [Verb + Theme] type.

In the next section, I establish that the P head of the Korean ditransitive structure is P_{loc}, not P_{have}.

4. P_{loc} in [IO-DO]

I propose that the underlying order [IO-DO] is an instantiation of the prepositional locative structure, as similar to Harley's proposed structure for the to-DC in English. However, in contrast to English (Harley 2002), I argue that in Korean prepositional locative structure, the IO (Goal) c-commands the DO (Theme). This is contrary to Harley's typological generalization where the DO (Theme) c-commands the IO (Goal) in P_{loc} structure. Korean, thus, becomes a counterexample to Harley's typological generalization according to my analysis. I show that Korean has another locative structure in the form of a double subject construction. I argue that the syntactic relationship between the Location and the Theme in double subject locative structure is replicated by the syntactic relationship between the Goal (IO) and the Theme (DO) in ditransitive structure. I present three supporting arguments for this claim: quantifier scope, PRO controlling, and honorific agreement.

4.1 [IO-DO] as an instantiation of $\boldsymbol{P}_{loc}$ structure

I provide Harley's analysis concerning P_{have} and P_{loc} structure in English before going into the discussion on Korean. As discussed in section 2.2, Harley proposes that DOC and to-DC are separately headed by different elements, P_{have} and P_{loc} respectively. In DOC, there is an animacy constraint on the Goal argument as in (34). Harley connects this to the semantics of possession and establishes that DOC is headed by P_{have}.

(34) a. The editor sent **Sue** the article.
b. ??The editor sent **Philadelphia** the article.

In (34), the Goal argument *Sue* or *Philadelphia* is interpreted as a possessor that is required to be an animate entity. (34-b) is grammatical only under the reading that *Philadelphia* refers to an organization or a company.

In contrast, in to-DC as in (35), there is no animacy constraint on the Goal argument. Harley connects this to the semantics of Location and establishes that to-DC is headed by P_{loc}.

(35) a. The doctor sent the article to **Sue**.
b. The doctor sent the article to **Philadelphia**.

In other words, in English, DOC is grammatical only when the Goal argument is animate, while to-DC is not subject to this restriction. Harley (2002) thus proposes that DOC establishes a prepositional possessive structure headed by P_{have} in which the Goal (possessor) c-commands the Theme (possessee), and to-DC establishes a prepositional locative structure headed by P_{loc} in which the Theme (Locatee) c-commands the Goal (Location).

On the basis of the distribution of P_{have} and P_{loc} in English and other languages, Harley formulates an interesting cross-linguistic generalization: across languages, in the P_{loc} structure, the Locatee (Theme) c-commands the Location (Goal) and, if a language has the P_{have} structure, the possessor (Goal) c-commands the possessee (Theme).

Now, I turn to the data in Korean. I propose that the dative construction [IO-DO] establishes a prepositional locative structure headed by P_{loc}, as similar to Harley's to-DC in English. However, the c-commanding relationship between arguments in the Korean prepositional locative structure is at odds with Harley's typological generalization. In Korean, the IO (Goal) c-commands the DO (Theme), unlike the corresponding structure in English in which the DO (Theme) c-commands the IO (Goal).

One piece of evidence in support of my proposal that Korean [IO-DO] is a projection of P_{loc} is that there is no animacy constraint on the Goal argument in Korean. For example, as the data in (36) show, both the animate Goal argument *chinkwu* 'friend' in (36-c) and the inanimate Goal argument *hakkyo/sewulsi* 'school/Seoul city' in (36-a) is allowed. That the animacy constraint does not apply to [IO-DO] ([Goal-Theme]) supports that dative construction in Korean is a prepositional locative structure rather than a prepositional possessive structure. Moreover, there is no animacy constraint on the Goal in [Theme-Goal] ([DO-IO]) either, as shown in (36-b) and (36-d). This supports that [Theme-Goal], the scrambled order, is also an instantiation of prepositional locative structure headed by P_{loc}.

(36) a. Sue-nun hakkyo/sewulsi -*ey* ton-*ul* ponay-ess-ta. [Goal-Theme]
Sue-TOP school/Seoul city-DAT money-ACC send-PST-DEC
'Sue sent money to school/Seoul city.'

b. Sue-nun ton-*ul* hakkyo/sewulsi -*ey* ponay-ess-ta. [Theme -Goal]
Sue-TOP money-ACC school/Seoul city-DAT send-PST-DEC
'Sue sent money to school/Seoul city.'

c. Sue-nun chinkwu-*eykey* ton-*ul* ponay-ess-ta. [Goal-Theme]
Sue-TOP friend-DAT money-ACC send-PST-DEC
'Sue sent money to a friend.'

d. Sue-nun ton-*ul* chinkwu-*eykey* ponay-ess-ta. [Theme- Goal]
Sue-TOP money-ACC friend-DAT send-PST-DEC
'Sue sent money to a friend.'

(36-a) and (36-b) can be construed as 'Sue CAUSED the money to be LOCATED at school/in Seoul City' and (36-c) and (36-d) can be construed as 'Sue CAUSED the money to be LOCATED at friend'.

In addition, the data in (37) below further support that the Goal argument in the Korean dative construction has semantics of location corresponding to the Goal in to-DC in English. In English, for example, as already discussed in section 2.2, comparing the data in (37-a) with (37-b), there is a much stronger implication that the students actually learned or acquired French in (37-a) compared to (37-b). (37-b) does not imply that the students necessarily learned French.

(37) a. John taught the students French. [DOC]
b. John taught French to the students. [to-DC]

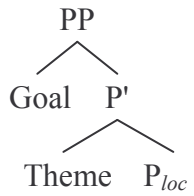
The corresponding Korean examples in (38) have a similar interpretation to that in (37-b).

(38) a. Sue-nun haksayngtul-*eykey* hankwuke-*lul* kaluchi-ess-ta. [Goal-Theme]
Sue-TOP students-DAT Korean-ACC teach-PST-DEC
'Sue taught Korean to the students.'
b. Sue-nun hankwuke -*lul* haksayngtul-*eykey* kaluchi-ess-ta. [Theme-Goal]
Sue-TOP Korean-ACC students-DAT teach-PST-DEC
'Sue taught Korean to the students.'

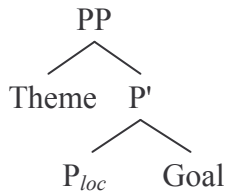
The data in (38) do not imply that the students necessarily possess knowledge of Korean. In (38-a) and (38-b), students were taught Korean by Sue, but it does not guarantee that they actually learned to speak or write Korean. Thus, if students receive a Location role, the semantics of Location on the Goal argument makes sense. The data in (38) can be construed as 'Sue CAUSED the knowledge of Korean to be LOCATED at the students'.

Therefore, on the basis of there being no animacy constraint on the Goal argument and the Goal argument patterning with the Location role, I propose that Korean dative construction is a prepositional locative structure headed by P_{loc} where the Goal c-commands the Theme as in (39). The reverse order [Theme-Goal] is derived by scrambling of the Goal over the Theme.

(39) Korean (Proposed):



(40) Harley (2002):



The proposed P_{loc} structure for Korean, however, is very different from Harley's (2002) proposed structure. According to Harley (2002), in the prepositional locative structure, the Theme c-commands the Goal, as in (40). She claims that this c-commanding relationship is observed across all languages. Her cross-linguistic generalization states that in the prepositional locative structure, the Theme (Locatee) c-commands the Goal (Location).

But in the Korean prepositional locative structure proposed in (39), the Goal c-commands the Theme. According to my analysis, Korean thus becomes a counterexample to Harley's generalization.

In the next section, I discuss the Korean case further and show that Korean has another locative structure in the form of a double subject construction. I argue that the arguments in the double subject locative construction have the same c-commanding relation as the [Goal-Theme] in ditransitive structure. This reinforces the conclusion that Korean P_{loc} structure varies from English P_{loc} structure.

4.2 Locative structure in the form of double subject construction (DSC)

Korean has another locative structure in the form of a double subject construction. I propose that the syntactic relationship in the double subject construction is duplicated by the syntactic

relationship in the dative construction. Specifically, the syntactic relationship between the Location and the Theme in the double subject construction is replicated by the syntactic relationship between the Goal and the Theme in the dative construction. The two constructions are comparable, as the Location and the Goal belong to the same type of thematic relation, as in Jackendoff (1972).

Let us first examine the double subject construction in Korean. As the data in (41) show, the Korean double subject locative construction consists of the Location argument marked with the dative *-ey(key)* and the Locatee (Theme) argument marked with the nominative *-i/ka*. The Location argument can also appear in the nominative or with the topic marker *-nun*. As in (41-a), the Location can precede the Locatee (Theme) and as in (41-b), the Locatee (Theme) can precede the Location.

(41) a. chayksang-*ey(-nun)* chayk-*i* iss-ta. [DSC]
desk-DAT (-TOP) book-NOM exist-DEC
Location Locatee (Theme)
b. chayk-*I* chayksang-*ey (-nun)* iss-ta. [DSC]
book-NOM desk-DAT(-TOP) exist-DEC
Locatee (Theme) Location
'On the desk, the book exists.' (There is a book on the desk.)

I argue that [Location-Theme] in (41-a) is the underlying structure and [Theme-Location] in (41-b) is derived through scrambling of the Theme over the Location. This makes the syntactic relationship between *chayksang* 'desk' and *chayk* 'book' in (41-a) equivalent to the syntactic relationship between *hakkyo* 'school' and *ton* 'money' in (42): the Location c-commands the Locatee (Theme) in the double subject construction, similar to the way that the Goal c-commands the Theme in [IO-DO].

(42) Mary-nun hakkyo-*ey* ton-*ul* cwu-ess-ta. [IO-DO]
Mary-TOP school-DAT money-ACC give-PST-DEC
Goal Theme
'Mary gave money to school.'

The c-commanding relationship between [Location-Theme] and [Goal-Theme] is consistent with Kuno's (1973) general hierarchy. According to Kuno (1973), in Japanese, the Goal is hierarchically higher than the Theme. This is consistent with my claim that the Location c-commands the Theme in double subject construction and the Goal (IO) c-commands the Theme (DO) in the dative construction. In addition, previous studies on the syntax of the double subject locative construction have shown that the first NP, the Location, is the sentential subject of the double subject construction, which again supports that the Location c-commands the Theme (Gerdts & Youn 1988; Kim 1990; O'Grady 1991; Gerdts & Youn 1999; Yoon 2001).

In the rest of section 4, I discuss quantifier scope, PRO controlling, and honorific agreement as supporting arguments for the claim that the syntactic relationship between the Location and the Theme in the double subject locative construction is replicated by the syntactic relationship between the Goal (IO) and the Theme (DO) in [IO-DO] in the Korean dative construction. I show that the underlying structure is [Location-Theme] with the Location c-commanding the Theme, just as [Goal-Theme] is the underlying structure in the dative construction, with the Goal c-commanding the Theme. I show that the Location as the sentential subject of the double subject locative construction c-commands the Theme. This is

significantly different from Harley's cross-linguistic generalization that the Theme c-commands the Goal (Location) in the prepositional locative structure: in the Korean prepositional locative structure the Goal (Location) c-commands the Theme.

4.2.1 Quantifier scope

The first piece of evidence comes from quantifier scope, which has already been used to establish the underlying order in the dative construction in section 3.1. Quantifier scope supports that in the double subject locative construction, [Location-Theme] is the underlying structure, deriving the reverse structure [Theme-Location] through scrambling. I show that [Location-Theme] does not display scope ambiguity similar to [Goal-Theme] ([IO-DO]), while [Theme-Location] does, similar to [Theme-Goal]. This shows that the Location is the sentential subject in [Location-Theme] and as such, it c-commands the Theme.

As already noted in section 3.1, scope freezing is attested in [Subject-Object], a canonical word order in Korean, but not in [Object-Subject], the scrambled word order. This is called the 'scope freezing effect' in Korean. This quantifier scope can be used to establish the underlying structure in the double subject locative construction. If [Location-Theme] is the underlying structure, it should show frozen scope. In contrast, [Theme-Location] should show flexible scope. Indeed, this prediction is borne out as illustrated in (43).

(43) a. **etten** pang-*ey* **motun** khemphyuthe-*ka* iss-ta. [Location-Theme]
some room-DAT every computer-NOM exist-DEC
'In some room, every computer exists.'

b. **etten** khemphyuthe-ka_i **motun** pang-*ey* t_i iss-ta. [Theme-Location]
some computer-NOM every room-DAT exist-DEC
'In every room, some computer exists.'

For example, in (43-a), [Location-Theme] reveals frozen scope: *etten* 'some' only takes scope over *motun* 'every' and not vice-versa. The only available reading is that 'there are all the computers in a particular room'. In contrast, in the reverse order [Theme-Location] as in (43-b), has flexible scope: *etten* 'some' only takes scope over *motun* 'every' and vice-versa. This indicates that in (43-b), the Theme *etten khemphyuthe* 'some computer' (Location) has scrambled over the Location *motun pang* 'every room', leaving a trace. The trace of the Location allows the inverse scope reading *motun* > *etten* 'every > some'. Two readings are thus available in (43-b). When *some* takes scope over *every*, the interpretation is that 'there is a particular computer in all the rooms'. When *every* takes scope over *some*, the interpretation is that 'every room is equipped with a possibly different computer'.

Similar scope ambiguity is attested with an animate Location, as the data (44) show. In (44-a), [Location-Theme] reveals frozen scope: *etten* 'some' only takes scope over *motun* 'every'. The only available reading in (44-a) is that 'a particular student has all the books'. In contrast, the reverse order [Theme-Location] in (44-b) has flexible scope.

(44) a. **etten** haksayng-*eykey* **motun** chayk-*i* iss-ta. [Location-Theme]
some student-DAT every book-NOM exist-DEC
'To some student, every book exists.'

b. **etten** chayk-i_i **motun** haksayng-*eykey* t_i iss-ta. [Theme-Location]
some book-NOM every student-DAT exist-DEC
'To every student, some book exists.'

In summary, on the basis of the scope freezing in [Location-Theme] and the scope ambiguity in [Theme-Location], I conclude that [Location-Theme] is the underlying structure in which the Location as the sentential subject c-commands the Theme. This supports that the syntactic relationship between the Location and the Theme in the double subject locative construction is similar to the syntactic relationship between the Goal and the Theme in the dative construction.

4.2.2 PRO controlling

The next piece of evidence to support that [Location-Theme] is the underlying structure in which the Location as the sentential subject c-commands the Theme comes from PRO controlling. If the Location c-commands the Theme, the Location as the sentential subject should be able to control PRO in a subject-oriented adjunct clause. This prediction is borne out as shown in (45) (Youn 1985, 1989; Gerdts & Youn 1989b; O'Grady 1991; Yoon 2001).

As the data in (45) show, the PRO in the Korean subject-oriented adjunct clause, that is, the -*seto* construction in this example, can only be controlled by the Location argument in the double subject locative construction.

(45) a. [$PRO_{i/*k}$ koa-myen-seto] Sue -$eykey_i$ enni-ka_k iss-ta. [LOC-THM]
orphan-COMP Sue-DAT sister-NOM exist-DEC
'Though PRO being an orphan, to Sue, a sister exists.'
b. [$PRO_{i/*k}$ koa-myen-seto] enni-ka_k Sue -$eykey_i$ t_k iss-ta. [THM-LOC]
orphan-COMP sister-NOM Sue-DAT exist-DEC
'Though PRO being an orphan, to Sue, a sister exists.'

For example, in (45-a), *Sue* as the sentential subject is able to control the subject PRO in the adjunct clause, while *enni* 'sister' cannot control the PRO. In a scrambled order shown in (45-b), the location as the subject is also able to control the subject PRO in the subject-oriented adjunct clause.

To summarize, given that the Location controls the missing subject PRO in a subject oriented adjunct clause -*seto* 'though' construction, I conclude that the Location is the sentential subject and as such, it c-commands the Theme.

4.2.3 Honorific agreement

Another piece of supporting evidence for the proposal that the Location as the sentential subject c-commands the Theme and that [Location-Theme] is the underlying structure is provided by the honorific agreement holding between the sentential subject and the predicate (Gerdts & Youn 1989a; Youn 1985, 1989; Gerdts & Youn 1989b; O'Grady 1991; Yoon 2001).

Indeed, in (46), the honorific subject marker -*kkey* on the Location co-occurs with the honorific marking -*(u)si*- on the predicate. The same holds in a scrambled order shown in (46-b). In contrast, example (46-c) is not grammatical because the honorific marking -*(u)si*- on the predicate does not agree with *aki-eykey* 'baby-DAT'. The same holds in the scrambled order shown in (46-d).

(46) a. sensayngnim-**kkey** aki-ka iss-**usi**-ta. [Location-Theme]
teacher-DAT.HON baby-NOM exist-HON-DEC
'To a teacher, a baby exists.'

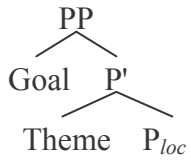
b. aki-ka$_i$ sensayngnim-**kkey** t$_i$ iss-**usi**-ta. [Theme-Location]
baby-NOM teacher-DAT.HON exist-HON-DEC
'To a teacher, a baby exists.'

c. *?aki-eykey sensayngnim-I iss-**usi**-ta. [Location-Theme]
baby-DAT teacher-NOM exist-HON-DEC
'To a baby, a teacher exists.'

d. *?sensayngnim-i$_i$ aki-eykey t$_i$ iss-**usi**-ta. [Theme-Location]
teacher-NOM baby-DAT exist-HON-DEC
'To a baby, a teacher exists.'

In sum, the arguments presented in this section support that the Location is the sentential subject of the double subject locative construction and that as the sentential subject, it c-commands the Theme. Thus, [Location-Theme] is the underlying structure and [Theme-Location] is derived through scrambling. I propose that [Location-Theme] establishes locative structure in which the Location c-commands the Theme as in (47).

(47)



This in turn supports the syntactic relationship between the Location and the Theme in double subject locative structures is similar to the syntactic relationship between the Goal (IO) and the Theme (DO) in ditransitive structures. This reinforces my proposal that [IO-DO] is an instantiation of prepositional locative structure in Korean in which the Goal c-commands the Theme. This means that Korean is a counterexample to Harley's typological generalization that the Theme c-commands the Goal in prepositional locative structure.

5. Conclusion

In this paper, I have provided an analysis of the Korean dative construction consisting of the Goal (IO), a dative-case marked NP, and the Theme (DO), an accusative-case marked NP. I observed that a dative NP (IO) can precede an accusative NP (DO) and vice-versa as in [IO-DO] and [DO-IO], and proposed that [IO-DO] ([Goal-Theme]) is the underlying order and [DO-IO] ([Theme-Goal]) is generated by scrambling of the DO over the IO. I also proposed that the dative construction is an instantiation of the prepositional locative structure headed by P$_{loc}$ structure, as similar to Harley's proposed structure for the to-dative construction in English. I argued that in the Goal (IO) c-commands the Theme (DO) in P$_{loc}$ structure. However, this is inconsistent with Harley's typological generalization in which cross-linguistically, the Theme (DO) c-commands the Goal (IO) in P$_{loc}$ structure. I provided a discussion on the syntax of double subject locative construction in Korean that reinforces my proposal that Korean P$_{loc}$ structure indeed varies from English P$_{loc}$ structure. The data in Korean, thus, shed new light on the typology of ditransitive construction: there is another type of dative construction projected from P$_{loc}$, in which the Location (Goal) c-commands the Locatee (Theme).

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Lan Kim
Linguistics Department, Simon Fraser University
lank@sfu.ca
www.sfu.ca/~lank

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Full partitives, bare partitives and non-maximal definites

Bert Le Bruyn

In this paper I investigate the restrictions on the use of bare partitives in Dutch. My main claim is that these restrictions originate in the competition of bare partitives with full partitives and non-maximal definites.

1. Introduction

1.1. Topic and aim

The topic of this paper are bare partitives in Dutch (see de Hoop, Vanden Wyngaerd & Zwart 1991; Hoeksema 1996; Oosterhof 2005a,b; Le Bruyn 2007a). Bare partitives are expressions of the form *of + definite determiner + Noun* and are different from full partitives like *two of the boys* in having no quantifier in front of *of*. An example of their use is given in (1):

(1) [When Aunt got ill Floddertje decided to make a nice pot of soup. She soon noticed that the soup got lumpy and saw no other solution than to take the mixer. You can imagine the consequences… Indeed : the soup got spread all over Aunt's kitchen and covered the nice white walls.]

Ondanks	alle	moeite	die	Floddertje	deed	om	het	geklieder	op	te	kuisen	
Despite	all	effort	that	Floddertje	did	to	the	mess	up	to	clean	
vond	tante	weken	later	nog	steeds	**van**	**die**	**soep**	in alle	hoeken	van	de
found	aunt	weeks	later	still	still	of	that	soup	in all	corners	of	the
keuken.												
kitchen												

'Despite all the effort Floddertje put into cleaning up the mess Aunt weeks later still found some of that soup in all corners of the kitchen.' [1]

The above example was presented to Dutch and Belgian speakers of Dutch who almost unanimously agreed on its acceptability. The amount of context is not gratuitous though, bare partitives are only acceptable under very restricted conditions. This paper aims at uncovering these.

[1] I translated *van die soep* as *some that soup* to obtain an acceptable English translation. Note though that quantity is in fact underspecified.

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1.2. Hypothesis

The hypothesis I defend is that the restrictions on the use of bare partitives originate in their competition with other expressions. The underlying idea is that speakers select among closely related expressions the one that conveys best the meaning they want to express. From this perspective, uncovering the conditions on the use of bare partitives consists in evaluating which meanings bare partitives express better than other similar expressions. The set of expressions I propose to compare are those that allow to refer to parts of the denotation of a definite DP. Next to bare partitives this set contains full partitives and non-maximal definites. I will refer to this set as the competition set.

1.3. Overview

The core of the paper consists of five sections. Sections 2 through 4 are devoted to a discussion of the basic meaning of non-maximal definites, full partitives and bare partitives respectively. They also gradually build up the competition account that is further elaborated in section 5. Section 6 checks the predictions the analysis makes for bare partitives.

Note that for ease of exposition most examples concerning full partitives and non-maximal definites will be given in English. Whatever applies to English for these expressions applies to Dutch too.

2. Non-maximal definites

Definites are standardly associated with a maximality operator. *The boys* e.g. refers to all the boys in a model. It has however been pointed out that definites needn't always refer maximally. A paradigmatic example is (2):

(2) The boys constructed the raft.

There is consensus that (2) can be true even if not all the boys in the model actively contributed to the construction of the raft. This is known as the non-maximal reading of definites (Brisson 1998). Definite DPs then allow to refer to both proper and improper parts of the referent of a definite DP and therefore belong in our competition set. This section tries to establish how the non-maximal reading comes about, proposes a formal analysis and concludes with an assessment of the role non-maximal definites play in our competition set.

2.1. The origin of non-maximality

To account for the non-maximality reading of definites two hypotheses are available. According to the first non-maximality is nothing more than a sloppy maximal reading. According to the second definites should be interpreted as 'close to all N'. It is the first hypothesis that is standard in the literature but to my knowledge no (linguistic) arguments have been presented against the second. This subsection discusses one which is based on Nouwen (2003).

Nouwen (2003) investigates the possibilities of anaphoric reference of pronouns. Standard is their ability to pick up the referent of a plural DP. This is known as reference to the reference set (REFset) of the DP.

(3) Few MPs came. – **They** decided not to discuss anything important.

(4) Most MPs came. – **They** made a lot of important decisions.

Less well-known is the ability of plural pronouns in (5) to refer to the MPs that didn't come and their inability to do this in (6). This is known as reference to the complement set (COMPset) of the DP.

(5) Few MPs came. – **They** stayed home instead.

(6) Most MPs came. – #**They** went to the beach instead.

The origin of this contrast is not important for our present purposes. What is important is that COMPset reference is generally available when the anaphor involves explicit reference to the COMPset:

(7) Most MPs came. – **The others** went to the beach instead.

(8) Most MPs came. – **The rest of them** went to the beach instead.

This last fact offers us a simple argument against the hypothesis according to which the non-maximality of definites originates in a 'close to all N' interpretation. The argument goes as follows: if definites were really interpreted as 'close to all N' we would expect them to have a COMPset and for COMPset reference to be possible with 'the others' or 'the rest of them'. As can easily be verified this is contrary to fact:

(9) The MPs came. – #**The others** went to the beach instead.

(10) The MPs came. – #**The rest of them** went to the beach instead.

From the above I conclude that non-maximal readings are sloppy maximal readings and not proper partitive readings.

Before presenting an analysis that accounts for non-maximal readings of definites I would like to make a small digression. It concerns verbs that prohibit REFset reference to their definite DP object under certain conditions. Examples are given in (11) and (12):

(11) I ate the cakes today. – # I'll eat **them** again tomorrow.

(12) I sold the cakes today. – # I'll sell **them** again tomorrow.

The reason why verbs like *eat* and *sell* – consumption and transaction verbs – don't allow for the continuations in (11) and (12) is that they entail that their subject can perform the verb-action on the object only once. I coin this property the *once-only* property and propose the following formal definition of *once-only* verbs:

(13) $\forall R(\text{Once-Only}(R) \leftrightarrow \forall e,x,y,e'(R(e,x,y) \& R(e',x,y) \rightarrow e=e'))$

This definition states that whenever there are two events that involve a once-only verb, the same subject and the same object the two events are necessarily identical. For consumption verbs we can furthermore leave out the subject condition:

(14) $\forall R(\text{Once-Only}(R) \leftrightarrow \forall e,x,x',y,e'(R(e,x,y) \& R(e',x',y) \rightarrow e=e'))$

I close this digression here but once-only verbs will be picked up again in section 6.

2.2. Analysis

The way I propose to formalize that non-maximal readings of definites are sloppy maximal readings is to use the concept of *cover* (see Brisson 1998). A cover C is a set of subsets of the domain that is such that every individual in the domain belongs to (at least) one subset of C and that the empty set is not in C. For a domain with three boys (a,b,c) (15) lists some of the possible covers:

(15) i. $\{\{a\},\{b\},\{c\}\}$
ii. $\{\{a,b\},\{c\}\}$
iii. $\{\{a\},\{b,c\}\}$
iv. $\{\{a,b,c\}\}$
v. $\{\{a,c\},\{b\}\}$

If we now assume that *the* is contextually interpreted as in (16), cover (ii) gives us a reading according to which *I saw the boys today* is true even if I only saw boys *a* and *b*.

(16) $\iota\lambda x \exists y(\text{Plural}(x) \& x \in y \& y \in \text{COV} \& y \subseteq \text{BOYS})$

Informally this analysis creates a 'junk pile' of individuals that are simply not taken into account when evaluating the truth of a sentence containing a non-maximal definite (see Brisson 1998). This is exactly what a sloppy interpretation of maximality amounts to.

There is one question concerning the above analysis that I cannot answer, *viz.* how sloppy definites can get. The problem with this question lies in the fact that the sloppiness of definites can only be measured if we assume that the speaker knows how many N are in the model. Given that there is no reason to assume this the question how sloppy definites can get can simply not be answered without extra assumptions (this in contrast to the sloppiness of e.g. '1000 kilometers' discussed by Krifka 2001). Hopefully I will have the opportunity to work out these extra assumptions in future research but for the moment I will simply assume that there is no limit on the sloppiness of definites.

2.3. Non-maximal definites and the competition set

In this section I defended the view that the non-maximality of definites originates in sloppy maximality. The question I will be concerned with in this concluding subsection is what this means for the position of non-maximal definites within our competition set. To do this I need to distinguish between two kinds of partitive relations. The first is proper partitivity:

(17) *x* is a proper part of *y* if *x* is part of but not identical to *y* (<)

In a model with three men a proper part of the men contains at most two men. The second is improper partitivity:

(18) *x* is an improper part of *y* if *x* is part of and can be identical to *y* (≤).

In a model with three men an improper part of the men can contain up to three men. Note that if *x* is a proper part of *y* it is automatically an improper part of *y* too. The inverse does not apply. If follows that the improper part relation is more general than the proper part relation.

On the basis of the fact that non-maximal definites are in origin maximal I claim that they are extremely fit to encode the improper part relation. Indeed, despite the fact that non-maximal definites can refer to parts of the referent of a definite DP they don't allow for COMPset reference. Put differently, they refer to parts of the referent of the definite DP without ever excluding that they actually refer to the whole referent. It should also be clear that given their maximality origin non-maximal definites cannot be used to encode proper partitivity.

If we assume that the above analysis is on the right track we face the question why non-maximal definites are preferred over full and bare partitives to express improper partitivity. Two hypotheses are available. The first is that full and bare partitives have proper partitivity encoded in their semantics and simply can't convey improper partitivity (see Zamparelli 1998, Barker 1998). The second is that full and bare partitives in principle encode improper partitivity but are outranked by non-maximal definites in expressing the latter for some reason yet to be specified. I will defend the second hypothesis.

3. Full partitives

Full partitives have received quite some attention in the formal semantics literature. Two questions seem to have driven most of the contributions:

(19) Why is it that indefinites are less felicitous than definites in the downstairs position of full partitives ? (see De Hoop 1998 for an overview)

(20) Why is it that full partitives seem to encode proper and not improper partitivity ? (Barker 1998, Zamparelli 1998)

I have nothing to add to the answers to the first question. I will simply restrict myself to discussing full partitives with a definite downstairs DP. As for the second question I do want to take position and claim that proper partitivity is not encoded in the semantics of full partitives. More precisely I claim that the default semantics of full partitives is that of improper partitivity. The initial motivation for this claim is the fact that encoding proper partitivity in the semantics leads to conceptual and empirical problems (see Le Bruyn 2007b).

In this section I will show that we can derive the inclination of full partitives towards proper partitivity without having to encode it in the semantics. All I need is the assumption that full partitives can encode both proper and improper partitivity. I take the more general improper partitive relation to be the default one:

(21)	$\lambda z(Books(z))$	books
	$\lambda P \iota P$	the
	$\iota\lambda z(Books(z))$	the books
	$\lambda x \lambda y(\leq(y,x))$	of
	$\lambda y(\leq(y,\iota\lambda z(Books(z))))$	of the books
	$\lambda P \lambda Q \exists x(three(x)\&P(x)\&Q(x))$	three
	$\lambda Q \exists x(three(x)\&(\leq x,\iota\lambda z(Books(z)))\&Q(x))$	three of the books

In section five I will show how we can establish that improper partitivity is indeed the default interpretation of full partitives.

3.1. Full partitives and the existential constraint

There is one aspect of full partitives that has not received a lot of attention – if any – in the literature. It concerns the fact that partitives assert existence of parts of an entity that is presupposed to exist.[2] *Three of the books* e.g. asserts that there exist three books of a set of books that is presupposed to exist. The reason why this is relevant is that asserting the existence of an entity that is presupposed to exist has been claimed to lead to pragmatic infelicity. Crucially, Barwise & Cooper (1981) claimed that the tautological nature of this kind of assertion is at the origin of the unacceptability of (existential) *there*-sentences with a definite DP:

(22) *There are the men.

For ease of exposition I introduce the following constraint:

(23) Existential constraint: Don't assert existence of (parts of) an entity that is presupposed to exist.

Expressions in which existence is asserted of (parts of) an entity that is presupposed to exist will accordingly be taken to violate this constraint. Given the semantics I proposed for non-maximal definites and full partitives the latter but not the former belong to this category.

3.2. Full partitives and non-maximal definites

In most formal frameworks constraints are strong in the sense that their violation leads to unacceptability. Given that full partitives violate the Existential constraint and non-maximal definites don't I would accordingly end up predicting that non-maximal definites are always to be preferred over full partitives. This is clearly not what I want. What I do want is for non-maximal definites to be preferred to express meanings they can express and full partitives to be preferred to express meanings non-maximal definites cannot express. Given that non-maximal definites can express improper but not proper partitivity (see section 2) this would lead to an analysis that predicts that non-maximal definites are preferred to express improper

[2] Note that this is not valid for all full partitives. Interestingly full partitives headed by *all* don't have this property. Their semantics is the following: $\lambda Q \forall x((\leq x,\iota\lambda z(N(z)))\&Q(x))$. I will ignore *all* in what follows. Another kind of full partitives that does not have this property will be discussed in section 5.

partitivity and that full partitives are preferred to express proper partitivity. This would correctly derive the inclination of full partitives towards proper partitive readings. The way this can be implemented is by assuming that the Existential constraint is violable if a more important constraint is obeyed. One form this constraint could take is the following :

(24) Proper partitivity constraint: If you want to express proper partitivity use an expression that is able to do so.

A formal framework that allows for violable constraints is Optimality Theory (OT). I will be using this framework because of this particular characteristic. In the following subsection I will work out an OT analysis.

3.3. Full partitives and non-maximal definites in OT

Up till now I have introduced two constraints, *viz*. the Existential constraint and the Proper partitivity constraint. In OT terms the first is a markedness and the second a faithfulness constraint. They will be abbreviated as *EXIST and FAITH PROP PART. The meanings we want to express are proper and improper partitivity. The forms we are comparing are the full partitive (# of the N) and non-maximal definites (the' N). The idea is to link meanings to the forms that express them best.

It is standard practice in OT to present the analysis in a tableau. The meaning to be expressed is put in the left upper box, the constraints to its right in order of decreasing importance, the competing forms beneath it. A * is used to indicate violation of a constraint. The form with the least violations of the most important constraints is the form that expresses the meaning best. It is indicated with ☞. The relevant OT tableaus look as follows:

(25)

Improper partitivity	FAITH PROP PART	*EXIST
☞The' N		
# of the N		*

(26)

Proper partitivity	FAITH PROP PART	*EXIST
The' N	*	
☞# of the N		*

These tableaus are a formalization of the analysis I presented. The tableau in (25) tells us that non-maximal definites are preferred over full partitives to express improper partitivity. This is due to the fact that full partitives violate the Existential constraint whereas non-maximal definites don't. The tableau in (26) tells us that to express proper partitivity the full partitive is preferred over non-maximal definites. Even though full partitives violate the Existential constraint they can be preferred over non-maximal definites because the latter only allow to express improper partitivity.

3.5. Taking stock

In this section I showed that we can derive the inclination of full partitives towards proper partitivity even if we assume that their default interpretation is that of improper partitivity. The gist of the proposal is that in general non-maximal definites specialize in conveying improper partitivity and full partitives convey whatever is left, *viz.* proper partitivity. The reason why full partitives play a secondary role is that they violate the Existential constraint.
One question that was not answered is how we can check that improper partitivity should be the default semantics of full partitives. This will be done in section 5. Another question that imposes itself is what is left for bare partitives to express if non-maximal definites specialize in improper partitivity and full partitives in proper partitivity. This question will be answered in the following section.

4. Bare partitives

Bare partitives are expressions of the form *of* + *definite determiner* + *Noun*. The semantics I propose is parallel to the one I propose for full partitives (see section 3):

(27)	$\lambda z(\mathrm{Books}(z))$	books
	$\lambda P \iota P$	the
	$\iota\lambda z(\mathrm{Books}(z))$	the books
	$\lambda x \lambda y(\leq(y,x))$	of
	$\lambda y(\leq(y,\iota\lambda z(\mathrm{Books}(z))))$	of the books

There are two important differences. The first is that they lack an upstairs quantifier. The second is that bare partitives don't have intrinsic existential force. I assume that in this they are parallel to bare plurals and consequently share their distribution. Crucially they are then predicted to be unacceptable or at least infelicitous in subject position. I will therefore limit myself to the object position. Another important aspect of bare partitives is that – when used in a sentence – their semantics is the following:

(28) $\lambda Q \exists y(\leq(y,\iota\lambda z(\mathrm{Books}(z)))\&Q(y))$ of the books

From this it follows that bare partitives violate the Existential constraint that was introduced in section 3.

Based on what precedes it is not difficult to establish which role bare partitives play within our competition set. First of all they only compete with non-maximal definites and full partitives in object position. Second, given that they violate the Existential constraint they can only be used to express proper partitivity. Third, because of the fact that they differ from full partitives in their lack of an upstairs quantifier they will be used when the speaker wants to stay neutral with respect to quantity. To formalize this I need an extra constraint of the following form:

(29) QUANTITY: Mark quantity if and only if in input.[3]

[3] In fact this is a combination of a faithfulness and a markedness constraint the former ranking over the latter. For expository reasons I combined them into one constraint.

Under the assumption that this constraint ranks above FAITH PROP PART and *EXIST I derive that :

- non-maximal definites are preferred over full and bare partitives to express improper partitivity
- full partitives are preferred over bare partitives and non-maximal definites to express proper partitivity whenever the input is not neutral with respect to quantity
- bare partitives are preferred over full partitives and non-maximal definites to express proper partitivity whenever the input is neutral with respect to quantity

The corresponding OT tableaus look as follows:

(30)

Improper partitivity	QUANTITY	FAITH PROP PART	*EXIST
☞The' N			
# of the N			*
Of the N			*

(31)

Proper partitivity + #	QUANTITY	FAITH PROP PART	*EXIST
The' N	*	*	
☞# of the N			*
Of the N	*		*

(32)

Proper partitivity	*QUANTITY	FAITH PROP PART	*EXIST
The' N		*	
# of the N	*		*
☞ Of the N			*

The above tableaus make no predictions about non-maximal definites or full partitives that were not explicitly treated in sections 2 and 3. The predictions about bare partitives however still need checking. One extra prediction will be introduced in section 5.

5. How to check whether partitives encode proper partitivity in their semantics ?

In this section I will show how we can check whether or not (full and bare) partitives encode proper partitivity in their semantics. The key lies in the above analysis according to which proper partitivity obtains via competition with non-maximal definites. It follows that if we can neutralize this competition we will have the possibility to check the default interpretation of (full and bare) partitives. Given that the competition originates in the fact that partitives

normally violate the Existential constraint I will present a context in which this constraint is not violated.

One way for partitives to circumvent the Existential constraint is for their downstairs DP to refer to (sub)kinds. Given that a kind doesn't carry the presupposition that it has instances in a given world this is exactly the context in which we expect partitives to show their true nature. In what follows I work out the necessary formal tools. I first define kinds using Chierchia's down operator:

(33) $^{\cap}P$: (For any situation/world s) $\lambda s\ \iota\ P_s$ if $\lambda s\ \iota\ P_s$ is in K, undefined otherwise (P_s is the extension of P in s)

Kinds then receive the following definition:

(34) The kind corresponding to a set P is $^{\cap}P$

Subkinds are nothing more than a kind to which a contextual restriction has been added[4]:

(35) $^{\cap}\lambda x(P(x)\&C(x))$

The crucial question now is what it would mean for a partitive relation to be applied to kinds. Given that the down-operator can be seen as the intensional counterpart of the ι-operator we could imagine an intensional part-of operator that maps kinds to its atomic members in a world. One could in principle entertain two versions, one encoding proper partitivity and another encoding improper partitivity:

(36) $^{\cup 1}d$: (Let d be a kind. For any world s) $\lambda x[x<d_s]$ if d_s is defined, where d_s is the plural individual that comprises all of the atomic members of the kind.

(37) $^{\cup 2}d$: (Let d be a kind. For any world s) $\lambda x[x\leq d_s]$ if d_s is defined, where d_s is the plural individual that comprises all of the atomic members of the kind.

The first version predicts that partitives referring to all the atomic members of a kind should be infelicitous. The second version predicts that this shouldn't be a problem. In section 3 I claimed that the second version is the correct one.

In the following section I will check the predictions introduced in section 4 and in the present section.

6. Checking predictions

In this section I will check two predictions. The first is concerned with the role of bare partitives within our competition set. In section 4 I predicted that bare partitives are preferred over full partitives and non-maximal definites to express proper partitivity whenever the input

[4] This is just one kind of subkind. To account for the subkind reading of indefinites one has to assume (see Dayal 2004) that next to the standard domain there exists a domain of subkinds. This kind of domain can however not be assumed to be underlying all subkind readings of demonstratives. The main problem this kind of analysis would have is to account for the fact that *those lions* can refer to one subkind of lions. (see Le Bruyn 2007a)

is neutral with respect to quantity. I therefore expect bare partitives to be acceptable under these circumstances. Let's take another look at the example I started out with:

(1) [When Aunt got ill Floddertje decided to make a nice pot of soup. She soon noticed that the soup got lumpy and saw no other solution than to take the mixer. You can imagine the consequences… Indeed : the soup got spread all over Aunt's kitchen and covered the nice white walls.]

Ondanks	alle	moeite	die	Floddertje	deed	om	het	geklieder	op	te	kuisen		
Despite	all	effort	that	Floddertje	did	to	the	mess	up	to	clean		
vond	tante	weken	later	nog	steeds	**van**	**die**	**soep**	in alle	hoeken	van	de	
found	aunt	weeks	later	still	still	of	that	soup	in all	corners	of	the	
keuken.													
kitchen													

'Despite all the effort Floddertje put into cleaning up the mess Aunt weeks later still found some of that soup in all corners of the kitchen.' [5]

Two aspects make *van die soep* acceptable in this example. The first is that *van die soep* cannot refer to all the soup Floddertje initially spread all over the kitchen (she cleaned part of it herself). This forces proper partitivity. The second is more subtle: when I claimed that bare partitives can be used when the speaker wants to stay neutral with respect to quantity this doesn't necessarily mean that whenever he wants to he can leave it out. Indeed, for a sentence containing a bare partitive to be felicitous it is necessary for it to be relevant without the need of specifying quantity. This is the case in (1) given that the fact that soup could still be found after two weeks seems relevant enough in itself. I predict that when we modify one of these aspects the example becomes infelicitous. (38) shows this for proper partitivity and (39) for quantity relevance.

(38)

?Floddertje	was	zo van	slag	dat	tante	uiteindelijk	zelf	van	die
Floddertje	was	so off	stroke	that	Aunt	finally	herself	of	that
soep	moest	opkuisen.							
soup	had	clean							

'Floddertje was so off her stroke that Aunt eventually had to clean up some of the soup herself.'

(39)

?Het	was	een	enorme	klus	maar	dezelfde	dag	nog	kuiste	Floddertje
It	was	a	huge	job	but	that same	day	still	cleaned	Floddertje
van	die	soep	op.							
of	that	soup	up							

'It was a huge job but the very same day Floddertje cleaned up some of that soup.'

There are a few verbs that seem to combine more freely with bare partitives in the sense that they don't need for the context to guarantee proper partitivity or relevance. Examples are given in (40) and (41):

[5] I translated *van die soep* as *some that soup* to obtain an acceptable English translation. Note though that quantity is in fact underspecified.

(40) Ik heb van de kersen gegeten.
I have of the cherries eaten
'I ate some of the cherries.'

(41) Ik heb van die boeken verkocht.
I have of those books sold
'I sold some of those books.'

Interestingly the verbs concerned are exactly the once-only verbs discussed in section 2. I assume their once-only status is at the basis of their productive combination with bare partitives. The underlying idea is that they are more sensitive to the difference between proper and improper partitivity and therefore more easily allow for (bare) partitives.

The second prediction concerns the claim I made in section 3 and 4 concerning the improper partitive status of (full and bare) partitives. Based on the discussion in section 5 this claim predicts that partitives with a kind-referring downstairs DP should be able to refer to all the instances of the kind in a given world. That this is the case is shown for bare partitives in (42) and full partitives in (43).

(42) Gisteren zag ik van die gekke marsmannetjes in mijn tuin.
Yesterday saw I of those crazy Martians in my garden
Ze vertelden me dat ze de laatste overlevenden waren van
They told me that they the last survivors were of
hun beschaving.
their civilization
'Yesterday I saw some of those crazy Martians in my garden. They told me they were the last survivors of their civilization.'

(43) Gisteren zag ik drie van die gekke marsmannetjes in mijn tuin.
Yesterday saw I three of those crazy Martians in my garden
Ze vertelden me dat ze de laatste overlevenden waren van
They told me that they the last survivors were of
hun beschaving.
their civilization
'Yesterday I saw three of those funny Martians in my garden. They told me they were the last survivors of their civilization.'

Note that it is not a coincidence that I chose examples with a demonstrative DP. The reason for this is that these can refer to subkinds whereas DPs introduced by the definite article refer to kinds. Examples with the definite article would consequently be equivalent to simple bare plurals 'funny martians' (in the case of bare partitives) and simple DPs 'three funny martians' (in the case of full partitives). Standard economy considerations would rule these out.

7. Concluding remarks

In this paper I presented a competition analysis of three closely related expressions in Dutch : non-maximal definites, full partitives and bare partitives. This competition analysis led to interesting results two of which are a principled account of the distribution of bare partitives and a principled way of deriving the inclination towards proper partitivity of full and bare

partitives. Other aspects of the paper that are worth mentioning are the linguistic argument in favour of the sloppy maximality analysis of non-maximal definites and the semantic characterization of consumption and transaction verbs.

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A fresh look at the paradoxal nature of Chinese contour tones

Te-hsin Liu

In the literature of tonology, it is generally assumed that contour tones are more marked than level tones, as they are more "complicated", or more difficult to produce and perceive (Yip 2002, Zhang 2002). This hypothesis fails to explain why there are Chinese dialects with only contour tones, and why there is no tonal system having only level tones in Chinese dialects. On the basis of a universal tonal periodic skeleton HLHL postulated by Carvalho (2002), we propose a tonal representation capable of naturally accounting for the notion of tonal markedness, the interaction between contour and register, and diverse sandhi systems of Chinese dialects. By comparison with current models in which tonal markedness and licit contours are obtained by stipulation, the present framework yields a completely different picture of tonal markedness. It provides furthermore a unified explanation to the paradoxical nature of Chinese contour tones and offers a straightforward account of the concordant relationship between citation tones and sandhi behavior.

1. Introduction

Since the 1970s, the tonology has received a lot of attention in generative and post-generative phonology. From the theory of the tone feature system of Wang (1967) to the hypothesis of a dominance relationship between register and tone as suggested by Clements (1983), and the internal structures of the tone proposed by Yip (1980, 1989) and Hyman (1986), whose models are capable of explaining tonal behaviors in Chinese and African languages. For example, Yip (1989) posits that underlying tones include contours under a single Root Node encoding register in Chinese. By contrast, it is well admitted that, in African languages, underlying tones are all level tones, and contour tones are the result of associating two tonal Root Nodes to one tone-bearing unit. Assuming this representational difference, one typological problem remains. If contour tones are more marked than level tones, as they are more "complicated", or more difficult to produce and perceive, why contour tones can be found on any syllable in Chinese whereas they can be found only under certain conditions in African languages? Why are there Chinese dialects which have only contour tones, such as in Chengtu, Shanghai, Zhenhai, Pingyao and Wuxi? Why is there no tonal system with only level tones in Chinese dialects?

Current tonal models consider the syllable to be a base occupying a portion of time. Tones are autosegments linked to this syllabic base through a tonal node (or a tonal root), and they are likely to spread and to be dissociated. However, in order to account for such typical features of Chinese tones as contour- and register-based oppositions, this view compels us to enrich tonal

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representations both in terms of primitives and of their organization. Hence, for example, the nature of the nodes dominating [+/–upper] features remains obscure. Does the register imply a specific prime?

According to Cao (1985), there exists a fundamental difference between African tones and Chinese tones, with the latter not being a prosodic fact:

> "*...le ton du chinois et du vietnamien n'est pas un fait prosodique: il caractérise la syllabe au même titre que l'initiale et la rime...il n'y a pas de raison de placer le ton sur un étage autosegmental...comme toutes les autres unités linguistiques, les unités prosodiques ont leur place dans la hiérarchie du système et leur fonction. C'est en ignorant ce fait qu'on en est venu à se créer l'illusion d'une pluralité d'étages autonomes et segments indépendants les uns des autres, illusion qui à son tour donne naissance à des faux problèmes comme celui de tons flottants.*"
>
> [...tones in Chinese and in Vietnamese are not a prosodic fact: they characterize the syllable just as the initial and the rime...there is no reason to put the tone on an autosegmental tier...just as any other linguistic units, prosodic units have their own place in the hierarchy of the system and their function. It is by being unaware of this fact that we came to create the illusion of a plurality of autonomous tiers and independent segments one from the other, illusion which in its turn gives rise to false problems such as floating tones.]

However, a number of facts support Wang's (1967) assumption according to which the tone is located on a specific tier, tonal processes being largely independent of segmental features:

> "*the interaction of tones in a sequence is independent of the nature of the segments which occur with tones*."

The goal of this research is to propose a tonal representation capable of accounting naturally for the notion of tonal markedness and diverse sandhi systems of Chinese dialects. We work under the assumption of a universal tonal periodic skeleton HLHL postulated by Carvalho (2002), analogous to the syllabic skeleton CVCV proposed by Lowenstamm (1996). According to this view, in Asian languages, syllables, not tones, look for a "skeletal" base, which is, thus, of a tonal nature. Based on the principles of government phonology, this model provides a straightforward formalization of two major characteristics of Asian tonal systems: the contour and the register.

2. *Hypothesis of a tonal template*

We conjecture that Chinese tones are constrained by a portion of a periodic HL skeleton: a tonal template HLHL. Following Clements (1983) and Kaye (2001) according to whom the register is the tonal head, we posit that Chinese contour tones can be analyzed as a succession of two level tones defined by an intratonal government relationship H/L encoding the notion of register, just as the vocalic aperture contrast /e/ : /ε/ has been said to involve an infra-segmental government relationship between primitive elements : /I > A/ versus /A > I/ respectively (Anderson & Ewen 1987, Kaye *et al* 1985). The four citation tones in Mandarin can thus be represented as follows (the vertical link indicates the tonal head). The register is low if and only if the head is low; it is high if and only if the head is high.

(1) a. **H** L **H** L Tone 1 : level tone (55)

σ

b. H **L** **H** L Tone 2 : rising tone (35)

σ

c. **H** **L** **H** L Tone 3 : falling-rising tone (21[4])

σ

d. **H** **L** [H L] Tone 4 : falling tone (51)

σ

The representations in (1a-d) imply that the level tone in (1a) is not intrinsically shorter than the other three tones, especially the contour tone HL in (1d), which only involves a small portion of the tonal template. The level tone constitutes a contour just as a long vowel or a geminate consonant, associated to two skeletal positions. Indeed, according to the phonetic studies of Kratochvil (1968) and Xu (2004), tone 1 is longer (and, in any case, is not shorter) than tone 4 when pronounced in isolation, as is shown in figure (1), drawn from Xu (2004):

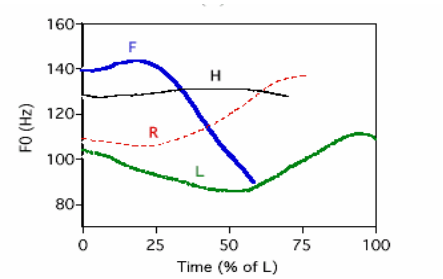


Figure (1): Mandarin four tones pronounced in isolation

If the analogy syllable/tone is on the right lines, it follows from (1a-d) that tonal markedness can be deduced from the hypothesis of a tonal skeleton within a 'strict HL' approach:

(2) *a.* *Just as CV is unmarked compared with .VC. within a 'strict CV' approach, the falling tone HL is unmarked by comparison with the rising tone LH, because the latter one supposes two empty positions on its right and left sides.*

b. *Just as geminate consonants (CC) are marked compared with CV, level tones are more marked than contour tones since their lexical representations involve not only two empty tones just as the rising tone, but also a median empty tone.*

Regarding level tones, we suppose that they are more marked than contour tones since their lexical representations involve not only two empty tones, but also a *median* empty tone. In other words, there are two successive empty L (or H) tones, which would also be difficult for two successive empty nuclei, as in *[rvny] in French. Even assuming that they involve one single HL

base, level tones are more marked than falling tones, in so far as they imply an empty skeletal position: H(B) or (H)B. Consequently, their existence should imply the presence of contour tones, but the opposite is false.

If the nucleus is said to be the sonority peak since Sievers (1876) and Jespersen (1912), we might ask what the tonality peak is in the tonal domain. From an acoustic point of view, the high tone is more prominent than the low one (de Lacy 2002). Let us hypothesize that it has the same status as the nucleus. Consequently, just as V is structurally unmarked compared with C, H should be unmarked by comparison with L. The existence of low tones, structurally marked, should imply the presence of high tones.

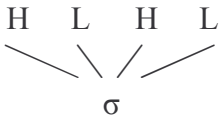
If, in the domain of syllables, all government relations are ultimately derived from the nucleus, we might expect that the high tone plays the same role in Asian tonal languages. Remind that the nucleus governs the onset, and, in the case of branching onsets, it licenses the non-head segment to govern its complement. For example, in French *patrie*, /i/ licenses the less sonorant consonant /t/ to govern the more sonorant consonant /r/ (see Charette 1990). Assuming the parallel syllable/tone, H should license L so that the latter one has the possibility to govern. This conjecture has an empirical consequence: it implies that, in a right-dominant tonal language where there is a sequence of two successive L tones, the intertonal government relationship cannot be derived legally since there is no high tone licenser. The only way to authorize the intertonal government relationship is to insert an epenthetic H tone licensing L_2 so that the latter one can play its role of governor. As we will see in §4.3, this is exactly what happens in Tianjin, where L_1+L_2 gives L_1H.L_2.

We assume furthermore the following locality constraint:

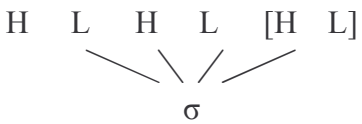
(3) *In lexical tones, a governed position is adjacent to its head.*

It follows from this constraint that *HLHL and *LHLH are naturally excluded, since they would automatically violate the locality constraint in (3). (4b) also violates a strict HLHL template.

(4) a. *HLHL



b. *LHLH



Within current models, tonal markedness and licit contours are obtained by stipulation. Thus, Yip (1980) postulates that "*the maximum number of tone feature occurrences in sequences is three*." OCP has also been invoked to explain the nonexistence of citation tones *[HL][HL] and *[LH][LH] (Yip 1989). In our model, however, neither stipulations nor OCP are necessary for avoiding overgeneration.

3. Arguments for the existence of a tonal skeleton

Having deduced the tonal markedness and excluded impossible tones in Chinese from the assumption of a tonal skeleton, the issue is whether there exists such a tonal skeleton, or it is only an artifact of the theory. It will be shown that arguments from typology, word games, and language acquisition provide strong evidence in favor of its existence.

3.1 Typological argument

In a statistics on 187 tonal languages, Zhang (2002) noticed that 37 languages have a falling tone without a rising one. Only three languages have a rising tone without a falling one: Margi, Lealao Chinantec and Zengcheng. That level tones are marked vis-à-vis contour tones is also supported by empirical facts, since a language can have only contour tones without level tones, as in Chengtu, Shanghai, Zhenhai, Pingyao and Wuxi.

The unmarkedness of the high level tone compared with the low level tone is supported by the typology: in Contanese, Tianjin, and Taiwanese, the low level tone and the high level tone coexist; Mandarin has only the high level tone without its low counterpart. Chen (2000) also notices that, if a language has one level tone, it is almost invariably the high one.

3.2 Language acquisition

Evidence of the unmarked nature of H can also be found in language acquisition. In a study about a Cantonese speaking child from 0;6 to 2;6, J. Tse (1978) observes that the low rising contour (13) is more difficult for child than the high rising contour (35). A. Tse (1992) also notices that the three tones of the high register (55, 35, 33) are mastered earlier than those of the low register (22, 13, 21). These studies confirm the primitive character of the H register since it is acquired earlier by children. In a study about two Mandarin speaking children from 1;10 to 2;10, Clumeck (1980) confirms this order of acquisition : the high level tone is pronounced with an accuracy rate of 97.2%, followed by the falling contour (95.8%), the falling-rising contour (73.9%), and the rising contour (61.3%).

The marked status of the rising tone compared with the falling contour is supported by A. Tse's study: the low falling tone is acquired by 2;9, whereas the low rising tone is learned by 3 years old.

3.3 Fanqie languages

Fanqie ("reverse cut") was a traditional philological method used to specify the pronunciation of a new character in terms of two known words. According to Bao (1990, 1999), the following tone patterns are observed in *fanqie* languages, based on different dialects:

(5) a. May-ka: new rime on σ_1; source tone on σ_2, new tone on σ_1.
ma 55 > m<u>ay</u> 15-ka **55**
pən 15 > p<u>ay</u> 15-kən **15**

b. Mo-pa: new rime on σ_1; source tone on both σ_1 and σ_2.
pã 33 > po **33**-vã **33**
ts^hɪ 4 > ts^ho **4**-zɪ **4**

c. Man-t'a: new coda on σ_1; source tone on both σ_1 and σ_2.
ma 55 > man **55**-t^ha **55**
taw 51 > tan **51**-taw **51**

d. La-pi: new nucleus on σ_2; source tone on both σ_1 and σ_2.
t^hat 31 > lat **31**-t^hit **31**
hyaw 53 > lyaw **53**-hi **53**

We notice a double asymmetry in *fanqie* languages. First, the second syllable always retains the source tone. The following form is not attested in the literature on *fanqie* languages.

(6) t^haw 13 > *law 13 t^h**i** **31**

Secondly, the replacement of the source tone on the first syllable implies that of the rime (cf. 7a), but the substitution of the rime doesn't trigger that of the source tone (cf. 7b). The rime can't be retained on σ_1 if the source tone is replaced (cf. 7c).

(7) a. pən 15 > p**ey** **51**-kən 15 (new rime, new tone)
b. pã 33 > p**o** **33**-vã 33 (new rime, source tone)
c. hyaw 53 > *ly**aw** **13**-hi 53 (source rime, new tone)

From the perspective of a framework which assumes the skeletal nature of tones, these remarks are highly significant: in any case, tones may be stable (and reduplicated) under the substitution of the rime, the nucleus and the coda. It is well admitted that reduplication primarily acts on skeletal units, which encode phonological length (cf. Mokilese *sɔɔrok*→*sɔɔ-sɔɔrok*). Now, reduplication may involve tones but not segments. Therefore, tones dominate syllables (which dominate segmental primes), and form, thus, the skeleton of phonological representations.

3.4 Empty tonal positions

In Mandarin, grammatical morphemes (particles, classifiers) are conveyed by syllables that carry the so-called 'light tone'. These syllables, which follow those bearing one of the four lexical tones, are characterized by a shorter duration, and have no lexical tone. According to Shih's (1987) phonetic analysis, such toneless syllables are realized as follows:

(8)

Preceding tone		Toneless syllable
55	H	starts high, then falls
35	LH	starts high, then falls, but not as low as after 55
21(4)	HL(H)	starts fairly low, then rises
53	HL	starts fairly low, and falls even lower

Within the present framework, we suppose that the toneless syllable associates to the last full tone of the first syllable and to the following empty tonal position, if any:

(9) a. H_1 L_1 H_2 $\mathbf{L}_2$

σ_1 σ_2

b. H_1 L_1 $\mathbf{H}_2$ L_2

σ_1 σ_2

c. H_1 $\mathbf{L}_1$ $[H_2$ $L_2]$

σ_1 σ_2

d. H_1 $\mathbf{L}_1$

σ_1 σ_2

This hypothesis predicts correctly the register of the light tone preceded by the four lexical tones: in Shih's phonetic analysis, the light tone is realized as a falling tone when it is preceded by tone 1 or tone 2, but it has a low register when it is preceded by tone 1. The light tone is realized as a rising tone with a low register after tone 3. When preceded by tone 4, it has a low register. The intratonal government encoding the notion of the register accounts for the realization of the light tone naturally: in (9a, c, d), the light tone has a low head whereas it has a high head in (9b).

4. A unified explanation to tone sandhi in Mandarin and in Tianjin

4.1 Mandarin Tone Sandhi

Remind that there are four lexical tones in Mandarin, namely 55 (H), 35 (LH), 214 (HLH), and 51 (HL). There is a concave tone HLH (214) in Mandarin, but not, e.g., in Tianjin. Moreover, Mandarin is known to be a right-dominant language (Chao 1968, Yip 1980, Lin 1983, Hashimoto 1987), where the pretonic syllable, being unstressed and relatively short, is not capable of bearing the concave tone HLH. These facts can be captured by the following constraints:

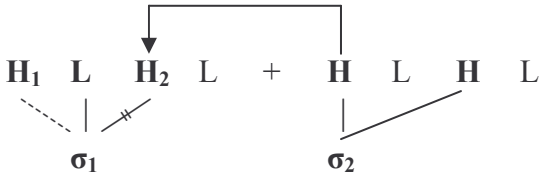
(10) a. Templatic constraints:
i) $M \leq S + 1$: the number of modulations cannot be superior to the number of syllables + 1;
ii) $M\sigma_1 \leq 1$: no more than one modulation in the pretonic syllable.

b. Intertonal government:
The head of the governing syllable governs its melodic counterpart in the governed syllable. The direction of intertonal government goes from right to left.

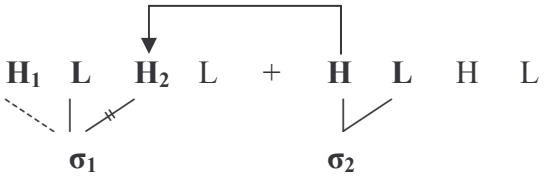
c. Proper government:
A position is *properly* governed by the head of the governing syllable iff the templatic constraints in (a) are violated. The properly governed position is *empty*.

The famous “T3 sandhi” can be given the following unitary account:

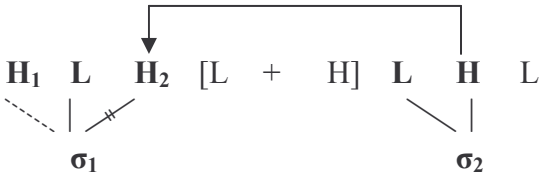
(11) a. 214+55 → 21.55



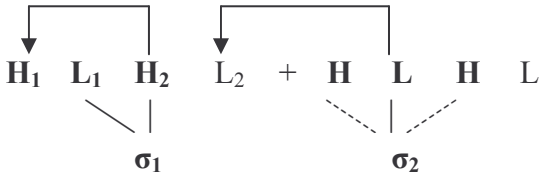
b. 214+51 → 21.51



c. 214+35 → 21.35



d. 214+214 → 35.214



In (11d), just as in French schwa/zero alternations, where an empty nucleus is phonetically realized when it is not properly governed (i.e *r<u>e</u>venu* [rəvny]), we suppose that H_2, not properly governed, must be realized phonetically. Hence, it governs H_1 that is lexically empty, and L_1 becomes an intratonal governed position, which involves register change. Thus, T3-sandhi supports our conjecture that the register is the tonal head.

4.2 Tianjin tone sandhi

According to Shi (1990), the tone digits of the four citation tones in Tianjin are 11 (L), 55 (H), 24 (LH) and 53 (HL). The head of contour tones in Tianjin are at left, since LH and HL have, respectively, L and H registers. The Tianjin sandhi rules are given in (12) (Yip 1989, Chen 2000):

(12) Tonal dissimilation:
a. L+L → LH.L
b. LH+LH → H.LH
c. HL+HL → L.HL

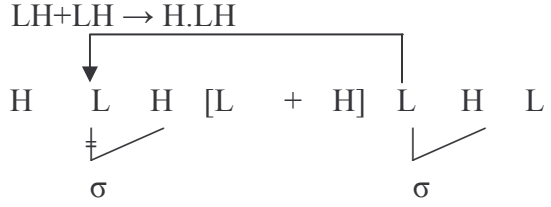
In addition, L+L gives H.L among young speakers (Wee 2004).

Based on Optimality Theory, Yip (2002) and Chen (2002), among others, posit that Tianjin tone sandhi is triggered by the Obligatory Contour Principle (OCP), banning two adjacent identical contours or tonal segments. However, we don't understand why <u>HL</u>.<u>HL</u>, <u>LH</u>.<u>LH</u> and L<u>H</u>.<u>H</u>L are not subject to tone sandhi in Mandarin, if the OCP is a universal principal rather than

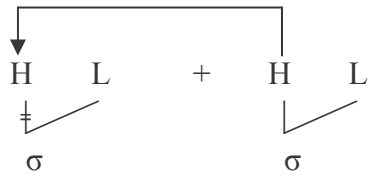
a violable constraint. Now, there is a concordance between the number of modulations on lexical tones and the number of modulations on disyllable words in Tianjin as well as in Mandarin.

As there are neither concave nor convex citation tones in Tianjin, we suppose that *the number of modulations should be equal to that of syllables* in this dialect. In (13b) and (13c), there are three underlying modulations on two syllables, which triggers the tone sandhi. Consequently, the governed head of the first syllable becomes empty, as is shown in (13):

(13) a. LH+LH → H.LH



b. HL+HL → L.HL

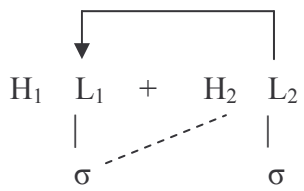


4.3 Tonal epenthesis in Tianjin

Why is there tone sandhi in the sequence L+L in Tianjin, which does not violate the templatic constraints? Why is there no tone sandhi in the sequence H+H, leading Yip (1989) to hypothesize that H is the unmarked tone?

As is shown in §2, we hypothesize that all government relations are ultimately derived from the high level tone in the tonal domains. H should license L so that the latter one has the possibility to govern. Consequently, in a right-dominant tonal language where there is a sequence of two successive L tones, the only way to authorize the intertonal government relationship is to insert an epenthetic H tone licensing L_2 so that H can play its role of governor. This is exactly what happens in Tianjin, where L_1+L_2 gives L_1H.L_2[1]

(14) L+L → LH.L



This explains at the same time the tonal stability in H_1+H_2 and L_1+L_2H. In the first case, H_2 is itself the licenser; hence it can govern its melodic counterpart. In the second case, H licenses L_2, so that it can govern L_1[2]. Consequently, the reason why there is tone sandhi in the Tianjin

[1] In the Mandarin sequences HLH+H, HLH+HL and HLH+LH, the licenser coincides with the intratonal governing head (cf. §4.1). In the sequence HLH+HLH, the intratonal L head of the stressed syllable receives its licence to govern from the preceding H tone so that L can assume its role of governor (cf. §4.1).

[2] Notice that there is no deletion of the governed tone here since templatic constraints are not violated.

sequence L+L, whereas tones remain stable in the sequence H_1+H_2 of Tianjin and Mandarin, is now evident: it is the necessity for an intratonal L head to be licensed to govern by the H tone.

Ancient Chinese confirms the unmarked nature of H: the H register appeared always with voiceless onsets, and the L register appeared with the voiced ones. Voiceless consonants are known to be unmarked vis-à-vis voiced and aspirated ones[3]. This leads us to assume that unmarked consonants occur only with the unmarked register.

The last argument, although indirect, of the primitive character of the H register comes from some Mandarin dialects spoken in the northwest of China. In Shang, the tone is used to mark the pronominal plurality (Yuan *et al.* 1960, Zhan 1981):

(15) a. ŋɤ 53/21 "I/we"
b. ni 53/21 "you (sg.)/you (pl.)"
c. tʰɑ 53/21 "he, she, it /they "

The singular pronouns all have the high falling tone 53, and their counterparts have the low falling contour 21. In other words, the number distinction can be reduced to register only: H marks singular, and L plural. The singular being *an atom* vis-à-vis the plural in the sense of Chierchia (1998), it seems that speakers choose an unmarked register to express a primitive category.

Given the templatic constraint and the elision, we are now in a position to explain the different sandhi behavior between Mandarin and Tianjin: contrary to what happens in Tianjin, there is no tone sandhi in Mandarin in sequences such as HL+HL or LH+LH because Mandarin and Tianjin have different templatic constraints: there can be three modulations on two syllables in Mandarin, not in Tianjin. The conditions required by elision explain why there is no tone sandhi in the Mandarin sequence LH+HL, while the same sequence undergoes sandhi in Tianjin: only the tail can be elided, not the head; now, the head of LH is L in Tianjin, but H in Mandarin.

4.4 Tonal absorption in Tianjin

Apart from tonal dissimilation rules, there are also three tonal absorption rules, as are reported by Yip (1989) and Wee (2004). The three tonal absorption rules are given as follows:

(16) a. HL+L->H.L
b. LH+H->L.H
c. LH+HL->L.HL

One might ask why there is tone sandhi in these cases, as the templatic constraints are not violated. We suggest that there is *elision*: just as in the case of French *liaison*, where “la + amie” gives “l’amie”, so does the tonal tail of the first syllable fall if (a) it has the same height as the head of the second syllable, (b) both tones are adjacent.

Note that the elision occurs only when the tail of the first syllable and the head of the second syllable are adjacent and homorganic. That’s why, in Mandarin, the sequence LH+HL does not undergo tone sandhi, while it does in Tianjin: only the tail can be elided, not the head, and Mandarin has L<u>H</u> versus <u>L</u>H in Tianjin. Elision is thus the second reason for the dissociation

[3] All languages have at least a contrast between a voiceless consonant and another glottal state (aspirated, voiced, and/or glottalized). This seems to confirm the pivot role of the voiceless consonants. See Carvalho (2002).

of a governed position.

4.5 The nature of the tonal skeleton

From the assumption of the tonal skeleton, a basic question follows : what is the nature of these tonal positions ? We consider that they are similar to the moras, which encode both timing and weight.

Duanmu (1994) uses moras to explain the sandhi difference between Mandarin and Shanghai: Mandarin being a bimoraic language, every syllable is capable of carrying contour tones; Shanghai is a monomoraic language, so the syllable is not capable of bearing contour tones. For Duanmu, the function of the mora consists of explaining the capacity or incapacity of carrying a contour tone. However, there is no vowel length contrast in Chinese: the mora may be substantively grounded in Duanmu's conjecture, if contour tones do involve longer vowels; it remains that it has no independent phonemic motivation. This postulation is, as it stands, circular. If we assume that every minimal word is composed of two moras, a new problem arises: if the coda is not moraic, we don't understand why, in open syllables, the vowel doesn't lengthen; if the coda is moraic, we can't explain why it doesn't bear a tone in certain circumstances.

In the line of *phonetically-based phonology* (Steriade & Hayes 2004), Zhang (2001) argues that contour tones need ample duration to be realized, because the muscle contraction that is necessary for an articulatory movement needs time to be implemented. Thus, they are more marked than level tones. He also finds that the distribution of contour tones in a language is closely correlated with the duration of the sonorous portion of the rime. Syllable types which have longer sonorous duration of the rime, e.g. long-vowelled, sonorant-closed, stressed, final in a prosodic position, and in a shorter word, are more likely to carry contour tones. This approach incurs a simple criticism: while it may achieve observational adequacy, it fails to encode the observed preferences directly in phonological representations. Furthermore, admitting that there is a close relationship between the presence of contour tones and vowel length, why is it that, in right-dominant languages such as Mandarin and Tianjin, putatively marked contour tones can subsist and even emerge in pretonic position? In Tianjin for example, L+L gives LH.L. If tone sandhi was due to the OCP, banning two adjacent identical objects, why wouldn't we have *H.L or *L.HL in the surface form, which respect positional markedness?

Given the inadequacy of both Duanmu's moraic hypothesis, and phonetically-based explanations, we will make the following claim. If complex tones, and only tones, do require length, they should be viewed as being directly associated to the skeletal units encoding length in autosegmental theories. As will be seen, examples of tone sandhi in Tianjin provide strong evidence in favor of this assumption.

There are no obstruent-closed syllables in Tianjin, which is shared by most northern dialects; hence, all syllables are underlyingly bimoraic as represented in (17), where *the head will be assumed to be associated to both moras*[4]. One sandhi rule in Tianjin is HL+HL→L.HL.

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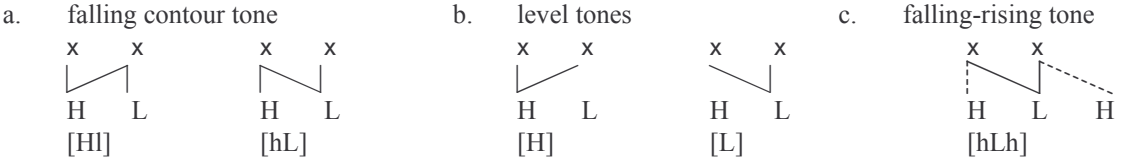
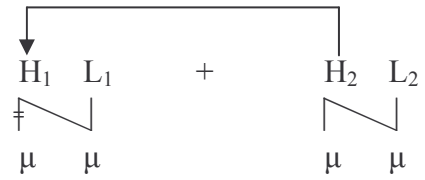
[4] The representations in (16) are a slightly revised version of those in (1). Following Carvalho (2002a, b) who uses the same device to represent VOT, we suggest that the tonal head can also be represented by the spreading of a tonal segment to an adjacent position (the capital letter indicates the the tonal head):



Intertonal government applies in (17a) because of the violation of the templatic constraint. L+HL, however, remains unchanged:

(17)

a. HL+HL→L.HL



b. L+HL→L.HL

It follows that the L tone derived from HL in (16a) should be shorter than the lexical L tone in (17b), since intertonal government causes dissociation of H_1. Besides, the initial part of the derived L tone should be raised by the head H_1. This conjecture is confirmed by phonetic data (Wee 2004): the derived L tone in Fig. 2 is both slightly falling and much shorter than its lexical counterpart in Fig. 3:

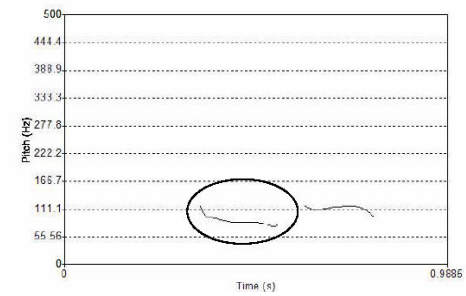


Figure 2: L derived from the sequence HL+HL → L.HL

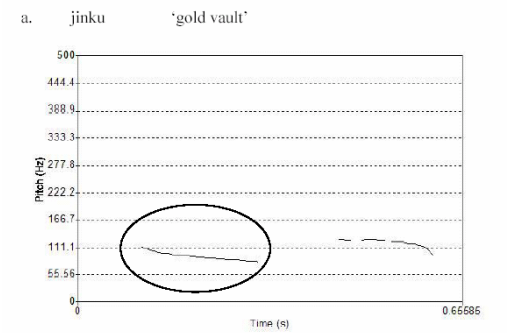


Figure 3: Lexical L tone

How to explain that, in the same context, the non derived L tone is longer than the L tone derived from /HL/? The only explanation is that, in /HL/, it is H which is associated to two positions and it is H the target of tone sandhi. On the contrary, in /L/, the tone is associated to two positions and is not affected by the /HL/ on its right side.

In (a), there is a perfect mapping between the tonal skeleton and the temporal skeleton, hence the unmarked nature of the falling tone. In this sense, in (c), HLH is marked in that there are three tonal segments against two skeletal positions, just as an branching onset is necessary marked compared to an simple onset. It follow that the relation between HL and pure positions are the same as that between ON and pure positions: just as the unmarkedness of ON implies the biunivocity in so fas as one position corresponds to a syllabic element (onset or nucleus) and vice-versa, now, if ONON constitues a skeleton, HLHL does, too.

5. Conclusion

One might ask why the order of the tonal skeleton should be HLHL..., rather than *LHLH...? The first argument comes from Chengtu, a Mandarin dialect spoken in the Province of Szechuan: when the low falling tone is preceded by other tones, it is realized in [LH]. However, there is an initial epenthetic H tone when the low falling tone is in the initial position, giving [HLH]. This comes in support of the conjecture that there exists a periodic tonal skeleton and that its order is HLHL rather than *LHLH.

The second justification comes from the majority realization of the light tone in falling contour in Mandarin, where there seems to be a final L tone (cf. §3.4). Duanmu (1994) posits as well a domain-final effect when treating the sandhi data of Wuxi and Old Shanghai, where in a dissyllabic (or longer) domain, the final syllable receives an additional L. This final L insertion can be accounted for in the present model, and there is no need to postulate an independent rule.

The hypothesis of a periodic tonal skeleton in which contour and register are represented through the same primes enables us to explain: (a) why there are Chinese dialects having only contour tones; (b) why there is no tonal system with only level tones in Chinese dialects. There is no need to posit register primitives, such as [+upper] or [-upper], since the register is incorporated into the tonal representation: it is the tonal head. More generally, it provides a simple and unified account of tone structure and markedness, which is supported by such diverse aspects as typology, language acquisition, word games (*Fanqie*), and the realization of toneless syllables ('light tone'). Furthermore, the present analysis sheds light on the relationship between the representation of tones and their behavior vis-à-vis sandhi. The sandhi-related differences among dialects are indeed due to different templatic constraints on the tonal system, as well as to representational differences between tones. Finally, examples from Tianjin sandhi provide evidence for a direct interaction between moraic and tonal positions, supporting the idea that, contrary to what follows from current models, Chinese tones do have a 'skeletal' character, and might constitute the basis to which syllables are associated.

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Te-hsin Liu
Department of Linguistics
Paris 8 University, UMR 7023
liu.tehsin@gmail.com

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Local vs. non-local consonantal intervention in vowel harmony

Shakuntala Mahanta

In this paper I address the issue of consonantal intervention in vowel harmony. A consonant may be eligible to block harmony at the segmental level, by virtue of being highly placed in the sonority scale and also as a result of sharing some feature with the triggering segment. However, all attested cases of harmony blocking by consonants in a non-local position (in Assamese, Lango, Yucatec Maya, etc.) are prosodically governed in the coda. In all these languages, the presence of closed syllables results in the non-propagation of harmony because coda consonants are assigned a mora.

1. *Introduction*

Canonical vowel harmony is expected to spread from vowel to vowel without affecting[1] or being affected by intervening consonants. That is only an ideal state of affairs, which is violated in a significant number of vowel harmony languages. The core of this paper deals with three kinds of blocking encountered in Assamese: blocking by the [-ATR, +low] vowel /ɑ/, blocking by the nasal consonants /n/, /m/ and /ŋ/, and blocking by consonants in a moraic position. The goal of this paper is to show that in Assamese, local intervention by consonants and vowels is driven by sonority. But non-local blocking, i.e. intervention by consonants which are not segmentally adjacent is the result of prosodic requirements. Therefore this paper addresses the question of adjacency and its consequences for languages where only some segments intervene in spreading processes and others do not. The arguments in this paper will motivate a theory of segments that may stand between the trigger and target and that impede spreading of the relevant [αF] vocalic feature. By doing so, I hope to fill a void where there has been hardly any analysis of consonantal intervention, within Optimality Theory (henceforth OT, Prince and Smolensky, 1993, 2006) in vowel harmony, save a few (Ní Chiosaín and Padgett 1997, 2001). In this paper, along with consonantal blocking in Assamese, I also discuss vowel harmony blocking by consonants in Turkish, where harmonisation of vowels in terms of the feature [+back] is blocked by palatal consonants. It

[1]Under the strict locality condition (Ní Chiosaín and Padgett 1997, 2004, Walker 1998), it is expected that vowel harmony will influence all the intervening segments, without resulting in distinctive featural changes.

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will be shown that such a phenomenon is also compatible with the definition of consonantal blockers that will be developed here.

Section 1.1 is a brief introduction to Assamese vowel harmony and its basic analysis within an OT framework. Section 1.2 presents the background to phonologically opaque vowels in Assamese and section 1.3 provides an OT analysis of phonological opacity caused by the vowel /ɑ/. Section 2 presents an in-depth account of nasals blocking harmony. This section is divided into three subsections in order to provide more evidence for a universal tendency of more sonorous elements to participate in vocalic processes. Section 3 presents a broad overview of consonantal participation in harmony processes and discusses various feature based theories before presenting the proposal that potential undergoers tend to block harmony. The section comes to an end with a synopsis of the unified analysis of consonants and vowels blocking harmony in vowel harmony languages. Section 4 presents an account of harmony blocking by coda consonants and shows that it is related to the prosody of the language.

1.1. Assamese vowel harmony

Assamese has an eight vowel inventory consisting of /i, u, ʊ, e, o, ɛ, ɔ, ɑ/. Assamese exhibits [Atr] harmony where the high vowels /i/ and /u/ regressively trigger harmony on the preceding [-Atr] vowels [ɛ] [ɔ] and [ʊ] resulting in [e] [o] and /u/. Harmony is regressive (neither stem controlled nor dominant-recessive) always extending till the initial syllable. Regressive harmony can only be triggered by the vowels /i/ and /u/ on the right side. Some examples of Assamese vowel harmony are presented below:

(1) Vowel harmony triggered by the /i/ suffix

	Root	Gloss	Suffix	Derivation	Gloss
a.	b^hɛkʊla	'frog'	i	b^hekuli	'frog'(dim)
b.	ʊpɔr	'above'	i	upori	'in
c.	k^hɔrɔs	'spend'	i	k^horosi	'prodigal'

In this section I present a basic OT analysis of Assamese vowel harmony and I define the relevant constraints below:

(2) *[-ATR][+ATR]
Assign a violation mark to a [-ATR] segment followed by a [+ATR] segment.

(3) IDENT [ATR]
A segment in the output and its correspondent in the input must have identical specifications for [ATR].

(4) IDENT [high]
A segment in the output and its correspondent in the input must have identical specifications for [high].

(5) *[+high, -ATR, -back]
The feature value [-ATR] is marked in [+hi] and [-back] vowels.
(Archangeli and Pulleyblank 1994)

(6) *[-high +ATR]
The feature value [+ATR] is marked in [-high] vowels.
(Archangeli and Pulleyblank 1994)

(7) Vowel harmony in Assamese

Input: /kɔr/+/-ɪ/ 'do'+inf	ID [hi]	*[-ATR, +hi, -back]	*[-ATR][+ATR]	ID[ATR]
a. kɔri			*!	*
d. kɔrɪ		*!		
c. kɔrɛ	*!			
b. ☞ kori				**

The tableau above shows that the constraints IDENT [hi] and *[-ATR, +hi, -back] are undominated in Assamese. The constraint *[-ATR][+ATR] plays a crucial role in prohibiting output sequences with an [ATR] mismatch in their feature specifications. ID[ATR] protects [ATR] values but it is low ranked, therefore does not succeed in prohibiting vowel [ATR] harmony.

1.2. The opacity of the vowel /ɑ /

It is commonly assumed that phonological opacity in vowel harmony arises as a result of vowels not bearing the features that harmony spreads. If a non-alternating vowel occurs between the target vowel and the trigger, the harmony span of the triggering vowel is blocked. Hence these non-alternating vowels are called opaque vowels. There are a staggering number of languages where /ɑ/ blocks harmony[2]. The data set below shows how /ɑ/ is opaque to vowel harmony in Assamese.

(8) /ɑli/ is an adjectival or nominal suffix which means 'having the quality of'

	Root/Stem	Gloss	Suffix	Derivation	Gloss
a.	Bʰʊg	'enjoyment'	ɑli	bʰʊgɑli	'enjoyable'
b.	Xʊn	'gold'	ɑli	xʊnɑli	'golden'
c.	Kʰɔr	'dryness'	ɑli	kʰɔrɑli	'dry season'
d.	Bɛz	'doctor'	ɑli	bɛzɑli	'doctorship'

In this paper, I propose that the opacity of /ɑ/ arises because of its high sonority. The standard treatment of phonological opacity is by using multiple feature markedness constraints (Baković 2000; Kiparsky 1981; Archangeli & Pulleyblank 1989). However, in many languages, vowels also alternate with other vowels which are not their exact harmonic counterparts in the inventory (e.g Turkish). In Assamese too, /ɑ/ alternates with /e/ and /o/

[2]This has been reported to be the case of [±Atr] harmony in Hall et al (1980), mostly in West African languages e.g. Wolof, Fula, Diola Fogni. In all these systems, the organising principle is such that [+Atr] vowels are dominant and [-Atr] vowels are recessive, so that opaque vowels can block the harmony propagated by the triggering [+Atr] vowel and start their own harmony domain.

when /-iyɑ/ and /-uwɑ/ exceptionally trigger harmony, as in /mɑr/ 'beat' + /iyɑ/ → /moriyɑ/ 'beat' (causative), /d^{h}ɑr/ 'debt' + /uwɑ/ → /d^{h}oruwɑ/ 'debtor' (see Mahanta 2007, for a detailed analysis). The undominated constraint *[+ATR +low], would only prohibit the non-occurring vowels [æ, ɐ] but not the potential ones, [e] and [o]. Therefore, it is argued here that the motivation for blocking is not solely provided by *[+ATR +low], as it is not able to prevent other ways of resolving phonological opacity. The constraint *[+ATR +low] is not able to prevent potential instances of [e] and [o] when /ɑ/ exceptionally undergoes harmony. To resolve the ambiguity that *[+ATR +low] gives rise to, we need another constraint IDENT[LOW] which is violated when /ɑ/ alters to other [+ATR] vowels in the inventory.

In an OT analysis, /ɑ/ opacity may also be cosidered to be the effect of a high ranking faithfulness constraint on low vowels, i.e. IDENT[low]. Intrinsic sonority of vowels has been widely accepted to vary according to the following hierarchy and I propose that the need for this highly ranked faithfulness constraint arises in order to protect more sonorous elements[3]:

(9) sonority hierarchy of vowels:
LOW ≫ MID ≫ HIGH
a ≫ e, o, ≫ i, u

I follow approaches which express the sonority scale in terms of faithfulness constraints (see Howe and Pulleyblank 2004):

(10) Harmony-as-faithfulness:

FAITHLOW	≫	FAITHMID	≫	FAITHHIGH
a	≫	e,o	≫	i

1.3. ATR harmony and the low vowel – OT account

As already stated in section 1.2, the presence of the vowel /ɑ/ blocks vowel harmony. The constraints which protects the [-ATR] values of low vowels from changing into [+ATR] are presented in this section. A faithfulness constraint preserving the low value of /ɑ/ is important due to considerations of sonority:

(11) [IDENT low]: Correspondent segments are identical with respect to the feature [Low] (McCarthy and Prince 1995)

The constraint which restricts the inventory to [-ATR] low vowels is:

(12) *[+ATR +low]
The feature value [+ATR] is marked in [+low] vowels.

(13) /ɑ/ remains unaltered

[3] While discussing the inapplicability of non-contrastive visibility to various cases of opacity, Nevins (2004) proposes that instead of non-contrastiveness, sonority should be considered the guiding principle in assessing opaque interactions in languages. This argument is fuelled by data from Wolof, Hungarian, and written Manchu etc., where despite the presence of contrastive vowels, only the non-contrastive ones are opaque. Although in this target-centric theory, opacity as such, is proposed to be non-existent.

Input : /kɔpɑh/+/i/	*[+ATR +low]	ID[low]	*[-ATR][+ATR]	*[-hi +ATR]	ID [ATR]
a. ☞ kɔpɑhi			*		
b. kopohi		*!		**	**
c. kopæhi	*!			**	**

The inertness of /ɑ/ to the harmony process is accounted for by high ranked IDENT [low] and *[+ATR +low]. These constraints are ranked higher than the harmony driving constraint *[-ATR][+ATR], therefore the candidate (13)-a which does not undergo any /ɑ/ alteration is the winning candidate.

In OT, the standard approach to blocking is with multiple feature markedness constraints as the one in (12). However, such a motivation for blocking needs to be approached with some caution. In so far as blocking in [+ATR] harmony systems is concerned, a system where *[+ATR +low] is violated in order to avoid opacity[4] is non-existent, as far as I am aware. In this sense, standard OT overgenerates in that it predicts the existence of certain language types which are not attested [5]. However, my proposal of sonority and corresponding faithfulness also cannot be held to account for all the complexities of blocking in vowel harmony. The problem of opacity and repairs needs a proper examination and I cannot claim to have proffered an adequate analysis. Future research in this interesting area may shed more light on this phenomenon.

As far as blocking by /ɑ/ is concerned, Assamese vowel harmony is not very special; the special feature of Assamese is that there are also other non-vocalic segments that block the spread of the feature [ATR], namely nasal consonants and all consonants in coda positions.

2. Consonantal intervention: an introduction

This paper argues that vowel harmony blocking by consonants is not an anomaly and consequently, one of the goals of this paper is to present a phonological explanation for these occurrences. I will not address the issue of feature spreading to all elements (in a certain domain) *per se*. Rather, I will show that in Assamese non-vocalic elements may *block* harmony. In other words, even though consonantal elements may allow harmony to spread from one element to the other, there may be consonantal segments which stop harmony from spreading.

Vowel harmony blocking by consonants is driven by the principle of 'similarity' in the appropriate local domain. The problem lies in defining what exactly similarity is. I propose that a consonant's similarity to a vowel in vowel harmony can be evaluated in two ways: i) it can be measured by a consonant's proximity to vowels on a sonority scale; ii) similarity can also be apparent from features that both vowels and consonants could possibly share.

[4] Leaving aside systems where the complete ten-vowel inventory is already present, or where there are [+ATR +low] counterparts present in the inventory.

[5] As Márton Sóskuthy kindly points out, this implies that there are two sets of languages: (i) where *[+ATR +low] is violated in the inventory as well as a means of avoiding opacity and (ii) where *[+ATR +LOW] is never violated, even as a means of avoiding opacity. However, the crucial point here is that *[+ATR +LOW] is always inactive in the second set of languages, which brings into question the primary motivation of lack of a counterpart as the driving force behind phonological opacity.

Importantly, I do not adopt the autosegmental approach to blocking by vowel harmony. I intend to show that vowels and consonants are not always bound by the conventions of locality proposed in previous work, mainly adopting the autosegmental requirement of segregated levels. It will be shown that in the case of blocking the important defining characteristic is the higher sonority of the blocking segment, which in Assamese simply precedes the triggering vowel.

With this brief background on the main ideas that will be explored in the following sections, I proceed to present the data and analysis of nasals blocking harmony in Assamese.

2.1. Nasals blocking harmony in Assamese

Vowel harmony is sometimes blocked by intervening nasal consonants. In (14) vowel harmony is blocked by an intervening nasal consonant:

(14) blocking in underived words

a.	sɛkɔni	'strainer'	(*sekoni)
b.	xɔmɔniɑ	'colleague'	(*xomoniɑ)
c.	pʊtɔni	'dumping ground'	(*putoni)
d.	k^hɔmir	'leavening agent'	(*k^homir)

All the nasals /n/, /m/ and /ŋ/ in non-derived words block harmony in the examples above. Harmony is blocked if the nasal occurs in similar positions in derived environments as well:

(15) blocking by nasals in derivations

	Root	Gloss	Suffix	Derivation	Gloss
a.	d^hɔr	'hold'	ɔni	d^hɔrɔni	'support'
b.	mɔt^h	'churn'	ɔni	mɔt^hɔni	'churning stick'
c.	pʊr	'burn'	ɔni	pʊrɔni	'burn'
d.	pɛlɑ	'throw'	ɔni	pɛlɔni	'throw'

The special feature of Assamese is that there is also a positional restriction on the nasals which block harmony: if the nasal is in the onset of a syllable containing the triggering vowels /i/ or /u/, vowel harmony will not take place, see (14); whereas a nasal somewhere else in the word does not function as a blocker, i.e. if the nasal is not in the onset position of a syllable triggering vowel harmony it will not block harmony. In (16) the words end in a syllable with a high vowel and all vowels agree in [+ATR] despite the presence of a nasal within the word:

(16)

	Word	Gloss
a.	porinoti	'consequence'
b.	ponoru	'onion'
c.	somokit	'frightened suddenly'

Also note that only when a sequence of a high-mid back vowel /ɔ/ and a nasal occurs, is [ATR] harmony blocked.

2.2. Analysis of nasals blocking harmony in Assamese

Nasals blocking harmony is a local process, i.e. the spreading process can be arrested by an intervening nasal only when it immediately precedes the triggering element. Local assimilation is dependent on phonotactic conditions and coarticulation, which requires adjacency of the participating segments[6]. For example, post-nasal voicing is often attributed to a coarticulation difficulty in devoicing following a nasal (Hayes & Stijvers 1995; Pater 1999). I assume that in the case of consonantal blocking in vowel harmony, the following (ad-hoc) principle plays a role:

(17) Let *a* > *b* > *c* be a string of segments in the input, for any agreement relation R in terms of feature (f), such that the potential output is *a*(+f) >*b*(+f) > *c*(+f), but the actual output is *a*(+f) >*b*(-f) > *c*(-f), if *b* prevents agreement, then *b* is vocalically compatible/ has agreeable features and *b* is segmentally adjacent.

The criteria of locality which is to be executed with the principles stated above must incorporate the following:

(18) Let *a* and *b* be segments in the output, such that:
a. *a* linearly precedes *b* in the output
b. And there is no element *c* which intervenes between *a* and *b*.

I assume that this principle plays a role in the GEN component of UG. For an OT account of nasals blocking harmony, I propose a sequential markedness constraint, *[oNi] which observes the principle of locality principle espoused in (17) and (18). This is the following constraint expressed as below:

(19) *[oNi]: Assign a violation mark to [+ATR –hi +back] vowels in the presence of an immediately following Nasal consonant and a high vowel.

As I will argue in the following section, the motivation for a featural markedness constraint is not satisfactory.

The feature [+ATR] spreads leftward from one non-low vowel to the next until it reaches the beginning of the word or a low vowel. This process of regressive harmony can be arrested by an intervening nasal which immediately precedes the triggering vowel. The tableau below shows an OT analysis of nasal blocking.

(20) *[oNi] blocks the spread of the feature [+ATR] locally

Input: /mɔni/ 'pearl'	*[oNi]	*[-ATR] [+ATR]	*[-hi +ATR]	ID [ATR]
a.☞mɔni		*		
b. moni	*!		*	*

[6]For an articulatorily motivated explanation of nasals blocking harmony in Assamese, see Grijzenhout and Mahanta (2004). Though I assume such constraints are at work in both assimilation and blocking, in this article I do not offer articulatory constraints for blocking. The reason for not adopting the articulatory explanation is because of its inability to tackle the local nature of blocking by nasals.

From the ranking above, it is evident that satisfying the constraint *[oNi] is more important than obeying the *[-ATR][+ATR] constraint. Note that this is a sequential markedness constraint and not a featural markedness constraint like *[+ATR Nasal]. This is because there is only a co-occurrence restriction prohibiting local nasal and ATR sequences and no such restriction distally (see the examples in (16)). This constraint bars candidates with vowel harmony only if the nasal is in the immediately preceding position of the triggering vowel in a word from being the optimal candidate.

(21) *[oNi] is not violated when there is no long-distance blocking

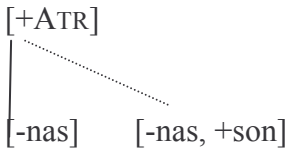
I:/pɔnɔru/ 'onion'	*[oNi]	*[-ATR][+ATR]	*[-hi +ATR]	ID[ATR]
a. pɔnɔru		*!		
b. ☞ponoru			**	**

*[oNi] does not choose between the candidates (21)-a and (21)-b because neither of them violate the markedness constraint. This constraint does not prohibit either candidate from winning because the nasal is not in the immediately preceding position of the triggering syllable, showing that absolute adjacency is required to obtain the kind of blocking exemplified above. Eventually, it is left to the harmony driving constraint *[-ATR][+ATR] to decide between the two candidates, and therefore it chooses (21)-b, the harmonised candidate.

2.3. Nasalisation and harmony in other languages

Trigo (1991) shows that in Madurese, where a [+ATR] specification spreads from a voiced obstruent but not from a voiceless obstruent and nasal, something which Trigo expresses as below:

(22) [-ATR] specification of nasals



While this shows that nasals are [-ATR], the relevance of this feature for nasals is not so straightforward in a vowel harmony context, but nasals might intervene because of their sonority. Some more interactions between nasals and oral vowel sequences have been identified in a variety of cases exemplified below.

Uffman (2006) shows that in epenthetic vowel assimilation in Shona loan words, sonority of the intervening consonants play a distinctive role in this language - vowel harmony only occurs across labial and coronal obstruents, not across sonorants.

(23) Epenthetic vowels after a sonorants

a.	aitemu	'item'	d.	kirabhu	'club'
b.	kiripi	'clip'	e.	chifi	'chief'
c.	timu	'team'	f.	kirimu	'cream'

In Ijesa and Ekiti, (Przezdziecki 2005) pronouns with [+ATR] oral vowels undergo harmony, while those with [-ATR] or nasal vowels do not.

(24)

[+ATR]			[-ATR]		
a.	órígi	's/he saw a tree.'	d.	ɔ́rílá	's/he saw okra.'
b.	arígi	'we saw a tree.'	e.	arílá	'we saw okra.'
c.	ɛ̃rígi	'you (pl) saw a tree.'	f.	ɛ̃rílá	'you (pl) saw okra.'

In Karajá (Ribeiro 2001), the vowels /ã/, /õ/, and /ẽ/ are opaque, systematically blocking the spread of regressive [ATR] harmony:

(25) Blocking by nasal vowels in Karajá

a.	rɛhãɖere	'I hit (it).'
b.	rakɔhɔdɛkõre	'He/she didn't hit.'
c.	rɛmẽre	'I caught (it).'

While Madurese shows a direct connection between [-ATR] and nasals, the other examples show a correlation between nasals and [ATR], i.e. there are constraints in the co-occurrence of the two. While this does not directly translate into a featural configuration of a nasal as [-ATR], it can be deduced that there are articulatory constraints on nasals and non-low vowels occurring together. However, postulating a [-ATR] feature for nasals does not help us in Assamese, because nasals only in the onset position of a triggering syllable block harmony. With this background on other languages which have nasalised segments and which also intervene in vowel harmony, I now move on to show the implications of nasals blocking vowel harmony in a broader cross-linguistic perspective.

2.4. Implications of nasal intervention in vowel harmony

Though cross-linguistically not common, nasals blocking/participating in harmony cannot be considered exceptional. Existing linguistic theories already presuppose that vowels and nasals interact more easily than other [continuant] segments. As a case in point, Walker (1998) proposes a typology of nasal harmony which predicts which segments are most likely to undergo harmony and which segments are most likely to block nasal spreading. According to this hierarchy, vowels are the most widely attested nasal segments and are the most susceptible to acquiring nasalisation in nasal spreading. Walker shows that all variation in the set of target segments in nasal harmony is based on the phonetically grounded universal harmony scale of nasalised segments which corresponds to the implicational hierarchy in (26). It is evident that the ranking in (26) also duplicates the effects of the sonority hierarchy:

(26) *Nasalised segment harmony scale*
a. nasal sonorant stop > nasal vowel > nasal glide > nasal liquid > nasal fricative > nasal obstruent stop

Walker in her implicational hierarchy observes that a vowel is more likely to acquire nasal features than any other segment.

Similarly, consonantal intervention in vowel harmony involves blocking by segments which are more likely to acquire vocalic features. Nasals, laterals and palatalised segments are the only segments which block harmony because they are more sonorous (i.e. by virtue of

being ranked higher in the sonority scale, the sonority threshold will be identified later in the article) and therefore they can potentially block to vocalic spreading. Cross-linguistically, nasals are regarded to be high sonority elements as they are capable of bearing the syllable nucleus. Nasalisation and nasal harmony are processes which lead to the articulation of the feature nasal on vowels as well as consonants. This means that consonants do take part in the process of harmony, and those features with a high degree of sonority, either primary or secondary, are eligible to be harmony blockers[7].

(27) glides > liquid > nasal > fricative > obstruent stop

The hierarchy above only replicates the sonority scale which is supposed to be operative in Universal Grammar, but the property of being more sonorous is not the only criteria which is important in the blocking of harmony; featural compatibility is also required to be a consonantal blocker. This means that the motivation of a sonority scale does not imply that all the higher sonority elements in the scale will necessarily block harmony in the concerned language. The sonorous element blocking harmony will also have to be complemented by an additional featural requirement. The question which also needs to be answered here is regarding the necessity of having the dual requirements of sonority as well as featural compatibility in blocking vowel harmony. The answer to this lies in the fact that though voiced consonantal segments also show the requirement of a [-ATR] feature, their demonstrated ability to block vowel harmony has not been recorded so far.

2.4.1. The acoustic and articulatory dimension of blocking by nasals

In this section I consider a number of phonetic and phonological factors in order to determine whether the features [ATR] or [High] that may be present in consonants. Though there is no constriction in the production of nasals, the articulatory mechanisms required for the production of nasals involve the lowering of the velum and a subsequent constriction of the pharyngeal cavity. In this section I discuss the function of these pharynx-larynx interactions and consider whether these factors lead to the specification of nasals phonologically as [-ATR].

It has also been observed by Trigo (1991) and Vaux (1996) that many languages show interactions between consonant voicing and vocalic [ATR] values, mainly inducing vowels to change to [+ATR]. Vowels surface as [+ATR] after voiced obstruents, and as [-ATR] after voiceless obstruents. These phenomena have been effectively interpreted by these authors as resulting from a rule spreading [+ATR] from a consonant to a succeeding vowel. Phonetically, tongue root advancement has been shown to be of crucial importance in the articulation of voiced stop consonants (Vaux 1996). According to Vaux, voiced stop production increases pressure in the subglottal area ensuring continuous vibration of the vocal folds, resulting in an expansion of the pharyngeal cavity and concomitant advancement of the tongue root. Trigo (in the case of Madurese, as shown in (22) notes some articulatory subtleties in the occurrences of [-ATR] vowels with nasals: (a) enhances the perception of nasality as their

[7] I assume that consonants do not trigger harmony and impose their consonantal features on vowels, as it is generally accepted as uncontroversial that imposing a consonantal place on a vocalic segment would lead to the undesirable consequence of prohibiting syllabification by converting a vowel into a consonant. (Ní Chiosaín and Padgett 1997 and others).

resonances are close together; (b) nasality and low vowels are articulatorily related - one of the muscles that constricts the pharynx also lowers the soft palate.

Whalen and Beddor (1988) show that in Eastern Algonquian historically nasalisation developed without any consonantal conditioning. Furthermore, they show that a correlation between low vowels and distinctive nasalisation is not uncommon cross-linguistically. This is probably connected to the lower position of the velum found for low vowels. Beddor (1983:168) comments on the fact that many of the languages in her study 'involve tongue position differences between oral and nasal vowels'.

3. A broad outlook on consonant-vowel relationships

Having discussed how nasal consonants can create disharmony in Assamese and how nasals behave in harmony processes in the preceding sections, I will now give a bird's eye view of how previous theories have proposed to deal with consonant-vowel interactions. After that I will explicitly state my own view regarding this phenomenon.

Linear phonology required certain rules to apply to non-adjacent segments, but the advance of non-linear phonology allowed a hierarchical set of features within a segment and made it possible to view long-distance rules as rules operating between segments adjacent at some level of representation. Locality theory was then subjected to various locality conditions, which required local elements to be subject to 'internal requirements' (Howard 1972) and a class of segments to be 'relevant' to the spreading phonological rule (Jensen 1974). In autosegmental theory (Goldsmith 1976, 1979), Potential feature Bearing Units (PBU) bear the spreading feature, so that the rule of spreading targets only the feature bearers excluding the non feature bearers (consonants in vowel harmony for instance). The No Crossing Constraint (NCC) forms the crucial constraint in the autosegmental analysis of intervening elements. The well-known NCC operating within autosegmental theory can be stated as below:

(28) Association lines may not cross on a plane
(Clements 1990)

The NCC prohibits the crossing of association lines, i.e. segments specified for the harmonising property cannot be excluded from the rule of spreading. In this theory, consonantal and vocalic place features are classified over different planes. Spreading of vocalic place features across consonants does not result in violation of the NCC, since consonants and vowels are on different planes. NCC was used to explain facts like the opacity and neutrality of some vowels in the harmony process. The No Crossing Constraint represents blocking of spreading through a [-αF] specification on the blocking segment. Significant developments ensued in understanding adjacency requirements in spreading processes, which includes as central studies, among many others, Steriade (1995) and Archangeli and Pulleyblank (1987, 1994). According to Steriade (1995:121):

(29) The elements related by a phonological rule or constraint must be adjacent on some tier.

The Prosodic Licensing Hypothesis (Itô 1986) proposed that features can be surface-true only when they are incorporated into the prosodic structure. The prosodic model by Hyman (1985) McCarthy and Prince (1986, 1990), Hayes (1989) and Itô (1988, 1989) proposes that features are aligned to prosodic structure, either by being incorporated into moras or into syllables.

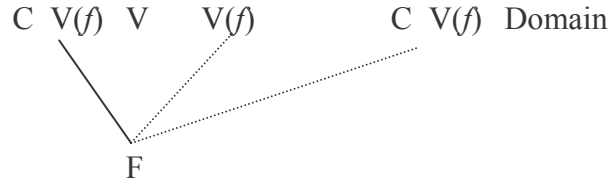
The length of long vowels, and coda consonants, are eligible to be counted as extra moras. In line with this tradition, Archangeli and Pulleyblank (1994) also propose that features ought to have prosodically defined anchors, which are (i) non-head moras, (ii) syllable head moras, (iii) non-head and head moras as well. Odden (1994) proposed two adjacency parameters: syllable adjacency and root adjacency. Piggott (1996) proposed that harmony is a relation which holds either between segments or between suprasegmental units. With this background on the paradigmatic relationships which have been proposed to exist between segments in a harmony domain, I move on to discuss some feature theories which have also contributed to the understanding of consonant-vowel relationships.

3.1. Feature theories

Different representational mechanisms have been assumed in linear as well as non-linear theories to explain segment skipping in vowel harmony domains (see also the discussion in the preceding section on approaches to opacity and neutrality of vowels). Vowel Place Theories (Clements 1985, 1987, 1989) segregate vocalic and consonantal Place features.

Clements (1980) and Goldsmith (1976, 1979), propose that segments which undergo a change under harmony are possible targets because they can bear the harmonising feature. Segments that do not show any featural change under vowel harmony do not have any corresponding features and may therefore emerge unaffected by the process. Schematically, such assumptions can be represented as in (30) below where the harmonising feature F propagates only to those segments which are 'legitimate feature bearers' indicated by (*f*) here.

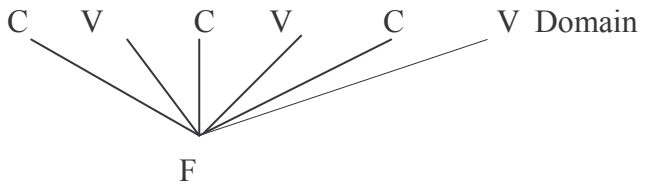
(30) Vowel Harmony as spreading of a harmonising feature F



Intervening segments are regarded as non-participants in the vowel harmony process (see above).

On the other hand, in the unified Feature Theory (Clements 1989), a single set of Place features for both consonants and vowels has been proposed. Others like the advocates of strict locality propose 'No segment skipping' (Ní Chiosaín & Padgett 1997; Gafos 1996). These approaches (also Walker 1998 and Ní Chiosaín & Padgett 1997, 2001) see spreading of features as strictly and segmentally local, i.e., according to them, harmony affects the intervening segments as well, even though this may not have an audible effect. This is shown below schematically:

(31) Vowel Harmony as spreading of a harmonising feature F affecting all elements within a certain domain



In this context, Casali (1995) treats blocking by consonantal segments in Nawuri labial harmony as the result of a place theory where labials occupy the same tier as vowels. In Nawuri round vowels and glides trigger high vowels in an immediately preceding syllable to become round. In careful speech, assimilation is blocked by intervening plain labial consonants. Singular noun class prefix /gI-/, where /I/ represents a high vowel whose roundness and ATR qualities are determined by the following vowel.

(32) Nawuri Labial harmony

a.	gɪ-sɪbɪta	'sandal'	b.	gɨ-mu	'heat'
	gɨ-keːliː	'kapok tree'		gɨ-fufuli	'white'
	gʊ-sʊ	'ear'		gɨ-pula	'burial'
	gu-ɟo	'yam'		gɨ-boːtoː	'leprosy'

Casali analyses this assimilation as spreading of [labial] from a [-consonantal] segment. Since the place node and its dependent features (e.g. [labial], [coronal]) occupy the same tier in consonants and vowels, labial consonants can lead to the blocking of labial harmony.

Finally, Articulator Theories see spreading as implementation on terminal nodes in the feature tree (Halle 1995; Halle et al. 2000). Halle (1995) shows that the reason why vowel features spread across intervening consonants is that vowel features are executed by dorsal and coronal articulators and Labial and Dorsal are non-contrastive among consonants. In this regard, Halle (1995) discusses the vowel copy rule in Ainu. In Ainu, suffix vowels are copied from the stem vowel. However, there is no vowel copying once the glides [y w] intervene between the stem and the suffix.

(33) vowel-copying in Ainu

a.	mak-a	'open'	tas-a	'cross'	ray-e	'kill'
b.	pop-o	'boil'	tom-o	'concentrate'	poy-e	'mix'
c.	pis-i	'ask'	nik-i	'fold'	eiw-e	'sting'

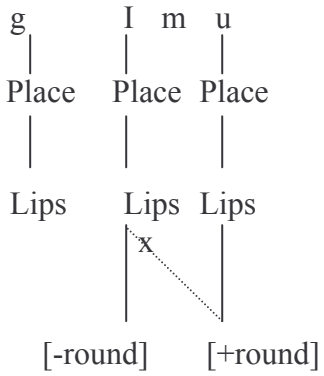
The Ainu glides [y w] are considered to be positional variants of the high vowels [i u]. Dorsal will spread freely across intervening consonants, but vowel features will not spread across a [y w] glide, since in Ainu these glides are actually high vowels and therefore possess a full complement of dorsal features that will prevent the spreading of the vowel features.

In the Revised Articulator Theory (Halle et al. 2000), henceforth RAT, which is very much like the AT, feature spreading is seen as an operation affecting only the terminal nodes of the feature tree. Terminal nodes are dominated by the place nodes, thereby allowing feature spreading only in the terminal nodes. According to the principles of terminal spreading, terminal features can spread individually and simultaneously. Halle et al. (2000) furnishes various arguments as to how RAT is superior to other theories: it replicates the actual functioning of the articulatory mechanism by assuming a representational hierarchy of features/designated articulators which correspond to their actual place in the vocal tract.

Contrastiveness in the sense of Calabrese (1995), plays a significant role here. Contrastiveness in this theory is related to the notion of markedness. Some feature combinations are marked and in languages where the marked combination exists, the two values of the feature are contrastive. According to RAT, only contrastive features are *visible* to the harmony rule. In the authors' (Halle et al. 2000:412) words: 'In the AT account the

interaction or non-interaction of consonant and vowel places is determined solely by the contrastiveness or markedness of features…' In RAT Nawuri blocking by labial vowels is handled in the following way: Nawuri contrasts plain and rounded labial consonants in its phonemic inventory: /p/ contrasts with /p^{w}/ and /b/ with /b^{w}/, /f/ with /f^{w}/ and /m/ with /m^{w}/. In RAT rounded labials are contrastively specified as [+round] and plain labials are contrastively specified as [-round]. The rule of spreading adopted here is: Spread contrastive [round] right to left from a [-consonantal, +sonorant] segment. This rule is applicable only to contrastive [round] specifications, it is blocked by the contrastive [-round] plain labials, as exemplified below:

(34) Spreading in Nawuri according to RAT



The rule of spreading is blocked in this case, but the rule applies successfully in other cases where segments without the relevant contrast intervene. Thus the singular noun-class prefix /gI/ becomes round before a round vowel in a following syllable.

In Turkish, on the other hand, the palatal lateral blocks harmony if it is in word-final position, where it can also occur contrastively:

(35) Palatal laterals block harmony in Turkish

/petroʎ/		'gasoline'
petroʎ	*petrol	nom-sg
petroʎ-y	*petroʎ-u	acc-sg
petroʎ-de	*petroʎ-da	loc-sg
/meʃguʎ/		'busy'
meʃguʎ	*meʃgul	'he is…'
meʃguʎ-dym	*meʃguʎ-dum	'I was…'
meʃguʎ-ym	*meʃguʎ-um	'I am…'

The palatal lateral's interaction with harmony shows that harmony is not a syllable head to syllable head interaction. Levi (2004) deals with the question of which segments have the relevant features. She concludes that harmony interacts with all segments which have the appropriate features, independent of their nuclear or syllabic status.

3.2. Syllable head theory

Discussing consonantal interference in vowel harmony van der Hulst and van de Weijer (1995:530) state that: 'Cases where such interaction takes place have been used to argue that features for representing place in consonants and vowels are partly the same, but precisely under what circumstances vowels harmonise with consonants is not clear…'. These authors claim that allowing consonants to freely influence vowel harmony would be a drawback to a theory of harmony where only syllable heads are expected to participate in harmony. They argue that vocalic content even in non-head positions may participate directly in harmony. The impetus for consonant-vowel interactions have thus been shown to be subject to some intervening secondary articulatory phenomenon. As for vowel harmony languages, the interaction between vowels and consonants was noticed primarily in Turkish, where secondary place features trigger harmony, initiating rounding harmony in Turkish. Clements and Sezer (1982) report Turkish words where palatalised /k^{j}/ spreads its palatalised quality to following suffix vowels.

(36) /k^{j}/ determines vowel harmony in Turkish

infil^{j}ak	infil^{j}ak^{j}i	explosion
idrak	idrak^{j}i	perception
ittifak	ittifak^{j}i	alliance
istirak	istirak^{j}i	participation
helak	hel^{j}ak^{j}i	exhaustion

These authors also mention other palatal harmony languages like Bashkir (based on Poppe 1964), where front velars are found in words with [-back] vowels and back velars are found in words with [+back] vowels.

3.3. Towards a unified analysis of harmony blocking by consonants and vowels

Most of the theories discussed in the preceding sections fail to capture the Assamese consonant-vowel interactions. In Assamese, there is no way to show that nasals are contrastive for the feature [ATR], as predicted by the Articulator Theories, and nasals are never syllabic in the language as predicted by the syllable head theory. Stepping aside from all the proposals in the previous sections, as already stated in the introduction, I propose that vowel harmony blocking by consonants is driven by the principle of 'similarity' in the appropriate local domain. I consider two factors which can determine similarity:[8] similarity can be measured by a consonant's proximity to vowels on a sonority scale. Similarity can also be apparent from features that both vowels and consonants could possibly share. This is also evident from other phenomena where consonant-vowel interactions involve agreement, as features like dorsal, coronal and labial can be seen as properties of both vowels and

[8] Walker and Rose (2004) examine Long Distance Consonant Agreement (LDCA), and formally analyse it as a relationship of similarity between the participating segments. For their computation, they use similarity scales as proposed by Frisch *et al* (in press) – which function as the basis for relative similarity along with a survey of attested LDCA patterns. It remains to be seen if such similarity scales play a role in blocking patterns attested in harmony.

consonants. Though unbounded feature spreading between vowels and consonants has not been established unequivocally, spreading between vowels and consonants does exist.

In the literature on harmony processes, it is commonly assumed that harmony is a process of establishing a relation of identity between adjacent syllables, moras, and the like. (Archangeli and Pulleyblank 1994; van de Weijer and van der Hulst 1995; Krämer 2003; Piggott 1999). The high sonority of nasals and their degree of closure may also make them suitable to have access to prosodic domains which other consonantal features may be deprived of. In this prosodic view, locality would require segments to be adjacent on one of the tiers of the prosodic hierarchy. Locality construed in these prosodic terms is paradigmatic and therefore segments can be adjacent to each other at a specific prosodic level even though at the level of segmental structure they are not strictly speaking adjacent.

I argue that consonantal segments can block vowel harmony to the extent that they can bear the spreading feature in some way. The notion of 'similarity' as used here should be understood in the sense of elements, which have a higher sonority (at least nasal and higher), and at the same time can share some feature specification of the triggering vowel. Nasals in Assamese can block harmony because while the nasal is sonorous it also interacts with [-ATR] feature in the language. The following is a partial list of consonants which have been known to have non-prosodically 'blocked' the spread of vowel features:

(37) Non-prosodic blockers in languages

Glides,	Nasals	liquids
Turkish	Assamese, Karajá	Turkish, Warlpiri

An implicational hierarchy assuming the following sonority scale can be constructed for all these cases of consonantal blocking. The result of this hierarchy would produce the following relevant constraints regarding consonantal blocking across languages:

(38) Turkish
<u>*glides+round</u> ≫ *liquid+round ≫*nasal+ round ≫ fricative, round ≫ *obstruent stop

(39) Turkish
*glides+round ≫ **<u>*liquid+round</u>** ≫*nasal+ round ≫ fricative+round ≫ *obstruent stop.

(40) Assamese, Karajá
*glides+ATR ≫ *liquid+ATR ≫ ***<u>nasal+ATR</u>** ≫ *fricative+ATR ≫ *obstruentstop +ATR

The constraint hierarchies show how the notion of the sonority hierarchy in blocking vowel harmony across languages can be incorporated. The typological prediction that this hierarchy makes is that in [ATR] harmonies[9], nasal segments would more easily block harmony than any other segment. In front/round harmonies, glides and liquids would be the most preferred opaque cosonantal segments in harmony than other consonants. In this context, it is easy to see that feature sharing also plays a role in blocking vowel harmony. Typologically, there are

[9] Sometimes it may also appear as a height-related feature, as in Shona (Uffman 2006)

no attested systems in which voiceless obstruents block harmony. This only goes to show that more sonorous segments (in the sonority hierarchy, the cut off point being the nasal segments) would block harmony more easily than less sonorous segments. I also assume, as far as the data presented from various languages in this chapter is concerned, that blocking by sonorous elements follow a sonority threshold which does not exceed that of the nasals. In other words, consonantal blocking is predicted to occur only when there are elements as sonorous as nasals or more sonorous than nasals.

Furthermore, in vowel harmony, it is not important whether primary or secondary features interact with harmony. The relevant attribute of an intervening consonantal segment is whether it is compatible with the harmonising vowels, or, if the consonantal segment shares some vocalic feature. With this discussion on non-prosodic intervention by consonants in vowel harmony, I move on to show how coda consonants block harmony in Assamese.

4. Harmony blocking by coda consonants in Assamese

Let us now turn to instances of blocking when there are more than one consonants intervening between the triggering vowel and the target vowel. The existence of two or more consonants in the given position creates an impediment in spreading of the harmonising feature values in Assamese. There are no morphemic factors which regulate this kind of blocking. The observed facts are completely phonological. It shows that Assamese [±ATR] agreement does not take place whenever more than one consonant appear between the vowel which is responsible for spreading harmony and the preceding vowels.[10] This is shown below in (41):

(41) Disharmony in the presence of two intervening consonants

	Word	Gloss
a.	bɔnti	'lamp'
b.	xɔkti	'strength'
c.	kɔlki	'last incarnation of Vishnu'
d.	xɔrɔswoti	'Hindu goddess of learning'
e.	xɔndʰi	'junction'
f.	gʊstʰi	'clan'
g.	kɛtli	'kettle'
h.	kɛrketuwa	'squirrel'
i.	sɔnduk	'box'
j.	kʰɔnzori	'small tambourine'

Similarly, in derivations too, whenever there are two intervening consonants, vowel harmony is blocked. This is shown below in (42):

(42) Derived words where harmony is absent due to two intervening consonants

	Root	Gloss	Suffix	Derivation	Gloss
a	sɔkrɔ	'circle'	ika	sɔkrikɑ	'platelet'
b.	kɔrmɔ	'work'	i	kɔrmi	'active person'

[10] There are also some exceptions: /bostu/ 'object', /osru/ 'tears' /bonduk/ 'gun' /xotru/ 'enemy' /zontu/ 'animal' /bondʰu/ 'friend', /xendur/ 'vermilion' /endur/ 'rat'.

c.	kɔlpɔ	'wish'	i	kɔlpi	'one who imagines'(fem)
d.	k^hɔndɔ	'fragment'	it	k^hɔndit	'severed'
e.	xɔbdɔ	'sound'	it	xɔbdit	'resounded'
f.	gɔrb^hɔ	'uterus'	woti	gɔrb^howoti	'pregnant'
g.	tɛz	'strength'	swi	tɛzɔswi	'powerful'

The derived examples above show once again show that [+ATR] agreement does not take place whenever there are more than two consonants between two the concerned vowels. (Krämer 2001, discusses similar facts of Yucatec Maya).

Consonants in a coda or a final position sometimes lend weight to the syllable so that more elements imply that stress is drawn to that syllable by virtue of its weight. These weight bearing elements are called moras (represented as μ, see also (44)). In Assamese, in the presence of two consonants word medially, the preceding consonant is the coda of the first syllable. Assamese has been shown to be a language which projects a mora when there is a syllable-final consonant. In section below in 4.1. I will discuss this fact of Assamese and also use this prosodic factor to explain blocking in Assamese in section 4.2.

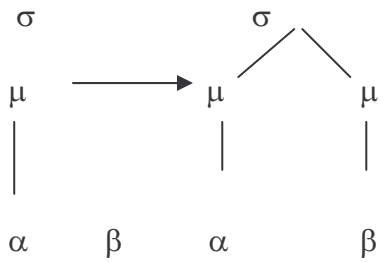
4.1. Stress and weight to position in Assamese

Within the Assamese word stress system, main stress is always assigned to the initial syllable (Mahanta 2002). Morphologically, stress shifts to the initial syllable under prefixation. Stress is not sensitive to affixation and the initial syllable is always the main stress-bearing syllable regardless of its morphological status. In a sequence of open syllables, stress assignment happens in the following manner:

(43) Stress in Assamese
[bɔ́ga] 'white' [bósori] 'yearly'

Weight-by-Position (Hyman 1985) a factor which renders closed syllables heavy, is interpreted in terms of coda consonants which are assigned a mora, by the following schema:

(44) Weight by position



where σ dominates only μ (Hayes 1989)

Mahanta (2002) shows that in Assamese weight to stress is a relevant factor as it counts the number of moras in order to assign stress. The examples below in (45) show that stress is on the initial syllable. However, owing to quantity-sensitivity, if a heavy syllable immediately follows a light syllable, the heavier counterpart emerges as the prominence-bearing unit. The second syllable is prominent if it is heavy and the first syllable is light. Otherwise the first

syllable is prominent. Assamese follows a trochaic rhythm and therefore stresses the initial syllable.

Heavy syllables never occur as primary stress bearing units beyond the second syllable. Coda consonants are moraic in the language, and therefore attract prominence by virtue of Weight-by-Position (We have excluded CVV's from our discussion as length distinctions are not phonemic in Assamese). This measure also keeps the prohibited *(**L**H)[11] foot at bay. Moreover, in trisyllables, heavy syllables have secondary prominence, and whenever a stress clash is imminent, it is averted by leaving a syllable unfooted.

(45) Stress in Assamese

	(**L**L)	Gloss		L(**H**)	Gloss
a.	[só.ku]	'eye'	c.	[zi.bɔ́n]	'life'
b.	[ráti]	'night'	d.	[bɑ.gɑ́n]	'garden'
	(**L**L)L			(**L**L)(**H**)	
e.	[gɔ́.hɔ.nɑ]	'jewellery'	g.	[m.rɔ́.mɔ̀r]	'loved'
f.	[zɔ́.hɔ.ni]	'cholera'	h.	[zɑ́.zɑ.bɔ̀r]	'vagabond'
	L(**H**)L			L(**H**)H	
i.	[ɑ.nɔ́n.dɔ]	'happiness'	k.	[ɑ.rɔ́m.bɔr]	'luxury'
j.	[gu.rút.tɔ]	'importance'	l.	[ɔ.hɔ́ŋ.kɑr]	'pride'

Assuming foot structures, it becomes clear from the examples above that the words have been parsed under strict binarity. Thus Assamese follows a strong – weak rhythmic profile, in which a foot is always bimoraic, as prominence always requires a bimoraic minimum, limiting the domain to the mora only. This factor limits foot shapes to either [σ(μμ)] or [σ(μ)σ(μ)], i.e. minimally and maximally two elements of identical status or two moras. The language also displays considerable sensitivity to quantity in all positions, unless there is a possibility of evading it by the occurrence of stress clash.

As already stated, Assamese follows a Trochaic (strong-weak) rhythm at the left edge of the word, and therefore invariably stresses the initial syllable. Further coda consonants are moraic in the language and therefore all VC / CVC / CVCC syllables are labelled heavy (H). This factor (Weight by position) renders codas stress-bearing units. Mahanta (2002) also shows that in an (**L**L) sequence, there is a distinct low fall on the first syllable. In an L(**H**), instead of a low fall on either of the syllables, the F_0 trace is like a plateau, where there is no sharp rise or fall. In this contour, the low pitch of the first syllable spreads over to the second syllable to indicate prominence on the second syllable.

This fact of the language requires postulation of a constraint whereby agreement is among the vocalic moras. Vocalic agreement between a heavy syllable and a light syllable violate the requirement of agreement among the vocalic moras. As a result of this requirement vowels must be absolutely adjacent to each other without the intervention of a consonantal mora. The following constraint is postulated to account for vowels which agree only when the moraic requirement among flanking vowels is met.

(46) *[-ATR] $_{\mu}$ [+ATR]
Assign a violation mark to a [-ATR] vowel followed by a [+ATR] vowel in an adjoining vocalic mora.

[11] The *(**L**H) foot is the marked foot structure for trochaic systems.

As a result of this constraint only moraic vowels which are adjacent to each other without the interception of a consonantal moraic unit can agree with each other. The constraint and its actual operation is shown in the next section.

4.2. An OT account of blocking by consonantal moras in Assamese

In the tableau below agreement between moras is demanded by the constraint *[-ATR]$_\mu$[+ATR]. As a result of this constraint only adjoining vocalic units will agree with each other, but will be blocked elsewhere.

(47) Harmony blocking by consonantal moras

Input: /xɔk/+/ti/ 'do'+1P	ID [hi]	*[-ATR +hi-back]	*[- ATR] $_\mu$ [+ATR]	*[-hi +ATR]	ID[ATR]
a. ☞xɔkti					
b. xokti			*!	*	*
c. xɔktɪ		*!			*
d. xukti	*!				*

In the tableau above, the faithfulness constraint Ident [hi] and the constraint *[-Atr +hi -back] prevent the selection of the candidates */xukti/ and */xɔktɪ/, respectively. These constraints practically winnow down the candidate set to the two candidates /xɔkti/ and */xokti/. The candidate selected in the evaluation is the unassimilated and therefore the fully faithful candidate. Significantly, the candidate */xokti/ fails because it agrees with the feature value of the triggering vowel, despite the presence of an intervening consonantal mora.

4.3. Prosodically determined blocking in Lango

This kind of prosodically determined harmony, just arrived at for Assamese has been argued to exist in other languages too. In Lango (Woock and Noonan 1979, Archangeli and Pulleyblank 1994) there are two progressive harmony rules. The [+Atr] vowels are [i, e, ə, o, u] and the [-Atr] vowels are [ɪ ɛ a, ɔ, ʊ]. If the stem vowel is [+Atr], then the suffix is also realised as [+Atr]. If the stem is [-Atr], then the suffix also surfaces as [-Atr]:

(48) Lango harmony

a.	cɪ̀ŋ	'hand'	cíŋɔ́	'my hand'
b.	wòt	'son'	wòdə̀	'my son'
c.	ŋèt	'side'	ŋètə́	'my side'

However, rightward [+ATR] spreading is blocked when two consonants intervene, as seen in the examples below:

(49) Lango harmony in closed syllables

a.	dòk	'cattle'	d.	dòkka	'my cattle'
b.	ñəŋ	'crocodile'	e.	ñəŋŋá	'my crocodile'
c.	gwèn	'chickens'	f.	gwènná	'my chickens'

In Lango the restriction is that in the presence of two consonants, the source of harmony must be the [+high] vowels /i/ and /u/. So the process of harmony is not affected in the following words with intervening geminates:

(50) Lango blocking

a.	píg	'juice'	c.	píggə	'my juice'
b.	òpúḱ	'cat'	d.	òpúkkə	'my cat'

Archangeli and Pulleyblank analyse this blocking by appealing to prosodic structure, where harmony progresses from mora to mora, and the moraicity of coda consonants blocks spreading.

Thus the claim that a weight-bearing unit impedes the process of harmony by blocking agreement between the two vowels has also been shown to work for Lango. A similar analysis is also presented for Yucatec Maya (Krämer 2003). Assamese, like Yucatec Maya and Lango, counts moras as a significant unit not only by assigning weight to the coda consonant but also by considering mora as an actual category of agreement.

4.4. Closed syllables blocking harmony as syllable structure

I have shown that blocking of harmony in closed syllables is a result of the moraic nature of syllable final consonants in Assamese. The other course one route take in analysing these examples is to assume that there is a structural constraint which prohibits the [+ATR] vowels from surfacing in closed syllables. But either way it is evident from the data presented in (41) and (42) that there is a prosodic restriction in the occurrence of [+ATR] vowels in closed syllables. However, in section 4.3 I present an analysis which shows that the markedness constraint which drives this in Assamese is $*[\text{-ATR}]_{\mu}[\text{+ATR}]$. This constraint requires agreement between moraic vowels because it relates the prosodic factor of stress, weight and harmony blocking in closed syllables in a straightforward way.

There may be further complications in an analysis with a constraint prohibiting [+ATR] vowels in closed syllables. For instance, Assamese has a [±ATR] contrast between high back vowels, (for instance, /xut/ 'interest', versus /xʊt/ 'flow'). The contrast between [+ATR] and [-ATR] high back vowels is maintained in closed syllables. However, to analyse harmony blocking in closed syllables like /xʊt+ti/ 'little flow', one would require a constraint which prohibits [+ATR] vowels in closed syllables, i.e. *[+ATR]C. But then, the presence of [+ATR] in examples like /kus.tʰi/ 'horoscope' etc. may give rise to concerns about the grandfather effect of McCarthy (2003), where a new markedness constraint blocks a general phonological process, but does not change marked structures that are already present.[12] In Assamese, by positing a constraint on syllable structure, like *[+ATR]C, one will also have to

[12]However, assuming that only mid [+ATR] vowels are disallowed in closed syllables may be a way out of the problem. But the typological motivation for such a constraint would be less than convincing.

account for the presence of such marked structures which already exist[13]. However this is not a problem for the present analysis.

5. Conclusion

The conclusion then is that there are some conditions on systematic intervention of consonants in a vowel harmony domain.

(i) If a consonant triggers or blocks harmony non-prosodically that consonant has to be above or equal to the sonority threshold of a nasal and also share featural attributes of the (non)harmony domain.

(ii) All other consonants can intervene due to structural or prosodic factors. Non-compatible interveners may not be segmentally adjacent, but they will be constrained by prosodic factors.

I also dealt with blocking by the vowel /ɑ/. I showed that blocking by /ɑ/ is also the reflex of a sonority condition on vowels – the more sonorous vowels in the inventory are more opaque, because they tend to be more faithful.

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Shakuntala Mahanta
Utrecht Insititute of Linguistics OTS
shakuntala.mahanta@let.uu.nl

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[13] In /xut/ 'interest' versus /xʊt/ 'flow', [±ATR] is contrastive. This contrast is lost in /xʊt/+/i/ → /xuti/ 'stream'. In a comparative markedness (McCarthy 2003) analysis, a new markedness constraint will block the assimilation process in closed syllables. Ex. /xʊtti/ 'little flow' etc.

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It takes two, baby!

CAUSE and the prerequisites for eventivity

Antonia Rothmayr

This paper discusses two major classes of stative verbs: those displaying a systematic stative/eventive ambiguity, and those allowing for a stative reading only. By examining the possible lexical-semantic structures for these verbs, the paper argues that it is the presence of CAUSE that enables the ambiguity. If CAUSE is absent, no other aspectual operators may be inserted, and no eventive reading can be created. This hints towards the idea that CAUSE is a prerequisite for the eventive reading, and that CAUSE is the only way natural language allows for two sub-events to be expressed within a single verb.

1. Introduction

This paper deals with the event structure of verbs, in particular, with the relationship between stative and eventive readings of verbs. In what is to follow, I will put forward and defend the claim in (1).

(1) **Main claim:**

- CAUSE is a prerequisite for eventivity
- CAUSE is the only way to combine two sub-eventualities within a verb

Certain classes of verbs (e.g. verbs like *obstruct*, cf. Kratzer 2000) display a systematic stative/eventive ambiguity, i.e., these verbs may receive an eventive reading (usually when an agent is present), or they may be interpreted as statives. The relation between these two readings is systematic, hence, rule-governed. In contrast, there are other verbs (like *last* in *last two hours*) that are stative only and cannot receive an eventive reading. I will show that the former group contains the CAUSE-operator in their lexical-semantic structure, and that the latter group lacks this operator. The distinction between the systematic stative/eventive ambiguity on the one hand and the stative-only readings on the other hand is therefore due to the presence or absence of the CAUSE-operator.

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I conclude that CAUSE in the counterfactual sense is a necessary prerequisite for eventivity, i.e., a verb can only receive an eventive reading if it contains the CAUSE-operator in its lexical-semantic structure. Moreover, I put forward the additional claim that CAUSE is the only way to combine two sub-eventualities within a verb, where CAUSE is the counterfactual operator and not the causative morpheme of causative verbs like *feed*. Hence, there is no other operation that is able to add a sub-event to a given one.

The paper is structured as follows: after giving a short background on the notion of stativity and a quick review of Dowty's aspectual calculus (Dowty 1979) that I am going to use, I will examine several classes of verbs - those that display the systematic stative/eventive ambiguity (verbs that undergo the instrumental alternation, and experiencer verbs that assign accusative case), and those that allow for the stative reading only (measure verbs, and experiencer verbs that assign dative case). This will provide empirical evidence for the main claim in (1). Before concluding, I will take a look at a tentative counterexample: the aspectual behavior of perception verbs in various languages.

2. *Background*

This section gives a definition of stativity that I will use throughout this paper. Drawing on a distinction originally made by Jaegwon Kim, Maienborn (2005) argues that there are two main types of stative expressions: *Davidsonian statives* and *Kimian statives*. These differ with respect to the ontological status of their eventuality argument. While the structure of Davidsonian statives contains the well-known event argument *e* (in this case a stative one, i.e., there is an event but in contrast to Davidson's original action sentences there is no action going on), Kimian statives bear an ontologically different argument - a so called Kimian state argument. Davidsonian statives express stative events such as *wait, sit, hang* or *glow*. Although there is no observable action going on, these verbs still refer to a full blown Davidsonian event. In contrast, Kimian statives include verbs such as *cost* and *resemble* as well as copular constructions. As we will see below, these verbs display systematic different properties. An overview of Davidsonian and Kimian statives is given in (2).

(2) **The ontological difference**

- **Davidsonian statives** have the usual event argument e
  - *sit, wait, hang*
- **Kimian statives** have an ontologically different eventuality argument
  - *cost, resemble* and copular constructions

[Maienborn (2003), Maienborn (2005)]

Kimian statives are no real events but are only properties that are exemplified at a particular time. In other words, Kimian stative verbs do not refer to a Davidsonian event, but to something ontologically different. It is a property *P* that is exemplified at a particular time *t*.

(3) **The Kimian state**

- K-states are abstract objects for
  - the exemplification of a property P
  - at a holder x
  - and a time t.

  [Maienborn (2005)]
- ⇒ No Davidsonian event argument with Kimian states!!

It is important to understand that Kimian stative verbs do not contain the Davidsonian event argument within their lexical semantic structure. Hence, in order to test if a verb expresses a Kimian state, one has to check whether it refers to an event or not.

Before I turn to these diagnostics, I briefly mention the rest of the theoretical apparatus I am going to employ. First, I will use the aspectual calculus put forward by Dowty (1979). This apparatus uses aspectual predicates in order to capture the behavior of different event classes. A summary is given in (4).

(4) **Dowty (1979) aspectual calculus**

- DO(α, Φ) the proposition Φ is under the immediate control of α
- BECOME(p) change of state from ¬p to p
- CAUSE(x, y) Lewis' style counterfactual analysis
  (x and y occur; y would not have occurred if x had not)

Note that I take CAUSE to correspond to the counterfactual analysis of causation, in the sense of Lewis (1973). This way of defining causation focuses on the relation between two events, two propositions or even two states, i.e., the causation relation means that two entities stand in the counterfactual relation to each other (the causee would not have occurred if the causer hadn't). In particular, this definition is not restricted to events. Therefore it is applicable to the relation of two states as well.

Moreover, I will analyze the lexical-semantic entries of the verbs under discussion in terms of *Semantic Form*, a notion that has been developed by Bierwisch (1982) and following work (Bierwisch (1987) and others). This form is used to capture the grammatical information (in contrast to world knowledge / conceptual information) that comes with a verb's lexical entry. In particular, it states the number of arguments and employs a decompositional calculus like the one developed by Dowty. Note that a layer such as Semantic Form is compatible with recent minimalist assumptions, such as lambda features in the lexicon as put forward by Butler (2004).

The diagnostics for a Kimian state rely on the main assumption that Kimian statives do not refer to an event. Therefore, the tests developed by Maienborn (2003) / Maienborn (2005) all try to detect the absence of an event. First, as there is no event, event-related manner adverbials are not compatible with Kimian statives. Hence, an adverbial that describes the way an event happened (not to be confused with adverbials that describe the way an agent carried out the event!) is excluded with Kimian states. Thus, the Kimian stative in (5) is ungrammatical when combined with a manner adverbial, but the Davidsonian stative in (6) is fine.[1]

[1] In examples (5) to (10), the glosses are from Maienborn (2005), the translations are mine.

(5) *Paul besitzt sparsam / spendabel viel Geld.
Paul owns thriftily / generously much money.
‘ Paul owns much money in a generous way.’
[Maienborn (2005): (30b)]

(6) Carol saß reglos / kerzengerade am Tisch.
Carol sat motionless / straight.as.a.die at.the table.
‘ Carol sat motionless at the table.’
[Maienborn (2005): (31b)]

Second, event-related locative adverbials are excluded as well. As there is no event that is being referred to in the first place, this event cannot be specified to happen at a particular location. Note that there are different kinds of locative adverbials; those that are the crucial here are base-generated at a low position in the structure and appear close to the verb in German.[2] The examples in (7) and (8) show the difference between Kimian and Davidsonian statives with respect to event-related locative adverbials:

(7) *Die Tomaten wiegen neben den Zwiebeln 1 Kg.
The tomatoes weigh besides the onions 1 kg.
‘ The tomatoes weigh 1 kg next to the onions.’
[Maienborn (2005): (26a)]

(8) Die spanische Armada lag bei Calais vor Anker.
The Spanish Armada lay near Calais at anchor.
‘ The Spanish Armada lay at anchor near Calais.’
[Maienborn (2005): (27b)]

The third test developed by Maienborn draws on the ambiguity of the adverbial *ein bißchen* ‘ a little’. In eventive verbs such as *to sweat*, this adverbial may either refer to the degree of sweat (the degree reading), or it specifies how long the event of sweating lasts (the time-span reading) (cf. Maienborn 2003). The time-span reading is excluded for Kimian statives, such that only the degree reading is available if the underlying predicate is gradable. See also (9) and (10) below.

(9) Paul hat ein bißchen im Garten gesessen. *eventive reading*
Paul has a little bit in.the garden sat.
‘ Paul has been sitting in the garden for a little while.’
[Maienborn (2003): (37b)]

(10) Carol ähnelte ein bißchen ihrer Großmutter. *only degree reading*
Carol resembled a little bit her grandmother.
‘ Carol resembled her grandmother to a small degree.’
[Maienborn (2005): (39c)]

The three tests are summarized in (11).

[2] See eg. Frey & Pittner (1998).

(11) **Diagnostics for a Kimian state**

- No event-related manner adverbials
- No event-related locative adverbials
- No time-span reading of *ein bißchen* ‘ a little’

[Maienborn (2005)]

To conclude the background section, I list all the candidates for Kimian-stative only verbs and those that display a systematic stative/eventive ambiguity in (12). Due to the lack of space, I will only discuss four classes from the candidates in (12). See Rothmayr (2006) for the complete picture.

(12) **Stative-only verbs**

- subject-experiencer verb (*hate*)
- object-experiencer verbs assigning dative case (*appeal to*)
- measure verbs (*last*)
- verbs that select for a PP complement (*border with*)
- modals

Stative/eventive ambiguous verbs

- verbs of the instrumental alternation (*obstruct*)
- object-experiencer verbs assigning accusative case (*worry*)
- dispositional verbs (*help*)
- *threaten*-type verbs
- perception verbs (*see*)

Finally, note that I am not going to say anything about the status of Davidsonian statives throughout this paper, despite that they do not display the ambiguity in the sense of (12), and they form a class (which is very likely to consist of several subclasses) on their own. I take eventive verbs, then, to be derived from Kimian statives with the help of the aspectual operators. I assume that the eventive nature of Davidsonian statives is due to the presence of some aspectual operator as well, though the detais of their structure remain to be investigated.

3. Example 1: instrumental alternation

In the next sections, I will discuss four classes of verbs that show the stative/eventive ambiguity or stative-only readings in greater detail. First, I want to take a look at those verbs that display the systematic stative/eventive ambiguity. In particular, in this section I want to discuss the behavior of verbs that undergo the instrumental alternation, such as *obstruct* or *decorate*. It has been noted by Kratzer (2000) that this class of verbs have both a stative (non-agentive) and an eventive reading, but a systematic examination and a comparison to other verb classes that display the same behavior have not been undertaken up to now.

In order to show that verbs that undergo the instrumental alternation possess a stative interpretation, I want to test them for the presence of a Kimian stative reading. As outlined in

the previous section, the first test is that event-oriented manner adverbials may not co-occur with Kimian statives, as these do not refer to an event in the first place. Consider the German example in (13).

(13) Die Kerzen schmücken *auf phantasievolle Weise* die Torte.
The candles decorate *in imaginative way* the cake.
‘ The candles decorate the cake in an imaginative way.’

On the first glance, it seems as if (13) is a blatant counterexample to the claim I just made. It looks as if there was a stative verb *schmücken* ‘ decorate’ combined with a manner adverbial, *auf phantasievolle Weise* ‘ in an imaginative way’. However, a closer look reveals that adverbials like the one in (13) are no manner adverbials, but rather so called *result-oriented adverbials*, as argued for in Geuder (2000). Compare the adverbial in (14):

(14) Die Beete waren üppig bepflanzt.
The flower beds were amply planted.
‘ The flower beds were amply planted.’ [Maienborn (2003); my translation]

The adverbial *üppig* ‘ amply’ does not refer to the way the planting was done; rather, it refers to the way the result was, i.e., that there were lots of flowers in the flower beds. Hence, the adverbial in (13) does not count as a manner adverbial. Therefore, the verbs that undergo the instrumental alternation pass this test for Kimian statives.

Next, we have to look at event-related locative modifiers. As before, these adverbials are excluded with Kimian statives as there is no event present that the adverbial could locate in space.

(15) *Die Kerzen haben die Torte *auf dem Tisch* geschmückt.
The candles have the cake *on the table* decorated.
‘ The candles have decorated the cake on the table.’

Example (15) shows that event-related locative adverbials are not compatible with verbs like *schmücken* ‘ decorate’. If these adverbials are acceptable at all in combination with Kimian statives, they receive a *frame-setter interpretation* (cf. Maienborn 2003). Frame-setter adverbials do not locate the event in space, but provide a general background to which the whole sentence is interpreted. In other words, locative frame-setter modifiers provide a background against which the whole proposition is interpreted (Maienborn (2003):77). For example, locative frame-setter adverbials may receive a temporal reading, as in (16) and (17).

(16) In Bolivien sind alle Lamas mit bunten Troddeln markiert.
In Bolivia are all lamas with colored beans marked.
‘ In Bolivia, all lamas are marked with colored beans.’
[Maienborn (2003):p. 78(37b), my translation]

(17) [...] Für alle Lamas gilt für die Zeit, zu der sie in Bolivien sind, dass sie mit bunten Troddeln markiert sind. (temporale Lesart).
‘ All lamas are marked with colored beans during the time when they are in Bolivia. (temporal reading)’
[Maienborn (2003):p. 78(37c), my translation]

In addition, (15) is of course acceptable if the adverbial is interpreted as part of the noun, i.e., under a reading that refers to a cake on the table. In this interpretation, the locative modifier does not refer to the location of the decorating-event.

Finally, we need to examine the different readings *ein bißchen* ‘ a little’ can have. As outlined in the previous section, this adverbial can have a time-span reading and a degree reading when combined with eventive verbs. With statives, however, only the degree reading (if grammatical at all) is available. Example (18) shows a combination of *ein bißchen* with a Kimian stative candidate:

(18) Kerzen haben die Torte *ein bißchen* geschmückt.
Candles have the cake *a little* decorated.
‘ The candles have decorated the cake a little.’

The sentence in (18) can mean that the degree of decoration was not too high, but it cannot refer to a situation of the cake being decorated with candles that lasted only for a short period of time. Hence, the time-span reading is not available for (18).

In sum, the three tests show that a verb like *schmücken* ‘ decorate’ that undergoes the instrumental alternation does indeed have a Kimian stative reading. In order to capture the second half of the ambiguity, we have to examine the existence of the eventive reading in turn.

The eventive reading should allow for the presence of manner adverbials and for event-related locative adverbials. This is indeed the case, as shown in the agentive (and therefore clearly eventive) example (19). It includes the manner adverbial *vorsichtig* ‘ carefully’ and the locative adverbial *in der Küche* ‘ in the kitchen’ that both refer to the event of decorating.

(19) Die Irmi schmückt die Torte in der Küche vorsichtig mit Kerzen.
The Irmi decorates the cake in the kitchen carefully with candles.
‘ Irmi carefully decorates the cake with candles in the kitchen.’

I put forward the following lexical-semantic structure for verbs that undergo the instrumental alternation. For the stative alternant in (20) the corresponding lexical entry (in terms if *Semantic Form*) is given in (21).

(20) Die Haare verstopfen den Abfluß.
The hair obstruct the drain.
‘ The hair obstruct the drain.’

(21) $\lambda y\ \lambda x\ \lambda s$ CAUSE(x, OBSTRUCT(y))(s) (*hair*) (*drain*) =
= λs CAUSE(*hair*, OBSTRUCT(*drain*))(s)

(21) expresses the idea that there are hair (a state) and that it is their presence that is relevant for the drain being obstructed. In addition, the drain would not have been obstructed if there

had been no hair. Therefore, (21) contains the CAUSE-relation. Note that CAUSE relates the presence of the hair to the state of the drain being obstructed. As you can see, there are no other aspectual operators present, hence we get the stative reading.

In contrast to the stative variant, the eventive one contains additional aspectual operators. With verbs that undergo the instrumenal alternation, there are two ways of rendering them eventive: by creating an agentive variant and by creating an inchoative one. The agentive version in (22) has the lexical entry in (23).

(22) Die Irmi verstopft die Straße mit ihrem Lastwagen.
The Irmi obstructs the street with her truck.
' Irmi is obstructing the street with her truck.'

(23) λz λy λx λs DO(x, CAUSE(y, OBSTRUCT(z))) (s) (*Irmi*) (*truck*) (*street*) =
= λs DO(*Irmi*, CAUSE(*truck*, OBSTRUCT(*street*))) (s)

The structure in (23) is quite similar to the stative one above, but it contains an additional DO operator that is responsible for the agentive meaning. (23) expresses that Irmi is under the immediate control of a proposition (this is the part that DO adds), namely that the truck causes that the street is in a state of being obstructed.

Finally, consider the inchoative variant in (24) and its structure in (25). It is almost always the case that one can force an inchoative reading on a Kimian stative verb with the help of the adverbial *nach und nach* ' bit by bit'. This adverbial refers to the gradual onset of the state.

(24) Das Gewebe hat *nach und nach* das Blutgefäß verstopft.
The tissue has bit by bit the *blood vessel* obstructed.
' The tissue has obstructed the tissue bit by bit.'

Note that the example in (24) has an interesting peculiarity: the subject *Gewebe* ' tissue' is understood to increase in size until the blood vessel is completely obstructed. Hence, the subject (or rather, the realization of the instrument) must be generated in the scope of the BECOME-operator.

(25) λs BECOME (CAUSE(*tissue*, OBSTRUCT(*blood vessel*)))(s)

Again, the lexical-semantic structure in (24) is similar to the one for the stative variant. It differs with respect to the aspectual operators involved: while the stative variant contains only CAUSE, the inchoative alternant contains the additional BECOME-operator.

4. *Example 2: object-experiencer verbs (ACC)*

The second example I want to discuss again exemplifies those verbs that display the systematic stative/eventive ambiguity. Apart from verbs that undergo the instrumental alternation, object-experiencer verbs that assign accusative case in German also belong to this group. These class of verbs is also known as the *piacere*-group in Italian or as the *worry*-type verbs in English. It has been observed for Italian by Arad (1998) (and subsequent work), and for Finnish by Pylkkänen (2000) that these experiencer verbs have both an eventive and a stative reading. Using data from

German, I will make sure that the stative reading is a Kimian stative one. Subsequently, I will provide the lexical-semantic structures for the various alternants.

First, manner adverbials are exluded for Kimian statives. The examples in (26) and (27) show that this is the case for the object-experiencer verbs under discussion. Example (26) contains a non-animate subject, and (27) has a sentential subject. Both of them exclude the agentive reading and are unacceptable in combination with the manner adverbial.

(26) *Der Stau ärgerte den Poldi *auf unpassende Weise*.
The traffic jam annoyed the Poldi *in inappropriate way*.
‘ The traffic jam annoyed Poldi in an inappropriate way.’

(27) *Daß die Irmi im Lotto gewonnen hatte, ärgerte den Poldi *auf unpassende Weise*.
That the Irmi in the lottery won had, annoyed the Poldi *in inappropriate way*.
‘ It annoyed Poldi in an inappropriate way that Irmi had won in the lottery.’

Second, event-related locative modifiers cannot co-occur with Kimian statives. As Kimian statives do not refer to a proper event, it is not possible to specify a particular location where this event takes place. The next two examples show that the verbs under consideration conform to this pattern.

(28) *Das Grinsen ärgerte die Irmi *unter einem Baum*.
The grinning annoyed the Irmi *under a tree*.
‘ The grinning annoyed Irmi under a tree.’

(29) *Daß die Irmi im Lotto gewonnen hatte, ärgerte den Poldi *unter einem Baum*.
That the Irmi in the lottery won had, annoyed the Poldi *under a tree*.
‘ It annoyed Poldi under a tree that Irmi had won in the lottery.’

Finally, both the sentence containing the nominal and the sentential subject allow only for the degree reading of *ein bißchen* ‘ a little’, as expected. Both examples in (30) and (31) refer to a small degree of depression/annoyance and cannot express the fact that this emotional state lasted for a short period of time.

(30) Der Witz deprimierte die Irmi *ein bißchen*.
The joke depressed the Irmi *a little*.
‘ The joke depressed Irmi a little.’

(31) Daß die Irmi im Lotto gewonnen hatte, ärgerte den Poldi *ein bißchen*.
That the Irmi in the lottery won had, annoyed the Poldi *a little*.
‘ It annoyed Poldi a little that Irmi had won in the lottery.’

In sum, object-experiencer verbs that assign accusative case in German pass the tests for the presence of a Kimian state. So, let’s look at their lexical entries next.

The stative variant in (32) expresses the fact that there was a traffic jam and that Poldi was annoyed about that. In addition, Poldi would not have been annoyed if the road had been free. This boils down to a counterfactual relation between two states. The structure, therefore, must contain the CAUSE-operator. The stative variant and its structure are given in (32) and (33).

(32) Der Stau ärgerte den Poldi.
The traffic jam annoyed the Poldi.
‘ The traffic jam annoyed Poldi.’

(33) λy λx λs CAUSE(x, ANNOYED(y))(s) (*traffic jam*) (*Poldi*) =
= λs CAUSE(*traffic jam*, ANNOYED(*Poldi*))(s)

In contrast, the eventive variant, exemplified here with the agentive use of the experiencer verb, contains the additional aspectual operators DO and BECOME.

(34) Die Irmi ärgerte den Poldi.
The Irmi annoyed the Poldi.
‘ Irmi annoyed Poldi.’

(35) λy λx λs DO(x, CAUSE(x, BECOME(ANNOYED(y))))(s) (*Irmi*) (*Poldi*) =
= λs DO(*Irmi*, CAUSE(*Irmi*, BECOME(ANNOYED(*Poldi*)))(s)

The discussion so far has shown three major points. First, the ambiguity is due to the presence or the absence of the DO- and the BECOME-operator. Second, there is no ”basic” stative verb (as it has been argued for at various places in the literature, e.g. Harley (1995), Marantz (2001) and others). Rather, there are different types of stative verbs, but they are stative due to the absence of the aspectual operators. It is not just a simple feature that renders a verb stative. Third, we have seen that stative verbs (but maybe not predicates) are not the simplest building blocks of event structure, as they may contain operators and lexical predicates themselves.

In the following, I will turn to those verbs that display the stative reading only. There is no way of coercing them into an eventive reading. The examples I am going to discuss are measure verbs and object-experiencer verbs that assign dative case in German. See the list in (12) for a complete list of all stative-only verbs and Rothmayr (2006) for a detailed examination.

5. *Example 3: measure verbs*

Measure verbs are part of the group of those verbs that display a stative reading only. Let’s briefly go through the tests that show that measure verbs are true Kimian statives.

As before, let’s start with manner adverbials. As (36) shows, manner adverbials like the German *auf epische Weise* ‘ in an epic way’ are not compatible with measure verbs. This hints towards the fact that measure verbs are Kimian statives.

(36) *Der Film dauert *auf epische Weise* zwei Stunden.
The film lasts *in epic way* two hours.
‘ The film lasts two hours in an epic way.’

Second, event-related locative adverbials are excluded with measure verbs, as the following example shows:

(37) *Der Film dauert *im Garten* zwei Stunden.
The film lasts *in the garden* two hours.
‘ The film lasts two hours in the garden.’

Third, the adverbial *ein bißchen* ‘ a little’ cannot be combined with measure verbs at all, as the degree of the verb is already expressed by the measure phrase. This implies that the time-span reading of *ein bißchen* is not available for measure verbs, as required.

(38) *Der Film dauert *ein bißchen* zwei Stunden.
The film lasts *a little* two hours.
‘ The film lasts a little two hours.’

(39) *Tante Erna wiegt *ein bißchen* 100 Kilo.
Aunt Erna weighs *a little* 100 kilos.
‘ Aunt Erna weighs a little 100 kilos.’

In addition to the aspectual behavior, measure verbs have another interesting property. As noted by Rizzi (1990), the measure phrase does not behave like a direct object, although on the surface both look quite the same. Rizzi discusses extraction properties of the measure phrase. In particular, he gives the example in (40) that shows that extraction out of a wh-island is possible for the direct object (as in the active variant), but prohibited for measure phrases.

(40) ?What did John wonder how to weigh t? [Rizzi (1990)]
⇒ potatoes
⇒ *200 lbs

In addition, measure phrases differ from direct objects in that they do not allow for strong determiners. Example (41) shows that the quantifier *jede* ‘ every’ and the definite determiner *die* ‘ the’ are excluded for the German measure phrase.

(41) *Der Film dauert *jede / die* Stunde.
The film lasts *every / the* hour.
‘ The film lasts every/the hour.’

These two facts show that the measure phrase has a different status than a direct object. I therefore suggest that the measure phrase is not an argument, but that it specifies the value of the degree argument of the measure predicate. This idea is reflected in the structure as folllows:

(42) Der Film dauert zwei Stunden.
The film lasts two hours.
‘ The film lasts two hours.’

(43) $\lambda y\ \lambda x\ \lambda s\ \exists d\ [\textsc{last}(x,d) \wedge d=y]\ (s)\ (\textit{2 hours}) =$
$= \lambda x\ \lambda s\ \exists d\ [\textsc{last}(x,d) \wedge d=\textit{2 hours}]\ (s)$

In (43), no aspectual operator is present, and CAUSE is absent, as well. The measure verb does not express the fact that two states, events or propositions stand in a counterfactual relation to each other. Rather, a measure verb specifies a certain dimension of its subject. In addition, the dimension may be further specified by giving an explicit value for the degree argument. The degree argument is existentially closed, thus it cannot be assigned a value directly. If the measure phrase is absent, the verb denotes a very high degree. If the measure phrase is present, it specifies the value of the degree argument in the lexical-semantic entry.

6. *Example 4: object-experiencer verbs (*DAT*)*

The next group of verbs I want to discuss is restricted to a stative interpretation as well: object-experiencer verbs that assign dative case in German. This class of verbs is also known as the *piacere*-group in Italian, or as the *appeal to*-group in English. Again, I start by going through the tests for the presence of a Kimian stative reading.

As expected, manner adverbials like *auf eine enge Weise* ‘ in a tight way’ are not compatible with an object-experiencer verb like *passen* ‘ fit’.

(44) *Die Hose hat dem Poldi *auf eine enge Weise* gepaßt.
The trousers has the Poldi *in a tight way* fitted.
‘ The trousers fitted Poldi in a tight way.’

Second, event-related locative modifiers are excluded as well. This is shown in (45), where the locative adverbial *vor dem Spiegel* ‘ in front of the mirror’ can only have a frame setter interpretation. In other words, the sentence in (45) cannot mean that the event of fitting took place in front of the mirror. Rather, it can only have the frame-setter interpretation which could be as follows. At the shop, when looking at oneself in a miraculous mirror, the trousers fitted very well, but in reality they looked rather bad.

(45) Die Hose hat dem Poldi *vor dem Spiegel* gepaßt.
The trousers has the Poldi *in front of the mirror* fitted.
‘ The trousers fitted Poldi in front of the mirror.’ (*frame-setter reading only*)

Third, the possible interpretations of *ein bißchen* ‘ a little’ are of interest. As (46) shows, this adverbial cannot receive the time-span interpretation, as the inference in (47) is not valid. Thus, (46) can only mean that Poldi thought that the cake was a little bit tasty, but not too much.

(46) Der Kuchen schmeckte dem Poldi *ein bißchen*.
The cake tasted the Poldi *a little*.
‘ Poldi thought the cake was a little bit tasty.’
$\not\Rightarrow$

(47) Etwas später hat er ihn grauslich gefunden.
A bit later has he it disgusting thought of.
‘ A bit later he thought it was disgusting.’

In sum, all three tests hint towards the fact that object-experiencer verbs that assign dative case have a true Kimian stative reading. As before with measure verbs, the underlying lexical-semantic structure is simple, as it involves only one lexical predicate that requires the experiencer and the stimulus as its arguments.

(48) Die Hose paßt dem Poldi.
The trousers fit the Poldi.
‘ The trousers fit Poldi.’

(49) $\lambda y\ \lambda x\ \lambda s\ \text{FIT}(x,y)\ (s)\ (\textit{trousers})\ (\textit{Poldi}) =$
$= \lambda s\ \text{FIT}(\textit{trousers}, \textit{Poldi})\ (s)$

The structure in (49) only relates the stimulus and the experiencer via the lexical predicate *fit*. There are no aspectual operators present, in particular, the CAUSE-relation is absent as well, since we cannot construct a counterfactual relation: it is not the case that there is a pair of trousers and that Poldi is in a state of being fitted. Nor is it the case that he wouldn't be in a state of being fitted if the trousers hadn't existed. Instead of a counterfactual relation, verbs like *fit* express that the trousers have the property of fitting Poldi.

6.1. No eventive counterpart?

Both of the two groups of verbs that I have discussed previously belong to the class of verbs that display a stative reading only. Interestingly, one cannot derive an eventive counterpart from them without adding a particle or a prefix. Hence, simple statives cannot have derived eventive readings without undergoing non-syntactic morphological processes. In order to illustrate this point, I want to look at possible eventive counterparts from subject-experiencer verbs like *hate* and from measure verbs.

It is easy to imagine a possible eventive counterpart of a verb like *hate*.[3] Instead of experiencing a stative emotion of hating, the subject experiencer could be actively engaged in an action of hating, thus the paraphrase in (50).

(50) Irmi is doing an action of hating Poldi.

This interpretation requires the DO-operator to be present in the lexical-semantic structure of the verb, as in (51).

(51) $*\lambda s$ DO(*Irmi*, (HATE(*Irmi*, *Poldi*))

However, as there is no verb (at least in the languages under consideration, that is German and English, as well as there is - to my knowledge - no reference to such a verb in Italian, Spanish, or Finnish) that expresses this meaning, the structure in (51) is ruled out.

Similarly, one can imagine that a measure verb is rendered eventive by describing the increase of the measure phrase until it reaches a certain value, as suggested in (52).

(52) The price of the book increases until it is 10 euros.

As pointed out by a reviewer, one can express the meaning of (52) as in (53). Still, (53) involves the verb *steigen* ' raise' that is not related to the measure verb at all.

(53) Der Preis steigt auf 10 Euro.
The price increases to 10 euros.
' The price raises to 10 euros.'

Of course there are deadjectival verbs like *cool* in *The soup cools*, but these differ from measure verbs in that they do not select for a measure phrase. Those deadjectival verbs always involve the BECOME-operator, which is added presumably as part of the word-formation process. The corresponding structure of the hypothetical measure verb in (52) that involves a change-of-state

[3] I avoid using the common example *love* for subject-experiencer verbs as this allows for eventive readings I do not want here.

is given in (54). Note that the structure now includes the BECOME-operator, but it is nevertheless ruled out.

(54) *λs BECOME(COST(*book*, *10 euro*)(s)

The two illicit lexical-semantic strucures in (51) and (54) raise an interesting question: what is the underlying reason for the fact that the DO- and the BECOME-operator cannot be inserted into the lexical-semantic representations for these verbs? I want to put forward the following answer: It is only CAUSE that permits the insertion of the aspectual operators. If a lexical-semantic structure does not contain the CAUSE-operator, no other aspectual operator may be inserted. Hence, the presence of CAUSE is a prerequisite for deriving an eventive reading from stative verbs. Thereby we get the distinction between those verbs that display the stative/eventive ambiguity, and those that allow for the stative reading only. While the former group contains the CAUSE-operator (and therefore allows to derive the eventive reading), the latter does not. Remember that these two groups have diverse subgroups as pointed out in (12) above. The alternative characterization of stative verbs that attributes their status to a feature whithin the little *v*-projection does not predict the variety of different verbs in (12). In contrast, the presence/absence of CAUSE allows for different lexical-semantic forms to have a stative reading.

6.2. Summary: stative reading only

In sum, the verbs that allow for a stative reading only display the following common properties. First, they lack the DO and the BECOME operators, just as the stative variants of those verbs that allow for the ambiguity. As none of those operators is present, the verb gets a stative reading.

Second, and more important, the stative-only verbs lack the CAUSE-operator. Presumably, it is the presence of CAUSE that is a prerequisite for the other aspectual operators to be inserted. As there is no CAUSE in the structure of the verbs under discussion, they do not allow for an eventive counterpart to be created.

The counterfactual relation combines two states or two (sub-)events within a single verb. In other words, the presence of the CAUSE-operator requires that the verb expresses two sub-eventualities. In contrast, if the CAUSE-operator is absent, there is only one state expressed by the verb. As I have shown, an eventive reading is only available if there is a CAUSE-relation expressed by the verb, I conclude that eventive readings require two sub-situations. Hence, in order to insert DO/BECOME, two sub-eventualities need to be expressed. It is CAUSE that is the only grammatical mechanism that allows for two sub-eventualities to be expressed within a single verb. There is no other operator that serves a similar purpose. As we have seen, these can be both simultaneous and stative, as in the stative variants of the ambiguous verbs. Of course, they can be also overlapping and eventive, which gives rise to the non-stative alternants.

7. A counterexample?

This section discusses a potential counter example to the picture that I have sketched so far, namely the verb *know* in various languages. First, consider the English *know*: we see that these

verbs have a stative reading only. Therefore one is tempted to analyze them as having a simple structure comparable to subject-experiencer verbs like *hate*.

However, the picture is not as straightforward as it may seem. For example, the Spanish counterpart of *know* is *conocer*, which does display the stative/eventive ambiguity: *conocer*, like many other Spanish verbs, occurs both with the abstract and the marked accusative case.[4] The abstract accusative case, exemplified in (55a), has a stative interpretation, similar to the English *know*. In contrast, the sentence involving the marked accusative in (55b) has an inchoative interpretation, i.e., it refers to the process of getting to know someone.

(55) a. Conocen bien un vecino suyo.
' They know a neighbor of theirs well.'

b. Conocen bien *a* un vecino suyo.
' They got to know a neighbor of theirs well.'

[Pesetsky & Torrego (2004): 18ab]

Hence, the Spanish case contrasts the English as it displays the systematic stative/eventive ambiguity. Let's look at German in turn.

The German verb *kennen* may be analyzed as a perception verb. As already discussed in Dowty (1979), perception verbs form stative / inchoative / agentive alternants, such as *see/watch* and *hear/listen* pairs. The ambiguity with *see*, for example, is this. A person can get to see something, like in a situation where a curtain is raised slowly. A person can be actively engaged in the perception process as in *watch*, and of course, a person can take part in a stative situation of perception. In order to allow for these ambiguities, which correspond to the insertion of DO and BECOME into the lexical-semantic structure, perception verbs need to incorporate CAUSE.

If the German verb *kennen* is understood as a perception verb, it involves CAUSE in its structure. Again, it is CAUSE that permits the stative/eventive ambiguity. It is possible that the verb *kennen* gets an eventive reading by overt prefixation with *er-*, as in *er-kennen*. This inchoative alternant must of course contain the BECOME operator. In German, the operation of *er*-prefixation is productive. Compare the case of *hË†ren* ' hear':

(56) a. Die Irmi hË†rt einen Vogel.
The Irmi hears a bird.
' Irmi hears a bird.'

b. Die Irmi *er*hË†rt seinen Wunsch.
The Irmi *er*-hears his wish.
' Irmi gives in to his wish.'

While the stative variant in (56a) refers to the state in which Irmi percieves that some bird is singing outside, the eventive and prefixed correspondent in (56b) refers to the change of state in which Irmi gets to answer someone's wish. In other words, the prefixed version expresses that Irmi willingly accepts the perception of the wish.

The same point can be made with the word *schmecken* ' taste'. The most common usage of *schmecken* is in combination with a prepositional phrase, such as *schmeckt nach Schwammerl* ' tastes of mushroom'. However, this variant is not of interest right now, as it is a stative-only

[4] See Torrego (1998), Pesetsky & Torrego (2004)

verb that expresses a certain property (a taste) of its subject. The second possible usage is the one given in (57), where the verb functions as a mere perception verb, very much like *see a bird* or *hear a noise*.

(57) Die Irmi schmeckt (ein) Schwammerl.
The Irmi tastes (a) mushroom.
' Irmi experiences that there is a taste of mushroom on her tongue.'

The corresponding structure is given in (58), incorporating the hypothesis that *schmecken* is a perception verb, hence involves CAUSE. As no other aspectual operators are present, we get the stative reading.

(58) λy λx λs CAUSE(x, TASTE(x,y)) (s) (*Irmi*) (*mushroom*) =
= λs CAUSE(*Irmi*, TASTE(*Irmi*, *mushroom*)) (s)

Like all other perception verbs, *schmecken* allows for *er*-prefixation as well. This process changes also the event structre of the verb: the prefixed variant expresses an inchoative eventuality as in (59): this sentence describes a situation in which Irmi is eating a certain dish. However, she is very much afraid of mushrooms, so she keeps chewing and sucking around, until she judges that one little mushroom was inside the huge pot of food.

(59) Die Irmi *er*schmeckt ein Schwammerl.
The Irmi *er*tastes a mushroom.
' Irmi gets to know that there is a taste of mushroom on her tongue.'

The inchoative alternant may be assigned a structure as in (60). This is an extended variant of the structure in (58) - it contains an additional DO- (for the process of chewing and tasting deliberately) and an additional BECOME-operator (for the change of perception).

(60) λy λx λs DO(x, BECOME(CAUSE(x, TASTE(x,y))))(s) (*Irmi*) (*mushroom*) =
= λs DO (*Irmi*, BECOME(CAUSE(*Irmi*, TASTE(*Irmi*, *mushroom*)))) (s)

In sum, we can assign a similar structure as those in (58) and (60) to *kennen* ' know'. While Spanish and German permit both the stative-only and the ambiguous variant, English lacks the latter one. Still, there is the possibility of expressing the inchoative variant in English by using the phrase *get to know*. All in all, perception verbs including *know* correspond to the aspectual pattern that is reflected by the presence or absence of CAUSE.

8. Conclusion

In conclusion, I have shown in this paper that the stative reading is due to the lack of both DO and BECOME in the lexical-semantic structure of the verb. In particular, the stative reading does not arise because of the presence of a simple "stative" feature.

In order to insert DO/BECOME the predicate must contain CAUSE, as CAUSE is the only way to combine two sub-eventualities within a verb.

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Antonia Rothmayr
University of Vienna
antonia.rothmayr@univie.ac.at

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A Formal Definition of Temporal Default Relations

Gerhard Schaden

In this paper, I will redefine standard formulations of aspect, using partial ordering structures (i.e., lattices) on intervals. I will show that such a reformulation allows unexpected insights on the nature of aspectual relations, and temporal relations more in general. More specifically, it will be shown that the underspecification account of unmarked aspect can be motivated in this way, and that the old idea of the present tense as a default tense (cf. Jakobson 1932/1971) can be formalized in a precise way. Furthermore, perfective and imperfective aspect turn out to be in a scalar relation, where imperfective aspect is more informative than perfective aspect.

1. *The Problem of Unmarked Aspect*

Until recently, most formal accounts of aspectual phenomena in tense-aspect systems of natural languages didn't feel a need to distinguish between the notions of *Aktionsart*-modifiers (like *begin to*) and view-point aspects (i.e., the aspectual properties associated with tenses like French *passé simple*, for instance), considering both of them as being essentially identical. From a type-theoretical point of view, these aspectual operators in a broad sense are supposed to be of type $\langle\langle e, t\rangle, \langle e, t\rangle\rangle$, that is, functions whose domain and range are sets of eventualities.[1] Such a proposal is expressed, among others, by de Swart (1998).

However, scholars like Smith (1991) and Klein (1994, 1995) have insisted to separate the more 'grammatical' *view-point aspect*, from more 'lexical' *Aktionsarten*-modifiers.[2] More precisely, Klein (1994) takes TENSE to be the relation between the time of utterance (TU) and the interval of assertion (T-Ast), whereas (view-point) ASPECT is the relation between the interval of assertion and the temporal trace of the eventuality (written here $\tau(e)$). Thus, according to this view, TENSE and (view-point) ASPECT are relations between intervals. But *Aktionsarten*-modifiers are relations between sets of eventualities.

[1] I use throughout this paper the following logical types: t stands for the type of truth-values, e for the type of eventualities, and i for the type of intervals (which may be points in time, that is, instants).

[2] In fact, this is a rediscovery of a theoretical distinction going back at least to Agrell (1908).

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From a type-theoretic point of view, TENSE is of type $\langle\langle i,t\rangle,\langle i,t\rangle\rangle$, (view-point) ASPECT of type $\langle\langle e,t\rangle,\langle i,t\rangle\rangle$, and *Aktionsarten*-modifiers are of type $\langle\langle e,t\rangle,\langle e,t\rangle\rangle$. Whereas TENSE and ASPECT are obligatory and non-recursive relations, *Aktionsarten*-modifiers may be present zero, one or more times (cf. Laca 2005).

As a consequence, each sentence in any language has got exactly one TENSE– and exactly one ASPECT-feature. There are no such restrictions on the occurrence of *Aktionsart*-modifiers.

1.1. Perfectives and Imperfectives

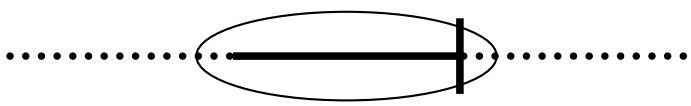
The neo-Reichenbachian frameworks of Smith (1991) and Klein (1994) provide a successful way of dealing with tenses expressing perfective and imperfective aspect. According to Smith, perfective aspect is associated with sequential readings (cf. the example in like (1a)), while imperfective aspect is associated with incidental readings (cf. (1b)):

(1) a. When John arrived, Mary sang a song. [perfective aspect in main clause]
b. When John arrived, Mary was singing a song. [imperfective aspect in main clause]

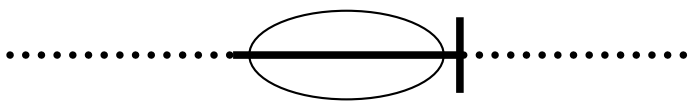
(1a) is interpreted as follows: the eventuality `sing(m)` starts after the eventuality of `arrive(j)` happened, and probably because of the occurring of the latter eventuality (this is referred to as the 'sequential reading'). (1b) does not allow for such a reading: the eventuality `sing(m)` must already have started, and still be ongoing, as the eventuality `arrive(j)` occurs (this is the 'incidental reading').

Smith (1991) characterizes perfective and imperfective aspect by a visual metaphor: aspect provides a 'lens' through which we perceive an eventuality. Perfective aspect allows us to 'see' the entire eventuality, while imperfective aspect 'hides' away from our vision the initial and end points of the eventuality, so that we cannot know if they actually took place. This is depicted in (2): the continuous, horizontal line stands for the temporal trace of the eventuality; the continuous vertical line marks the final transition of a (telic) eventuality. The dotted parts stand for initial and subsequent stages of an eventuality. The ellipsis delimits the region which is made 'visible' by perfective (in (2a)) and imperfective aspect (in (2b)), respectively:

(2) a.



b.



Similarly, according to Klein (1994), aspect is all about the speakers commitment to the existence of certain phases of the eventuality: perfective aspect means that the interval for which the speaker makes an assertion (the so-called *interval of assertion* or T-Ast) includes the temporal trace of the eventuality. In case of imperfective aspect, the interval of assertion is included in the

temporal trace of the eventuality. Therefore, in the latter case, the commitment of the speaker is restricted to inner stages of an eventuality, and crucially excludes the final transition.[3]

This has lead to the following formal representations of perfective and imperfective aspect:[4]

(3) a. $[\![\text{perfective}]\!] = \lambda P \lambda i \exists e[\tau(e) \subseteq i \wedge P(e)]$
b. $[\![\text{imperfective}]\!] = \lambda P \lambda i \exists e[i \subseteq \tau(e) \wedge P(e)]$

The formalizations in (3) are fairly standard in the sense that they are straightforward implementations of the views of Smith and Klein. However, they are incomplete: we know at least since Dowty (1979) that a reasonable account of imperfective aspect will have to include intensional (i.e., modal) semantics. However, (3b) is strictly extensional, which means that we will not be able to account for the so-called 'imperfective paradox'.[5] But as (3) captures straightforwardly the interval-part of the denotation of such aspects — which is what I am interested in — I will not be concerned here about this shortcoming. In the rest of the article, I will consider view-point aspect as relation between two intervals, and my only concern will be the formalization of the precise nature of this temporal relation.

Both Smith and Klein require thus the presence of an ASPECT-feature in any sentence. This raises an important issue: what is to be done with languages (like modern German or modern Hebrew) in which there is no opposition between two types of view-point aspect? In much of traditional work, ASPECT seemed to be a phenomenon worth of investigation only if it was involved in such aspectual oppositions, like perfective vs. imperfective in Slavonic languages, or the simple vs. progressive opposition in English.

I will address this problem now.

1.2. Dealing with Unmarked Aspect

Smith (1991) was the first author to propose a general treatment of aspectually unmarked tenses. She supposed that the aspectual behaviour of such tenses was the same across languages and across positions in the tense-aspect systems of particular languages: that is, (i) aspectually unmarked past tenses behave like aspectually unmarked future tenses; and (ii) aspectually unmarked tenses in Mandarin Chinese or Navajo behave like aspectually unmarked tenses in French or German. Smith showed that such tenses are ambiguous between a perfective-like sequential reading and an imperfective-like incidental reading in sentences containing a *when*-clause. The following two examples illustrate the point for the German *present perfect* and the

[3]Klein's notion of an assertion on phases of the eventuality is clearly a more proper way of speaking about the semantic properties of aspect than Smith's optical metaphor. However, the metaphor often provides a shorter way of saying things. Therefore, I will often say that such aspect x makes visible a certain phase y of the eventuality, which is a shortcut for the following: by using that aspect x, the speaker makes an assertion which is restricted to a certain phase y of the eventuality.

[4]Such a representation can be found, for instance, in Pancheva (2003:282).

[5]The paradox is that the formulas in (3) predict that the sentence below entails the existence of a (completed) event of building a house:

John was building a house [when he was struck by lightning and died].

However, nothing requires here that John actually finishes building the house.

simple *present* tenses:

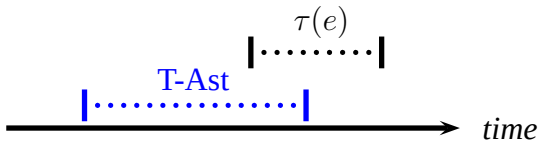
(4) a. Als Hans angekommen ist, hat Maria ein Lied gesungen.
when H. arrived is, has M. a song sung.
(i) 'When Hans arrived, Maria sang a song.'
(ii) 'When Hans arrived, Maria was singing a song.'

b. (Jedesmal) Wenn Hans ankommt, singt Maria ein Lied.[6]
(each time) when H. arrives, sings M. a song.
(i) 'Each time when Hans arrives, Maria sings a song.'
(ii) 'Each time when Hans arrives, Maria is singing a song.'

One sees that in both cases, the verb in the main clause may get the aspectual interpretation either of a perfective, or of an imperfective. However, these sentences do not allow for just any temporal ordering of the two eventualities: `sing(m)` may not be properly anterior to `arrive(h)`. According to Smith, this behavior is the same in all aspectually unmarked tenses she investigated.

Based on this empirical observation, Smith claims that there is one single type of view-point aspect, namely *neutral* aspect, which is able to explain the aspectual behavior of such aspectually unmarked tenses. This aspectual view-point has been characterized by the formula (5a), which is represented graphically in (5b):[7]

(5) a. $[\![\text{neutral}]\!] = \lambda P \lambda i \exists e[i \uplus \tau(e) \wedge P(e)]$
where $i \uplus i' \Leftrightarrow i \cap i' \neq \emptyset \wedge \exists t[t \in i \wedge t \notin i' \wedge \forall t'[t' \in i' \rightarrow t \prec t']]$

b. 

However, the formalization in (5) is not able to capture all readings we need. First of all, if the aspectual properties of the verb in the main clause are the determining ingredient for sequential or incidental readings in contexts like (1) or (4), the difference must stem from the fact that with perfective aspect, the initial point of the eventuality is visible. Therefore, we get an inchoative reading. With imperfective aspect, the initial point is not visible, and we will have an ongoing construal. But with the formula in (5a), the initial point of the eventuality under neutral view-point aspect is always visible. Therefore, we should systematically get sequential readings, and never any incidental readings.

One might argue that the relative temporal ordering of the eventualities in contexts of sentences containing a *when*-clause is not directly influenced by the aspectual properties of the verb in the main clause. It might be that rhetorical relations govern these orders, and that aspect

[6] A sentence like (4b), without the quantifier *each time*, would also have a futurate reading, and a reading one might qualify as 'modal' (if Hans arrives, there will be an event `sing(m)`). However, the relative temporal ordering in all of these readings may be sequential or incidental.

[7] The definition in (5) is taken from Pancheva (2003:282). This is not exactly the same definition as the one suggested by Smith, because Pancheva requires at least one subinterval of T-Ast to be situated before $\tau(e)$. However, both definitions will produce the same problems, because the initial point of the eventuality is always visible.

only gives some indication which rhetorical relation applies, without determining directly the relative temporal orders. SDRT-approaches to tense and aspect emphasize such relations (cf. Asher & Lascarides 2003). If their analysis is on the right track, the contexts used by Smith in order to identify aspectually unmarked tenses would not be very telling. But other contexts should allow us then to identify the exact characteristics of the view-point of aspectually unmarked tenses.

One context I would like to insist on as being particularly revealing for the aspectual properties of tenses are sentences containing *since*-adverbials. Notice first, that, if the notion of an interval of assertion has any descriptive value, that interval needs to cover in sentences like (6) the time-span from midday up to the time of speech. Second, remember that the German *present perfect* and the simple *present* tenses are aspectually unmarked in the sense of Smith (1991), as we have seen in the examples (4).

(6) a. Hans isst seit Mittag einen Apfel.
H. eats since midday an apple.
'Hans has been eating an apple since midday.'
b. Hans hat seit Mittag einen Apfel gegessen.
H. has since midday an apple eaten.
'Hans has eaten one apple since midday.'

(6a) is to be interpreted as follows: Hans has spent the whole period from midday up to the moment of speech eating an apple, and he is still eating it. This corresponds to an imperfective view-point, as the temporal trace of the eventuality needs to be at least as long as the interval of assertion. (6b) is to interpreted perfectively: the event of eating an apple is properly included in the interval of assertion, and crucially, it is no longer on-going at the moment of speech. Therefore, aspectually neutral tenses do allow for clear-cut imperfective, as well as clear-cut perfective construals of the temporal trace of the eventuality with respect to the interval of assertion.[8] However, a single view-point is not able to allow for such a behavior. As far as I know, the only theory compatible with clear-cut imperfective and perfective readings of aspectually unmarked tenses is the underspecification approach by Reyle et al. (2005).

According to such an underspecification approach, every aspectually unmarked tense is simultaneously perfective and imperfective. Discourse-update will decide if one of the two aspectual readings has to be eliminated.

There are, of course, some issues with such an underspecification approach, amongst others, a big potential for overgeneration. However, for the remainder of the paper, I will not be concerned with this problem. The only point I will discuss is the following: why should we underspecify between perfective and imperfective aspect, rather than, say, resultative and prospective

[8]Notice that the fact of the *present perfect* being a *perfect* does not change things: even if PERFECT denoted something like a proper or large precedence of $\tau(e)$ with respect to T-Ast (cf. the formulæ below), this would not explain the perfective reading of (6b); it predicts a 'perfect'-reading, according to which the post-state of eating fills up the whole interval of assertion. I leave it to the reader to check this.

a. $[\![\text{perfect}_1]\!] = \lambda P \lambda i \exists e[\tau(e) \prec i]$
b. $[\![\text{perfect}_2]\!] = \lambda P \lambda i \exists e[\tau(e) \preceq i]$

aspect?[9] Empirical adequacy is certainly one important point, but explanatory force is another. And unmotivated underspecification clearly lacks explanatory force.

In the remainder of the paper, I will show what it is that makes imperfective and perfective aspect privileged relations among all the possible temporal relations, and how aspectual underspecification — but also the idea of the present tense being a zero-tense — can be motivated.

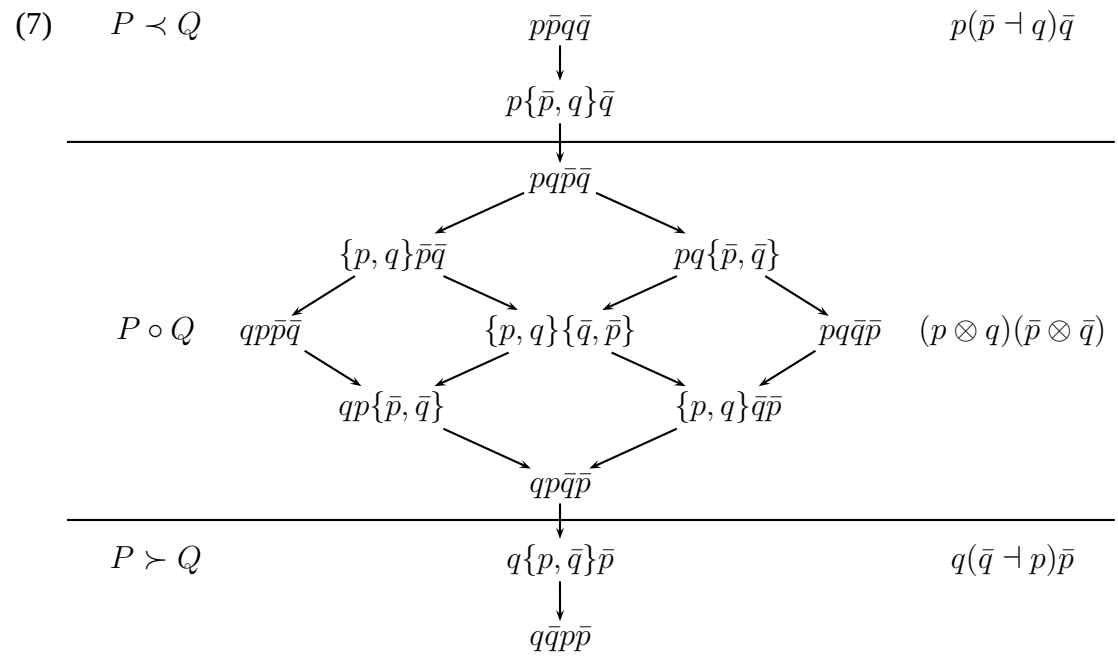
2. *Partial Orders on Intervals*

Partial orders have been used extensively and for quite some time in order to model event-structures, beginning with Bach (1986). To some degree, such analyses are competing with the neo-Reichenbachian approach in modelizations of aspectual properties of natural languages (cf. Krifka 1992, 1998; de Swart 1998). Surprisingly, there has not been much interest in modelizing intervals or time-structures in partial orders, maybe because of the standard model of time as a totally ordered structure. However, even if (the set of instants of) time is totally ordered, intervals clearly are not. To the best of my knowledge, Schwer in Battistelli et al. (2006) is the first to have modeled intervals in a lattice-structure.

Battistelli et al. (2006) show, following Allen (1984), that there are thirteen possible relations between two intervals, non of which is a point. While Allen has simply listed all the possibilities, the lattice by Battistelli et al. allows to see how the possibilities are interrelated, and that there are indeed no other possible temporal configurations.

The thirteen possible relations between intervals are organized as follows:

(7)



where x is the beginning point of interval X, $\bar{x}$ is the endpoint of X; xy means that x is located before y; $\{x, y\}$ means that x and y coincide.

[9] Following Klein, I assume aspect to be a relation between two intervals, namely the interval of assertion and the temporal trace of the eventuality. We will see in the next section that there are thirteen theoretically possible relations, if instants are excluded from the temporal ontology.

In the left column, we find the temporal ordering of the two intervals in a DRT-notation: either one of the two intervals precedes the other, or they overlap. The rightmost column shows the notation in Schwer's S-language which allows to generate the combinations in the central column (cf. Schwer 2002).

In order to get a feeling for the notation, let us follow the leftmost path from the highest node to the bottom node of the lattice. The first combination we find is $p\bar{p}q\bar{q}$. This means that the whole interval P — starting with p and ending with $\bar{p}$ — is situated before the interval Q — starting with q and ending with $\bar{q}$. As $\bar{p}$ is situated at the left of q, this means that $\bar{p}$ is anterior to p, and therefore, P and Q have no point in common.

The next position we come across is $p\{\bar{p}, q\}\bar{q}$. Here, the end-point of P and the beginning point of Q coincide; the two intervals 'touch', but without overlapping. Going down one more node, we find ourselves at $pq\bar{p}\bar{q}$. Here, for the first time, P and Q overlap. At the next step, q moves further right, and coincides with p, then precedes p still one node further, at $qp\bar{p}\bar{q}$. Now, P is included in Q. Then, $\bar{p}$ first coincides with, then follows $\bar{q}$. These are the last two cases of overlap on our path. Finally, P and Q separate again, first, $\bar{q}$ and p coincide, to end up with $\bar{q}$ being situated before p. Thus, at the bottom of the diagram, Q is completely anterior to P.

The path we have gone down may be imagined as follows: first, the beginning point of Q, namely q, 'moves' further and further left, until being in first position. Then, the end-point of P, namely $\bar{p}$, will move further and further right, until being in last position. Finally, the initial point of P will also move to the right, until the two intervals are disjoint again.

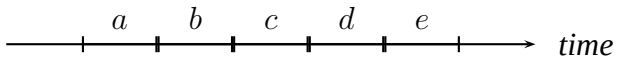
Now, perfective and imperfective aspect, according to the formulas I have given in (3), correspond to the three configurations in the middle-lign, namely $qp\bar{p}\bar{q}$, $\{p, q\}$, $\{\bar{p}, \bar{q}\}$ and $pq\bar{q}\bar{p}$. The fact that these configurations end up on a single lign might be a simple optical effect, or have some deeper meaning: Schwer's formalization does not provide us with a means to decide this.

So, the lattice by Schwer and the classification by Allen make the question even more intriguing: what makes perfective and imperfective view-point that special? In the next section, I will suggest an answer to this question: these two view-point aspects correspond to elementary subsets of partials orders on intervals: ideals and filters.

2.1. View-points, Ideals and Filters

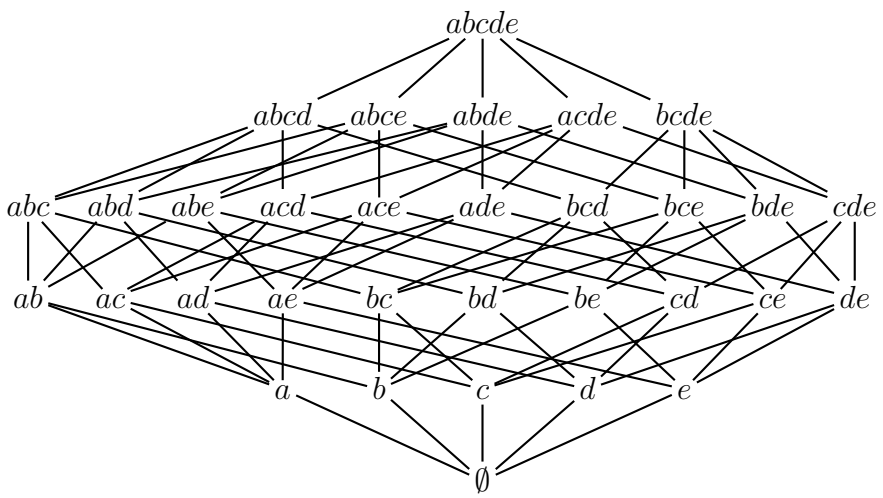
Bearing in mind the definitions of perfective and imperfective aspect from (3), we will establish the following minimal model: assume that there are five minimal temporal intervals a, b, c, d and e — ordered like in (8a), which together form the interval $abcde$:

(8) a. $a \prec b \prec c \prec d \prec e$

b. 

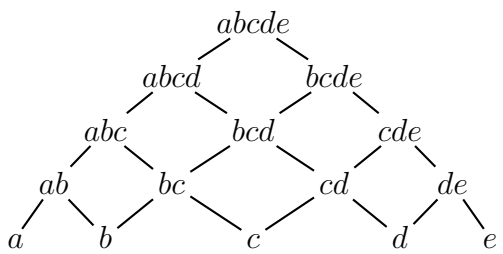
If we now establish blindly a lattice composed of these five minimal intervals, we will get the following:

(9)



For our purposes, (9) is not very useful. Notice that it contains many elements which are not intervals, that is, convex times. An interval is nothing but a set of times without 'holes'. Clearly, something like ac is not an interval, it rather is made of two disjoint intervals.[10] Then, there is no real need for the empty set at the bottom: one can quite safely assume that every eventuality has to occupy at least a minimal interval, or, put in an other way: every eventuality has a temporal trace, however short it may be. Therefore, we obtain the following semi-join-lattice, in which only intervals appear:

(10)



Now, let us suppose that our interval of assertion is bcd. Given the definitions in (3), the possible values of $\tau(e)$ under perfective (written $\tau(e)_P$) or imperfective ($\tau(e)_I$) aspect are the following:

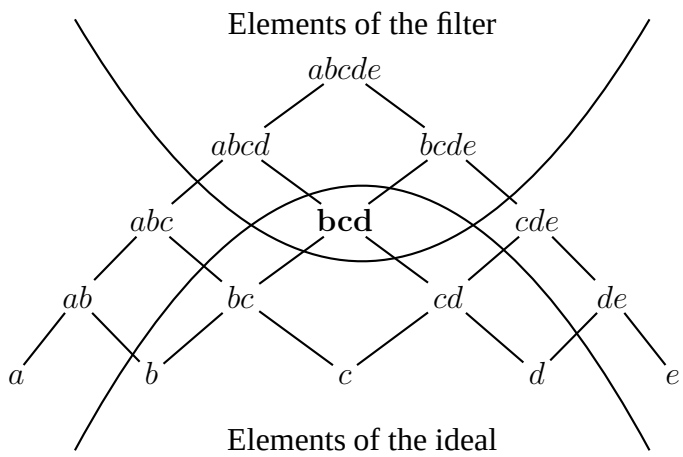
(11) a. Possible values of $\tau(e)_P$: $\{b, c, d, bc, cd, bcd\}$
b. Possible values of $\tau(e)_I$: $\{bcd, abcd, bcde, abcde\}$

These values are not just arbitrary subsets of the semi-join-lattice: they correspond to the ideal and the filter generated by bcd, that is, our interval of assertion.

(12) a. $(x] = \{y \in X : y \sqsubseteq x\}$, the ideal generated by x (the set of all parts y of x)[11]
b. $[x) = \{y \in X : x \sqsubseteq y\}$, the filter generated by x (the set of all elements y such that x is a part of y)

[10] ac has a 'hole', namely b.

c.



Perfective and imperfective aspect can therefore be redefined as follows:

(13) a. $[\![\text{perfective}]\!] = \tau(e) \in (\text{T-Ast}]$ [$\tau(e)$ = element of the ideal generated by T-Ast]

b. $[\![\text{imperfective}]\!] = \tau(e) \in [\text{T-Ast})$ [$\tau(e)$ = element of the filter generated by T-Ast]

Filters and ideals are very elementary subsets of partial orders. They have been used extensively to deal with the denotation of noun phrases, but also event-structures (cf. Landman 1991, 2000, 2004). As the anonymous reviewer of this paper pointed out, they are likely to be an essential underlying grammatical mechanism that applies to different components of grammar. Therefore, the fact that perfective and imperfective aspects correspond to those subsets provides an important motivation to single out these two view-points for the characterization of aspectually unmarked tenses, as proposed by Reyle et al. (2005) for the German present tense.

We may now give a formal definition of the default aspectual relation:

(14) $[\![\text{default aspect}]\!] = \tau(e) \in (\text{T-Ast}] \vee \tau(e) \in [\text{T-Ast})$

The unmarked view-point aspect corresponds therefore to the union of the filter and the ideal generated by the interval of assertion.

Notice that we have assumed so far an atomic semi-join-lattice for the sake of exposition. Note, however, that the definitions in (14) do not require us to assume an atomic lattice (and therefore, minimal temporal intervals): nothing rules out instants (i.e., temporal points) in our temporal ontology.

2.2. Generalizing to All Temporal Relations

We have developed so far a formalization of a default ASPECT-feature. Now, ASPECT is only one relation between intervals: we also have the TENSE-feature. Are there any default tense-relations as well? Indeed, Jakobson (1932/1971) — amongst others — argued that the (Russian)

[11] Definitions taken from Landman (2004), p. 3.

present tense is an instance of a default tense. Our definition provides indeed an easy way of generalizing what we have developed for the default ASPECT.

So, we can go a step further, generalize our idea to all temporal relations, and claim the following:

(15) An interval i is in a temporal default relation with respect to an interval i' iff i is an element of the filter or the ideal generated by i':
$i \circledcirc i' \Leftrightarrow i \in [i') \vee i \in (i']$

The definition in (15) allows to give a very precise formulation of Jakobson's idea that the present tense is a default tense, and we can check that the PRESENT feature assumed in various neo-Reichenbachian approaches is indeed an instance of the temporal default relation:

(16) $[\![\text{present}]\!] = \lambda i.[n \subseteq i]$
where n is the moment of utterance

If one assumes that the moment of utterance is always a point (or a minimal interval), (16) turns out to be a temporal default relation, because T-Ast $\subseteq$ TU reduces under this assumption to T-Ast $=$ TU, which is a special case of (16). Therefore, (16) is an instance of a temporal default relation.

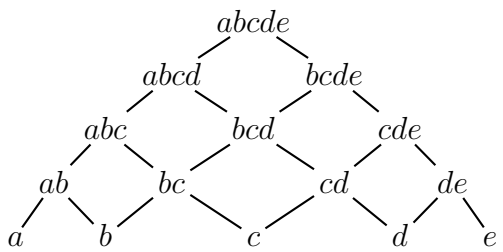
Let us now investigate the properties of the temporal default relation. One can show that it is reflexive, symmetric, but not transitive:

(17) a. Reflexivity: $\forall i[i \circledcirc i]$
b. Symmetry: $\forall i, i'[i \circledcirc i' \rightarrow i' \circledcirc i]$
c. Non-Transitivity: it is not the case that $\forall i, i', i''[i \circledcirc i' \wedge i' \circledcirc i'' \rightarrow i \circledcirc i'']$

(17a) states that each interval is in a temporal default relation with itself; (17b) that, if an interval is in a default relation with another interval, the other interval will itself stand in a default relation with the first interval. These points are obvious.

(17c) may be less obvious at first sight, but we can check it easily considering our minimal model in (10) (repeated below): the intervals b and bcd are in a temporal default relation; so are bcd and d. However, b and d clearly fail to be in a temporal default relation.

(10)



The property of non-transitivity of the temporal default relation has one important consequence: we cannot simply drop one temporal relation, and expect the system to be as expressive as with two temporal relations. Assume that c is our moment of utterance, and that we have got one single temporal default relation. Then, we may reach by this any element of the filter generated

by c, but a, b, d and e are out of range. Assume now that we have got two temporal default relations. We may now attain any element of the lattice: c is in a temporal default relation with the supremum (the supremum being an element of the filter generated by c), and any single interval is an element of the ideal generated by the supremum.

So, even if all temporal relations involved in a given tense (which might be the case of German or French simple present tenses), one may not simply drop one of the two relations: that means, both TENSE and ASPECT will remain obligatory. Given our original commitment to neo-Reichenbachian tense-aspect semantics, this is a welcome feature of the analysis.

2.3. Further Consequences and Possible Applications of this Analysis

The notion and precise definition of a temporal default relation may be useful for approaches dealing with the grammaticalisation of a tense-aspect form. It is often supposed that the grammaticalisation of a form corresponds to a 'rise' of that form in the functional structure of a sentence. For instance, the following process concerning the grammaticalisation of resultative forms to perfects seems to be cross-linguistically very frequent (cf. Meillet 1909/1982; Roberts & Roussou 2003):

(18) a. resultatives *become*
b. perfects *become*
c. past tenses

When is it possible for a form to rise? One may assume that this is the case only if the target position has not been already occupied. But what does it mean to for a functional projection to be 'empty'? In the temporal domain, one may assume that 'emptyness' corresponds to the temporal default relation. The process described in (18) could therefore be formalized as in (19):[12]

(19) a. TU $\circledcirc$ P, P $\circledcirc$ T-Ast, T-Ast $\succ \tau(e)$ [Resultative present] *becomes*
b. TU $\circledcirc$ P, P $\succ$ T-Ast, [Present perfect] *becomes*
c. TU $\succ$ P, [Past]

In (19), no non-default relation blocks the rise of the temporal relation '$\succ$'. Therefore, it can rise into the TENSE-position. Consider what happens with a *pluperfect*:

(20) a. TU $\succ$ P, P $\circledcirc$ T-Ast, T-Ast $\succ \tau(e)$ [Resultative past] *becomes*
b. TU $\succ$ P, P $\succ$ T-Ast, [Past perfect] *cannot become*
c. TU $\succ$ P, [Past]

The TENSE-position in (20) is already occupied by a non-default relation, namely '$\succ$': therefore, a *pluperfect* is predicted not to able to become a past tense, because the TENSE-position is already occupied.

[12] P is the point of perspective, introduced by Kamp & Reyle (1993). In Schaden (2007), I have argued for the necessity of integrating such a point P into a framework in the style of Klein (1994).

A rather unexpected consequence of the analysis advocated here is that we can show that imperfective and perfective aspect are situated on a Horn-scale, where the imperfective aspect is the strong member of the pair:

(21) perfective $<$ imperfective

Horn-scales (cf. Horn 1989) are scales of asymmetrical entailment, and are often used to explain the pragmatic inferences some quantifiers give rise to:

(22) some $<$ all
  a. Mary has eaten some apples.
  b. Mary has eaten all apples.

(22b) entails (22a), but (22a) does not entail (22b). Therefore, (22b) is said to *entail asymmetrically* (22a). Such scales are used in pragmatics to explain why sentences like (22a) are interpreted generally as *Mary has eaten some apples, but not all apples*, although this is not the truth-conditional content of such a sentence.[13] The argument goes roughly as follows: if the speaker of (22a) would have known (22b) to be true, he would have violated the Gricean maxim of quantity ("say as much as you can") in uttering (22a). Therefore, the speaker either does not know whether (22b) is true, or he knows that (22b) is false. In this way, we have explained why we get the inference.

A somewhat similar phenomenon in the tense-aspect system has been known for quite some time: sentences with perfective aspect entails asymmetrically the corresponding sentences with imperfective aspect:

(23) a. John drew a circle.
  b. John was drawing a circle.

(23a) asymmetrically entails (23b), and therefore we should expect the perfective to be strong member of the pair, and not the imperfective. So, how could it be possible that imperfective aspect could ever in a general way asymmetrically entail perfective aspect, like I have claimed in (21)?

The reasoning goes as follows: on the level of the aspectual projection, imperfective aspect does entail perfective aspect, because in any way, by the definition in (13), the interval denoted by $\tau(e)$ under perfective aspect (written $\tau(e)_P$) will always be included in the interval denoted by $\tau(e)$ under imperfective aspect (written $\tau(e)_I$). More generally, it is provably the case that any element of the ideal generated by the interval of assertion will be included in any element of the filter generated by that same interval:

(24) a. $\tau(e)_P \sqsubseteq \tau(e)_I$, since:
  b. $\forall x, y, z[x \in [z) \wedge y \in (z] \rightarrow y \sqsubseteq x]$[14]

[13]This can be shown as follows:

Mary has eaten some apples; in fact, she ate all of them.

The continuation should be infelicitous if the meaning of *some* were *some, but not all*.

Thus, choosing imperfective view-point aspect amounts for the speaker to asserting something for a longer period of time, and is therefore more informative (at the level of the ASPECT-feature) than perfective aspect.

It is easy to see why this Horn-scale on the rather abstract level of the ASPECT-feature does not carry over readily to cases like (23): in order to affect the sentence as a whole, the properties of the eventuality under perfective and imperfective aspect must be comparable. Crucially, this means that the eventuality must have the subinterval property, which is not the case in (23). Additionally, the interval of assertion must be stable between two sentences in order to maintain the scalar relationship. There is not guarantee either for this in (23).

These are quite restrictive conditions, but if they are respected, we do indeed get the entailment from imperfective to perfective sentences. Consider (25):

(25) John has been in Boston since Friday.

If the notion of interval of assertion has any descriptive content, it must apply in (25) to the interval starting at Friday, and lasting up to the moment of speech. Now, (25) has got an existential and a universal reading. Under the existential reading, John must have spent at least some subinterval of the relevant period in Boston. This is a perfective reading (because $\tau(e) \subseteq$ T-Ast). Under the universal reading, John must have spent the whole period in Boston, and must still be in Boston at the moment of speech. This is an imperfective reading (because T-Ast $\subseteq \tau(e)$). Notice that here, where T-Ast is fixed by *since Friday*, and where `be_in_Boston` has the subinterval property, the imperfective (universal) reading indeed does entail the perfective (existential) reading.[15]

The discovery of the scalar relation between imperfective and perfective may lead to insights concerning the aspectual behavior of some focus particles, like German *gerade* or Romanian *tocmai*, which, when applied to aspectually unmarked tenses, yield imperfective or progressive readings (cf. Schaden 2007):

(26) a. Als das Feuer ausbrach, setzte Otto seinen Helm auf.
when the fire outbroke, put Otto his helmet on.
(i) 'When the fire broke out, Otto put on his helmet.'
(ii) 'When the fire broke out, Otto was putting on his helmet.'

b. Als das Feuer ausbrach, setzte Otto gerade seinen Helm auf.
when the fire outbroke, put Otto GERADE his helmet on.
(i) *'When the fire broke out, Otto put on his helmet.'
(ii) 'When the fire broke out, Otto was putting on his helmet.'

The aspectually unmarked *Präteritum* may have a perfective or an imperfective reading (although the perfective reading is much more salient in (26a)). However, when applying *gerade* to the main clause, only the imperfective reading subsists. I have argued in Schaden (2007) that

[14]Proof (by contradiction) of (24b): Assume that there are x, y, z such that $x \in [z)$ and that $y \in (z]$, but that $y \not\sqsubseteq x$. But if $x \in [z)$, then $z \sqsubseteq x$ (by definition of the filter), and if $y \in (z]$, then $y \sqsubseteq z$ (by definition of the ideal). But if $y \sqsubseteq z$ and $z \sqsubseteq x$, then $y \sqsubseteq x$ (by transitivity of the partial order). Therefore, we have got a contradiction with the premise.

[15]This has already been noticed by Mittwoch (1988).

this behavior of *gerade* can be explained if one assumes that *gerade* applies to the ASPECT-feature, and that it discards the less informative perfective reading, while retaining the more informative imperfective reading.

3. Conclusion and Perspectives

In this paper, I have shown that standard formalizations of imperfective and perfective aspect can be redefined in a way that provides some insights about the configuration of the tense-aspect system of natural languages. Specifically, the proposed redefinition on partial orders of intervals allows to define a general notion of temporal default relations. It motivates aspectual underspecification approaches, and unveils the scalar relation between perfective and imperfective aspects.

Since events can be (and have been) analysed in lattice-structures, the definitions of perfective and imperfective aspect proposed in this paper could probably be used to investigate whether there exists a homomorphism between theories of aspect using eventuality modification as theoretic tool (like Filip (2000)), for instance), and theories advocating a view-point aspect in the sense of Smith (1991). These two schools of thought might very well turn out to be notational variants, and equivalent concerning the empirical predictions they produce.

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Multiple questions and apparent *wh*-in situ: evidence from Greek

Ourania Sinopoulou

The aim of this paper is to examine the syntactic position of *wh*-in situ in Greek multiple questions. It is argued that non-fronted *wh*-elements in matrix multiple questions do not reside in situ, but move to a higher structural position. On the basis of the similarities between focus and *wh*-constructions, it is proposed that in situ *wh*-elements move to a low focus position at the left periphery of vP (cf. Belletti 2004). Hence, multiple questions are treated on a par with clause-internal focus constructions.

1. *Introduction: the typology of multiple questions cross-linguistically*

It is widely recognized that languages can be divided into five groups according to the way they form multiple questions (see Cheng 1991; Tsai 1994; Richards 2001; Rudin 1988; Pesetsky 2000, among many others).
(i) In English-type languages (such as English, German, Spanish etc.) one *wh*-element fronts and the other(s) stay(s) in situ. An example is given in (1):

(1) Who has bought what?

(ii) In Bulgarian-type languages (also called multiple *wh*-fronting languages) (such as Bulgarian, Serbo-Croatian, Romanian, Polish, Russian) all *wh*-elements front (see Rudin 1988; Bošković 2002; Boeckx & Grohmann 2003, among others). The multiple question in (2) is an example from Bulgarian:

(2) Koj kakvo kupuva?
who what buys
'Who buys what?'

(iii) In Chinese-type languages (such as Chinese, Japanese, Korean) all *wh*-elements stay in situ (see Huang 1982; Watanabe 1992; Hagstrom 1998), as is shown in (3) from Japanese:

(3) Taroo-ga dare-ni nani-o ageta no?
Taroo.NOM who.DAT what.ACC gave Q
'Who did Taroo give what?'

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(iv) French displays properties of both English-type and Chinese-type languages (see Bošković 1998; Boeckx 1999; Mathieu 2004, among others). A multiple question in French can be formed as in (4a), where only one *wh*-element is fronted, or as in (4b), where all *wh*-elements are left in situ:

(4) a. Qu' a-t-il donné à qui?
what has he given to who
b. Il a donné quoi à qui?
he has given what to who
'What did he give to who?'

(v) Finally, Italian and Irish do not form multiple questions (for Italian, see Rizzi 1982; Calabrese 1984, 1992; for Irish, see McCloskey 1979). This is shown by the ungrammatical (5) from Italian:

(5) *Chi ha scritto che cosa?
who has written what
'Who wrote what?'

Turning to Greek, the data in (6) demonstrate that Greek is an English-type language:

(6) a. Pjos agorase ti?
who.NOM bought.3RD.SG what.ACC
b. *Pjos ti agorase?
who.NOM what.ACC bought.3RD.SG
c. *Agorase pjos ti?
bought.3RD.SG who.NOM what.ACC
'Who bought what?'

In the grammatical (6a), one question word is fronted and the other is left in situ, i.e., in the position where a non-*wh*-DP would appear. Compare the multiple *wh*-question in (6a) to the single *wh*-question in (7):

(7) Pjos agorase to vivlio?
who.NOM bought.3RD.SG the book.ACC
'Who bought the book?'

On the other hand, neither multiple *wh*-fronting nor multiple *wh*-in situ are grammatical in Greek, as shown by (6b) and (6c), respectively.

However, the classification of Greek as an English-type language seems problematic in light of the analysis that will follow. The proposed movement of *wh*-in situ to a low focus position clearly differentiates Greek from English and the other languages for which a true *wh*-in situ analysis is standardly assumed. Likewise, Greek cannot be taken to be a Bulgarian-type language, as the in situ *wh*-element is not fronted. This suggests that the multiple *wh*-questions typology should be reconsidered. An alternative typology could be based on the features that trigger the movements of *wh*-elements in multiple questions. Of course, this is an effort that exceeds the goals of the present paper.

This paper is organized as follows. In section 2, I present a number of puzzling Greek data, which seem to require a new analysis. In section 3, I review the argumentation for the analysis of *wh*-movement as focus-movement in Greek. In section 4, I present the focus constructions of Greek and argue that clause-internal focus constructions involve a low focus position, as Belletti (2004) proposes for Italian. As for multiple questions, I propose in section 5 that *wh*-in situ is a focal element that moves to the low focus position that is already established for focus constructions. Section 6 elaborates on this proposal, providing the details of the analysis. Finally, in section 7, I show that alternative analyses cannot readily account for the Greek multiple questions data.

2. The Greek data

It has been repeatedly argued that Greek is a VSO language. In the basic VSO order, the postverbal subject is vP-internal. In the SVO order, which is also grammatical, the subject is a topic occupying an Ā-position in the left periphery of the sentence (see Philippaki-Warburton 1985, 1987; Tsimpli 1990; Alexiadou & Anagnostopoulou 1998, among others).[1] As for *wh*-questions, I assume that they do not exhibit T-to-C movement, following Anagnostopoulou (1994) and Kotzoglou (2005). According to this view, the verb adjoins to the T-head via head-movement and post-verbal material remains in a lower position.

Taking these properties of Greek into consideration, let us consider the word order exhibited in multiple questions.[2] Given that Greek is a single *wh*-fronting language (see section 1 above), we expect one *wh*-element to front and the other to remain in situ, that is, in its base position. In this respect, the word orders exhibited by the multiple questions in (8)-(12) are unexpected:

(8) Pote agorase ti o Janis?
when bought.3RD.SG what.ACC the Janis.NOM
'When did John buy what?'

(9) Tinos edose ti o Janis?
who.GEN gave.3RD.SG what.ACC the Janis.NOM
'Who did John give what?'

(10) Pote doulepse pou i Anna?
when worked.3RD.SG where the Anna.NOM
'When did Anna work where?'

(11) Pjos ide pou tin tenia?
who.NOM watched.3RD.SG where the movie.ACC
'Where did who watch the movie?'

[1] But see Roussou & Tsimpli (2006), Spyropoulos & Revithiadou (2007) for the view that preverbal subjects in Greek are not necessarily dislocated elements.

[2] Throughout this paper, I will restrict myself to multiple questions with only two *wh*-elements, for the sake of simplicity.

(12) Pjos estile ti tis Marias?
who-NOM sent-3RD.SG what-ACC the Mary-GEN
'Who sent Mary what?'

First, in both (8) and (9) the in situ *wh*-object (*ti*) precedes the DP-subject (*o Janis*), thus reversing the expected neutral word order VSO. The fact that a syntactically different *wh*-element fronts in each sentence (namely the *wh*-adverbial *pote* in (8) and the indirect object DP *tinos* in (9)) does not affect the word order of postverbal material.

Second, in multiple questions with an in situ *wh*-adverbial, such as (10) and (11), the *wh*-adverbial (*pou*) immediately follows the verb and precedes the DP-subject (*i Anna*) and the DP-object (*tin tenia*), respectively. In both constructions, the expected order would be V S/O *wh*-adverbial.

Finally, a third word order puzzle is posed by double object constructions such as (12). Following Anagnostopoulou (2003), Georgiafentis & Laskaratou (2003), I understand V-$IO_{[GEN]}$-$DO_{[ACC]}$ to be the basic word order in Greek double object constructions. The multiple question in (12) exhibits the reverse order: The in situ *wh*-DO (*ti*) precedes the IO-DP (*tis Marias*), contrary to what is expected.

The above facts lead to the formulation of the descriptive generalization in (13):

(13) The in situ *wh*-phrases in Greek multiple questions precede all vP-internal constituents.[3]

Below, an account for this generalization will be provided. As has already been mentioned, I will argue that *wh*-in situ moves to a low focus position in the constructions under discussion. The argumentation will be based on the striking symmetries that focus and *wh*-constructions exhibit. Some of these are presented in the following section.

3. Wh-constructions as focus constructions

It is repeatedly noted in the literature that focus and *wh*-constructions seem to be parallel in many respects. This observation is usually based on syntactic, distributional similarities between interrogative *wh*-phrases and focus constituents in various languages, such as Hungarian (see Horvath 1986; Rochemont 1986; Brody 1990), Basque (see Ortiz de Urbina 1989), Bahasa Indonesia/Malay and Kikuyu (an African language spoken in Kenya) (see Sabel 2000), to name but a few of them. Specifically, it has been proposed that *wh*-phrases move to a focus position in these languages.

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[3] A note is in order here concerning multiple questions exhibiting the expected word order, such as the following:

(i) Pote agorase o Janis ti?
when bought-3RD.SG the Janis-NOM what-ACC
'When did John buy what?'

These constructions are not ungrammatical, though some speakers find multiple questions like (8) preferable. This fact does not constitute a problem for the analysis proposed in this paper. On the contrary, based on the view that *wh*-constructions are essentially focus constructions, the grammaticality of (i) is inferred. Specifically, constructions like (i) are parallel to clause-final focus constructions, where the focused constituent occupies the final, most embedded position of the clause (see section 4.1). That is, these are true *wh*-in situ constructions. Still, the main goal of this study is to provide an account for the word order properties displayed by the multiple questions of the main text.

With Greek, it has been convincingly argued by Tsimpli (1990, 1995, 1998) that *wh*-elements introducing matrix *wh*-questions move to a focus position in the left periphery of the clause. Tsimpli's argumentation is based on a number of properties displayed by both *wh*- and focus constructions. The most important ones are listed below:
(i) Both constructions exhibit island effects, as shown by the ungrammatical (14a) and (14b):[4]

(14) a. *Ti$_i$ ides ton andra pou diavaze t$_i$?
what.ACC saw.2ND.SG the man.ACC that was reading.3RD.SG
'What$_i$ did you see the man that was reading t$_i$?'
b. *Tin efimerida ida ton andra pou diavaze t$_i$.
the newspaper.ACC saw.1ST.SG the man.ACC that was reading.3RD.SG
'I saw the man that was reading the newspaper.'

(ii) Both constructions induce WCO effects.[5] This is illustrated by (15a) and (15b):

(15) a. ?*Pjon$_i$ voithise i mitera tou$_i$?
who.ACC helped.3RD.SG the mother.NOM cl.GEN
'Who$_i$ did his$_i$ mother help?'
b. ?*Ton Jani$_i$ voithise i mitera tou$_i$.
the Janis.ACC helped.3RD.SG the mother.NOM cl.GEN
'His$_i$ mother helped John$_i$.'

(iii) In both structures subject-auxiliary/verb inversion is triggered, as shown by the contrasts in (16) and (17):

(16) a. ??Pjon i Maria agapai?
who.ACC the Maria.NOM loves.3RD.SG
b. Pjon agapai i Maria?
who.ACC loves.3RD.SG the Maria.NOM
'Who does Mary love?'

(17) a. ??Ton Petro i Maria agapai.
the Petros.ACC the Maria.NOM loves.3RD.SG
b. Ton Petro agapai i Maria.
the Petros.ACC loves.3RD.SG the Maria.NOM
'Mary loves Peter.'

(iv) There are co-occurrence restrictions between focus phrases and *wh*-phrases, as shown by (18) and (19) (data from Tsimpli 1995:193).[6] A focused and a *wh*-constituent cannot coexist

[4] Throughout the paper, non-*wh* focused phrases will be underlined. No notational distinction between information and contrastive focus will be made, as I do not think that this distinction is valid (see the discussion in section 4.1 below).

[5] It should be noted here that the existence of WCO effects in *wh*-questions has been questioned in the literature regarding Greek (see Catsimali 1990:75-76, Horrocks 1994, among others). There appears to be a dialect split on WCO judgments. Most important for present purposes, speakers who get WCO effects in single *wh*-questions such as (15a) (myself included) also get similar effects in focus constructions like (15b).

[6] A *wh*-phrase and a focus phrase can co-occur in the same sentence only when the *wh*-phrase introduces an embedded *wh*-question, as in (ii) below:

in the same sentence, irrespective of whether either of them is preposed or in situ. This poses a strong argument for the view that there is only one focus position per sentence, which can be occupied either by a focused or by a *wh*-element.

(18) a. *Ti agorase i Maria?
what.ACC bought.3RD.SG the Maria.NOM
b. *I Maria agorase ti?
the Maria.NOM bought.3RD.SG what.ACC
c. *Ti i Maria agorase?
what.ACC the Maria.NOM bought.3RD.SG
'What did Mary buy?'

(19) *Pjos ipe oti tin Maria sinandise?
who.NOM said.3RD.SG that the Maria.ACC met.3RD.SG
'Who said that met Mary?'

(v) In matrix *wh*-questions, *wh*-elements bear focal stress, exactly like their non-*wh* focalized counterparts. Consider the well formed question-answer pair in (20), where the *wh*-phrase (*pjos*) of the question is replaced by a focused phrase (*o Petros*) in the answer.

(20) A: Pjos diavase to arthro?
who.NOM read.3RD.SG the paper.ACC
'Who read the paper?'
B: O Petros diavase to arhtro.
the Petros.NOM read.3RD.SG the paper.ACC
'Peter read the paper.'

(vi) Neither *wh*- nor focused elements can be topicalized, i.e. doubled by a clitic in Clitic Left Dislocation constructions.[7] This is shown by the ungrammaticality of (21a) and (21b).

(21) a. *Ti to theli i Anna?
what.ACC cl.ACC want.3RD.SG the Anna.NOM
'What does Anna want?'
b. *To CD to theli i Anna.
the CD.ACC cl.ACC want.3RD.SG the Anna.NOM
'Anna wants the CD.'

(vii) Both focused and *wh*-phrases can also remain in situ. This is the case in (22a)[8] and (22b).

(ii) O Janis me rotise pote tha figoume.
the Janis.NOM cl.ACC asked.3RD.SG when will leave.1ST.PL
'John asked me when we will leave.'

This is evidence for the view that *wh*-elements introducing embedded interrogatives are not focused, thus allowing another constituent to bear focal stress in this construction (see Tsimpli 1995:193).

[7] D-linked *wh*-phrases can coexist with a resumptive clitic. For these constructions, see Anagnostopoulou (1994).

[8] It should be noted that (22a) is not an echo question, but a standard question asking for new information.

(22) a. Ke o Janis tha feri ti?
and the Janis.NOM will bring.3RD.SG what.ACC
'And what will John bring?'
b. O Janis tha feri to krasi.
the Janis.NOM will bring.3RD.SG the wine.ACC
'John will bring the wine.'

The argumentation for the movement of *wh*-elements to a focus position primarily concerns left-peripheral, ex situ *wh*- and focus constructions, like the ones presented in (14)-(21). However, both focused and *wh*-constituents also appear in other postverbal positions (see (22)). In the following sections, I will direct my attention to postverbal focus constructions, in an attempt to demonstrate that the well-established parallelism between *wh*- and focus ex situ should be extended to postverbal *wh*- and focus constructions. If this proposal is sustainable, it provides evidence for a wider symmetry between the two constructions under discussion.

4. Clause-internal focus constructions in Greek

4.1. Overview of focus constructions

As has already been noted, focused constituents can occupy a number of different positions in Greek focus constructions. Given this criterion, the following focus constructions are distinguished:
(i) Clause-external focus construction, where the focused constituent precedes the verb, occupying the SpecFocP position in the left periphery of the clause. Examples of this construction are given in (23a-d), where the subject DP, the direct object DP, the indirect object DP/PP and an adverbial adjunct are focused, respectively:

(23) a. I Maria tha plini ta pjata.
the Maria.NOM will wash.3RD.SG the dishes.ACC
'Mary will wash the dishes.'
b. Ton Jani filise i Maria.
the Janis.ACC kissed.3RD.SG the Maria.NOM
'Mary kissed John.'
c. Tou Petrou /ston Petro edose o Janis to vivlio.
the Petros.GEN/to-the Petros.ACC gave the Janis.NOM the book.ACC
'John gave Peter the book/the book to Peter.'
d. Avrio fevgi i Maria.
tomorrow is leaving.3RD.SG the Maria.NOM
'Mary is leaving tomorrow.'

(ii) Clause-internal focus construction, where the focused constituent immediately follows the verb, as shown by the following data:

(24) a. Tha plini i Maria ta pjata.
will wash.3RD.SG the Maria.NOM the dishes.ACC
'Mary will wash the dishes.'

b. Filise ton Jani i Maria.
kissed.3RD.SG the Janis.ACC the Maria.NOM
'Mary kissed John.'

c. O Janis edose tou Petrou /ston Petro to vivlio.
the Janis.NOM gave.3RD.SG the Petros.GEN/to-the Petros.ACC the book.ACC
'John gave Peter the book/the book to Peter.'

d. Fevgi avrio i Maria.
is leaving.3RD.SG tomorrow the Maria.NOM
'Mary is leaving tomorrow.'

(iii) Clause-final focus construction, where the focused constituent occupies the final, most deeply embedded syntactic position of the clause. In this construction, the basic word order (VSO or SVO) is preserved. The relevant examples are given in (25):

(25) a. (I Maria) filise (i Maria) ton Jani.
the Maria.NOM kissed.3RD.SG the Maria.NOM the Janis.ACC
'Mary kissed John.'

b. (O Janis) edose (o Janis) to vivlio ston Petro.
the Janis.NOM gave.3RD.SG the Janis.NOM the book.ACC to-thePetros.ACC
'John gave the book to Peter.'

c. (I Maria) fevgi (i Maria) avrio.
the Maria.NOM is leaving.3RD.SG the Maria.NOM tomorrow
'Mary is leaving tomorrow.'

Clause-external and clause-internal focus constructions (see (i) and (ii) above) are narrow focus constructions. Focus projection does not apply with either of these. On the other hand, clause-final focus construction (see (iii) above) permits focus projection, thus giving rise to a number of possible focus interpretations (narrow or wide), depending on the context.[9] Furthermore, clause-final focus construction can be viewed as syntactically unmarked, given that the focused constituent surfaces in its base position and the basic word order of the clause does not change. Hence, this is a focus in situ construction. Nuclear stress (NS) is assigned to the final, most embedded constituent, according to phrasal metrical rules (see Cinque 1993; Zubizarreta 1998). Moreover, construction (iii) differs from narrow focus constructions (i) and (ii) for prosodic reasons as well. As shown by Baltazani (2002:42-43), Greek makes use of categorically different pitch accents to denote wide and narrow foci. Specifically, clause-final elements carry a H* or H*+L nuclear pitch accent (NPA), while fronted narrow foci are realized with a L+H* NPA.

On these grounds, it seems reasonable to suggest that the two exclusively narrow focus constructions need to be syntactically distinguished from the multiply ambiguous clause-final focus construction. This can be achieved if the former are treated on a par as focus ex situ constructions, and the latter as a focus in situ construction. This is the premise that is examined in this paper.

[9] Focus projection is the phenomenon of extension of focus to larger constituents containing the stressed word (see Selkirk 1984). In clause-final focus constructions, where the nuclear stress falls on the most embedded constituent, as for example the object DP in (25a), focus can extend to the whole VP or TP. It should be noted, though, that VSO and SVO do not fair the same with respect to focus projection. VSO is an exclusively wide focus construction that can be used to answer questions like 'What happened?'. As opposed to this, the SVO order permits focusing of the object DP, the VP or the TP, depending on the context.

Before closing this subsection, a note is in order regarding the distinction between information and contrastive focus (see Kiss 1998b). Most of the syntactic analyses proposed for the focus constructions of Greek have either neglected this distinction or have been based on it (see Tsimpli 1995, Georgiafentis 2004). However, the validity of such a distinction has come into question recently. In particular, Brunetti (2003) strongly argues for a unification of focus in Italian, demonstrating that the two types of focus (i.e. information and contrastive) do not exhibit any syntactic or interface differences. Also, Green & Jaggar (2003) question the validity of the syntactic distinction between information and contrastive focus, based on data from Hausa (a Chadic, Afroasiatic language). Brunetti's argumentation has been adopted by Gryllia (2004) and Haidou (2004), (2006), who argue for a unified focus in Greek as well. In light of the discussion above, it seems that a distinction in terms of broad vs. narrow focus might prove to be more theoretically and empirically justified. Therefore, I will accept the idea of unified focus, according to which both kinds of focus can be hosted in both the clause-external and clause-internal focus position.[10]

In the following subsection, I will proceed to examine clause-internal focus constructions, arguing that they involve a low focus position.

4.2. Low focus position in Greek

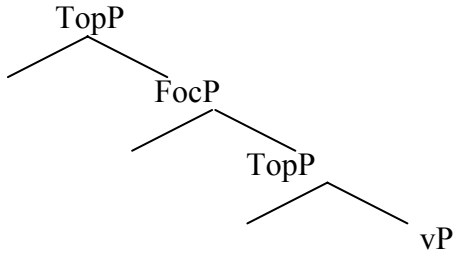
The existence of a low position inside TP/IP, where focused and/or *wh*-elements are hosted, has been proposed for a number of languages, like Hungarian (Kiss 1998a), Chadic (Tuller 1992), Hebrew (Belletti & Shlonsky 1995), English (López & Winkler 2003, Drubig 2003), German (Krifka 1998), Italian (Belletti 2004). For the purposes of the present paper, I will concentrate on the analysis that Belletti (2004) offers for Italian.

Assuming Rizzi's (1997) articulated left periphery (illustrated in (26)), Belletti (2004) proposes the existence of a FocP in the low IP area, right above VP, namely in the left periphery of vP.

(26) [ForceP [TopP* [FocP [TopP* [FinP [IP…

Moreover, she supports the idea that the vP-periphery is symmetric to the CP-periphery, stating that not only there is a low FocP, but also that two low TopPs surround it. The structure she proposes is depicted in (27):

(27)



According to Belletti's analysis, postverbal subjects occupy the low focus position in Italian. An example is given in (28) (data from Belletti 2004:18):

[10] This approach faces the optionality problem. The fact that there are not interpretive differences between clause-external and clause-internal focus constructions entails that focus movement to one or the other focus position is optional. For an interesting discussion of this problem, as well as for a tentative solution, see Brunetti (2003:155-160).

(28) E' partito Gianni.[11]
is left Gianni
'John left.'

Below, I will explore whether it is reasonable to extend Belletti's analysis to the Greek data and, in particular, to the clause-internal focus construction that was presented in section 4.1 above.[12] Consider the relevant data, repeated here for convenience:

(29) a. Tha plini i Maria ta pjata.
will wash.3RD.SG the Maria.NOM the dishes.ACC
'Mary will wash the dishes.'
b. Filise ton Jani i Maria.
kissed.3RD.SG the Janis.ACC the Maria.NOM
'Mary kissed John.'
c. O Janis edose tou Petrou /ston Petro to vivlio.
the Janis.NOM gave.3RD.SG the Petros.GEN /to-the Petros.ACC the book.ACC
'John gave Peter the book/the book to Peter.'
d. Fevgi avrio i Maria.
is leaving.3RD.SG tomorrow the Maria.NOM
'Mary is leaving tomorrow.'

As has already been observed, this is a narrow focus construction, where the focused constituent appears in a clause-medial, postverbal position. This position can host not only a DP-subject (see 29a), but also any other constituent: a direct object DP (see 29b), an indirect object DP/PP in double object constructions (see 29c), an adverbial adjunct (see 29d).[13]

Regarding the word orders exhibited by the data in (29), it is important to note that the base orders can change, so that the focused constituent appears in the relevant post-verbal focus position. This is the case in (29b), where the focused DP-object (*ton Jani*) precedes the defocalised subject, thus changing the neutral VSO order. The same observation holds true for the double object construction in (29c). Assuming the basic order of the objects is $IO_{[GEN]}$ > $DO_{[ACC]}$ (see section 2 above), (29c) exhibits the reverse order, namely $DO_{[ACC]}$ (*to vivlio*) > $IO_{[GEN]}$ (*tou Petrou*). Also, in (29d) a focused adverbial adjunct precedes the DP-subject. On the other hand, when the focused constituent is the postverbal DP-subject (as in 29a), the basic word order is preserved.

The fact that clause-internal focus construction does not exhibit the canonical word order indicates that it is not a focus in situ construction. Rather, it should be treated as a focus ex situ construction, on a par with clause-external focus construction. If this line of reasoning is correct, then Greek has two focus ex situ constructions and a focus in situ construction (that is, the clause-final focus construction presented in section 4.1 above).

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[11] (28) can be a felicitous answer to the question in (iii):
(iii) Chi è partito?
who is left
'Who left?'

[12] For Belletti's theoretical and empirical arguments for the postulation of a low focus position, I refer the reader to her work. Also, in the following analysis I will make reference only to the low focus position, in essence disregarding the proposed low topic positions, as these are not directly relevant to my topic.

[13] In Italian, on the contrary, the low focus position is only occupied by subject DPs. For this reason, Belletti's analysis is limited to constructions with a postverbal focused subject (see (28) in the main text).

In light of this discussion, the postulation of a low focus position seems plausible, as it captures the word order properties of clause-internal focus constructions. Following Belletti (2004), I take the low vP-peripheral focus position to display Ā-properties, as is also the case with the high CP-peripheral focus position. In terms of the hypothesis that clause-internal focused constituents overtly move to the low focus position, the emergence of WCO and reconstruction effects is expected. Indeed, this is the case with Greek, as exemplified by (30) and (31), respectively:

(30) ?*Voithise ton Jani$_i$ i mitera tou$_i$.
helped.3RD.SG the Janis.ACC the mother.NOM cl.GEN
'His$_i$ mother helped John$_i$.'

(31) a. Pistevi ston eafto tou$_i$ o Janis$_i$ ~~ston eafto tou$_i$~~.
believe.3RD.SG in-the self.ACC cl.GEN the Janis.NOM
'John believes in himself.'

b. Sinadise ton filo tou$_i$ to kathe agori$_i$ ~~ton filo tou$_i$~~.
met.3RD.SG the friend.ACC cl.GEN the every boy.NOM
'Every boy$_i$ met his$_i$ friend.'

vP-peripheral foci induce WCO effects, as shown by (30) (cf. the CP-peripheral focus construction in (15b)). In (31a), the moved focused phrase (*ston eafto tou*) reconstructs and the reflexive is successfully bound by the R-expression (*o Janis*). Likewise, a variable binding reconstruction effect is attested in (31b). Once again, the focused constituent reconstructs, so that the clitic pronoun (*tou*) is bound by the quantifier phrase (*to kathe agori*).

The low focus analysis proposed here is further supported by the intonational properties of clause-internal focus constructions. All the relevant data in (29) are pronounced with the main stress on the postverbal focus, but without an intonational break after it. This is evidence for the fact that postfocal material is not right-dislocated but occupies a vP-internal position. Hence, the focused constituent raises to a structurally higher position, such as the Spec of the low FocP.

An alternative way to account for the syntactic and intonational properties of clause-internal focus constructions is to propose that the postverbal focused constituent actually moves to the high CP-peripheral focus position. This movement is followed by remnant TP-movement to a position above the focused constituent, such as SpecTopP. Georgiafentis (2004) has proposed one such analysis to account for constructions with a postverbal (contrastively) focused constituent in Greek. With this analysis, (29a) (repeated here as (32a)) is derived as shown in (32b):

(32) a. Tha plini i Maria ta pjata.
will wash.3RD.SG the Maria.NOM the dishes.ACC
'Mary will wash the dishes.'

b. $[_{TopP}\,[_{TP}$ tha plini $[_{vP}\ t_i \ldots t_k]]]\ [_{FocP}$ i Maria$]_i\ [_{TopP}$ ta pjata$]_k\ t_{TP}$

The derivation in (32b) involves (i) topicalization movement of the DP-object (*ta pjata*) to a left peripheral topic position, (ii) overt movement of the focused subject (*i Maria*) to the CP-peripheral focus position, and (iii) remnant TP-movement to a higher topic position.

However, similar accounts face a number of difficulties. The most important is, perhaps, the fact that the trigger for remnant movement is not clear. Even if we understand remnant

movement to signal topicalization of defocalized constituents, it will be difficult to account for constructions where remnant movement does not apply. An example is given in (33), where the focused subject (*i Maria*) moves to the CP-peripheral focus position, exactly like in (32), only this time remnant TP-movement does not apply, despite the defocalized/topicalized status of TP.[14]

(33) a. I Maria tha plini ta pjata.
the Maria.NOM will wash.3RD.SG the dishes.ACC
'Mary will wash the dishes.'
b. $[_{FocP}$ i Maria$]_i$ $[_{TP}$ tha plini $[_{vP}$ t_i ta pjata]]

As opposed to the remnant movement analysis, the low focus analysis advocated here does not face similar difficulties, since it does not involve remnant topicalization movements.

In summary, in this section it has been argued that clause-internal focus constructions are in fact low focus constructions. The focused constituents are not in situ, but move to the low vP-peripheral focus position, which has been proposed by Belletti (2004) for Italian. In the following section, I will elaborate on the idea that multiple questions and clause-internal focus constructions can be subsumed under a common analysis, namely the low focus analysis.

5. Wh-in situ moves to the low focus position

In this section, I return to the issue of multiple questions, in an attempt to offer an explanation for the generalization in (13), repeated here:

(13) The in situ *wh*-phrases in Greek multiple questions precede all vP-internal constituents.

Building on the low focus analysis supported in the previous section, it will be argued that in situ *wh*-elements in multiple questions are focused elements that move to the low focus position in the periphery of vP. Such an approach requires that the low focus position can be filled by both focused and *wh*-elements, exactly like the high CP-peripheral focus position. If this proposal is correct, the symmetry between clause external focus and *wh*-constructions that was already described (recall the common properties presented in section 3 above) can be extended to clause-internal focus-constructions and multiple questions, which is a welcome result.

To begin with, the following observations are in order, regarding the status of *wh*-in situ as a focal element. First, the presence of a focused constituent in a multiple question gives rise to ungrammaticality in Greek, as shown by (34a):

(34) a. *O Janis pote pige pou?
the Janis.NOM when went.3RD.SG where
'When did John go where?'

[14] Of course, one might assume that the TP in (33) in not in situ, but that it has moved to a left-peripheral TopP lower than the FocP. Following this reasoning, one would have to expect remnant movement in all cases of remnant topicalized material, which, in my view, is not a very natural conclusion. For extensive argumentation against the remnant movement analysis, see Brunetti (2003:133-4).

The same observation also holds for the other *wh*-in situ constructions in Greek, namely single *wh*-in situ interrogatives (see fn. 8) and echo questions. The relevant data are provided by (34b) and (34c), respectively.

(34) b. *[Ke] o Janis tha kani ti?
[and] the Janis.NOM will do.3RD.SG what.ACC
'[And] what will John do?'
c. *I Anna pandreftike PJON?
the Anna.NOM married.3RD.SG who.ACC
'Anna married WHO?'

The ungrammatical *wh*-in situ constructions under (34) are reminiscent of the single *wh*-question (18a), repeated below, which is also ungrammatical:

(18) a. *Ti agorase i Maria?
what.ACC bought.3RD.SG the Maria.NOM
'What did Mary buy?'

Recall from section 3 that the ungrammaticality of (18a) is attributed to the fact that there is a unique focus position in matrix clauses. Given the focal status of *wh*-elements in matrix questions, the presence of a focused constituent is ruled out. Thus, the ungrammaticality of the constructions in (34) is easily accounted for, if *wh*-in situ is focused. This is a plausible suggestion, since these three constructions all have *wh*-in situ elements. As expected, the coexistence of *wh*-in situ with a focused constituent is not tolerated.[15]

Second, Tsimpli (1998:fn. 8) concludes that *wh*-in situ is focused, based on the observation that in situ *wh*-phrases cannot introduce embedded interrogatives. In Greek, *wh*-elements introducing embedded questions are not focused, as exemplified by the fact that they can coexist with a focused constituent. This is the case in (35) (see also fn. 7):

(35) O Janis anarotjeme ti tha kani.
the Janis.NOM wonder.1ST.SG what.ACC will do.3RD.SG
'I wonder what John will do.'

However, in situ *wh*-elements cannot introduce embedded questions, as shown by (36):

(36) *Anarotjeme tha kani ti.
wonder.1ST.SG will do.3RD.SG what.ACC
'I wonder what he/she will do.'

As Tsimpli notices, the ungrammaticality of (36) shows that an in situ *wh*-question "cannot satisfy the *wh*-selectional requirements of verbs like *wonder* (*anarotjeme*), indicating that the

[15] Note that the ungrammaticality of (34a) arises also when the focused constituent (*o Janis*) is postverbal, as in (iv) and (v):

(iv) *Pote pige o Janis pou?
when went.3RD.SG the Janis.NOM where
(v) *Pote pige pou o Janis?
when went.3RD.SG where the Janis.NOM
'When did John go where?'

in-situ option does not characterize [+wh] elements in Greek but [+wh, +f] phrases only". Hence, *wh*-in situ is necessarily focused.

Third, this conclusion is further supported by the intonational properties of multiple questions. Specifically, it is the in situ *wh*-element that bears focal stress. Fronted *wh*-elements are pronounced with a flat intonation, contrary to their fronted counterparts in single *wh*-interoggatives, which carry the NPA of the sentence (see Baltazani 2002:65-72).

Finally, the information structure of answers to multiple questions points to the conclusion that in situ *wh*-elements are focused. As mentioned in section 3, in well-formed (single) question-answer pairs, the *wh*-element of the question gets replaced by a focused constituent in the answer (see (20)). For multiple questions, consider the well-formed question-answer sequence in (37):

(37) A: Pjos agorase ti?
who.NOM bought.3RD.SG what.ACC
'Who bought what?'

B: O Janis agorase ena vivlio, o Petros agorase ena CD…
the Janis.NOM bought.3RD.SG a book.ACC the Petros.NOM bought.3RD.SG a CD.ACC
'John bought a book, Peter bought a CD…'

In the pair-list answer above, the DP-objects (*ena vivlio, ena CD*) corresponding to the *wh*-in situ (*ti*) are focused and bear the NS, as expected. On the contrary, the DP-subjects (*o Janis, o Petros*) that replace the fronted *wh*-element (*pjos*) are not focused.[16]

On the basis of these observations, it can be safely concluded that *wh*-in situ in Greek multiple questions is focused. Given also that (i) there is a low vP-peripheral focus position filled by clause-internal focused phrases and that (ii) fronted *wh*-elements in direct single questions occupy a focus position, I am led to the reasonable hypothesis that *wh*-in situ moves to the low focus position in the multiple questions under discussion (repeated below from section 2).[17] In the remainder of this section, more arguments will be offered in support of this hypothesis.

(38) a. Pote agorase ti o Janis?
when bought.3RD.SG what.ACC the Janis.NOM
'When did John buy what?'

b. Tinos edose ti o Janis?
who.GEN gave.3RD.SG what.ACC the Janis.NOM
'Who did John give what?'

c. Pote doulepse pou i Anna?
when worked.3RD.SG where the Anna.NOM
'When did Anna work where?'

[16] The DP-subjects of the pair-list answer might be better described as contrastive topics, which are distinguished from both topics and foci, on the basis of their semantic/pragmatic and intonational properties (see Büring 2003). For contrastive topics in Greek, though not in these contexts, see Alexopoulou (1996).

[17] However, I will continue to use the term *wh*-in situ, to distinguish the non-fronted *wh*-phrase from the fronted one.

d. Pjos ide pou tin tenia?
who.NOM watched.3RD.SG where the movie.ACC
'Where did who watch the movie?'

e. Pjos estile ti tis Marias?
who.NOM sent.3RD.SG what.ACC the Mary.GEN
'Who sent Mary what?'

(i) Based on the hypothesis above, the word orders exhibited by the multiple questions in (38) are expected. The fact that *wh*-in situ immediately follows the verb can be readily explained as a result of movement to the low focus position. In this respect, compare (38a) to the clause-internal focus construction in (39) below. Both display the same word order of postverbal material. The focused *wh*-/DP-object precede the DP-subject. Likewise, a comparison of (38b-38e) to the focus constructions in (29) confirms that the same word order is attested in both cases.

(39) Agorase <u>to vivlio</u> o Janis.
bought.3RD.SG the book.ACC the Janis.NOM
'John bought <u>the book</u>.'

(ii) The proposed movement of *wh*-in situ to the low focus position gives rise to WCO violations and reconstruction effects, as shown by (40) and (41), respectively:

(40) ?*Pote voithise $pjon_i$ i mitera tou_i t_i?
when helped.3RD.SG who.ACC the mother.NOM cl.GEN
'When did his_i mother help $whom_i$?'

(41) a. Pote sas edikse pjes fotografies tou eaftou tou_i o $Janis_i$ ~~pjes fotografies tou eaftou tou_i~~?
when cl.ACC showed.3RD.SG which pictures.ACC the self.GEN cl.GEN the Janis.NOM
'When did John show you which pictures of himself?'

b. Pote sinadise pjon filo tou_i to kathe $agori_i$ ~~pjon filo tou~~?
when met.3RD.SG which friend.ACC his.GEN the every boy.NOM
'When did every boy meet which friend of his?'

As is the case with clause-internal focus constructions (see (30)), in (40) the movement of *wh*-in situ (*pjon*) over a non-c-commanding coindexed pronoun (*tou*) induces a WCO effect. In (41a) and (41b), the moved *wh*-in situ phrases reconstruct in their base position, indicated by strikethrough typeface (cf. the corresponding focus constructions in (31)).

(iii) There is not an intonational break (a comma intonation) between *wh*-in situ and the constituents to its right. This excludes the right-dislocation analysis of post *wh*-in situ material. The same holds for post-focal material in clause-internal focus constructions, as pointed out in section 4.2 above.

The above observations support the analysis provided here, according to which multiple *wh*-questions are essentially treated on a par with clause-internal focus constructions. The following section elaborates on the proposed analysis in more detail, making special reference to feature checking.

6. Analysis

The analysis presented in this section is formulated in terms of the feature checking theory developed within the minimalist framework. Chomsky (2000) argues that overt *wh*-movement is triggered by an EPP feature of the interrogative C. The C-head and the *wh*-element enter an Agreement relation. Specifically, the functional head (i.e. the interrogative C) carries an uninterpretable Q-feature (*u*[Q]) and probes for a matching goal. The *wh*-element carries an interpretable Q-feature which checks (or values) the *u*[Q]-feature of C under Q-agreement, as shown in (42).[18]

(42) C – *wh*-phrase
u[Q], [EPP] [Q]

Q-Agreement

Focus movement can be treated in an analogous way, if the focus head carries an uninterpretable focus feature (*u*[Foc]) that is 'checked off' via Agree(ment) with the interpretable focus feature of the focused phrase, as shown in (43). Focus movement is triggered by the EPP-feature of the focus head.

(43) Foc – focused phrase
u[Foc], [EPP] [Foc]

Foc-Agreement

Turning to multiple questions, it has already been concluded that in situ w*h*-elements are focused. Therefore, in situ *wh*-phrases bear a focus feature, on a par with non-*wh* focused constituents. It is not a novel assumption that *wh*-elements may carry a focus feature. In Sabel's (1998, 2000) crosslinguistic analysis of *wh*-constructions, it is argued that in a number of languages (eg. Hungarian) *wh*-movement is triggered by a (strong) focus feature. Hence, *wh*-phrases not only check *wh*-features but also focus features. The conclusion reached in section 5 above, namely that *wh*-in situ moves overtly to a low focus position is compatible with such an analysis.

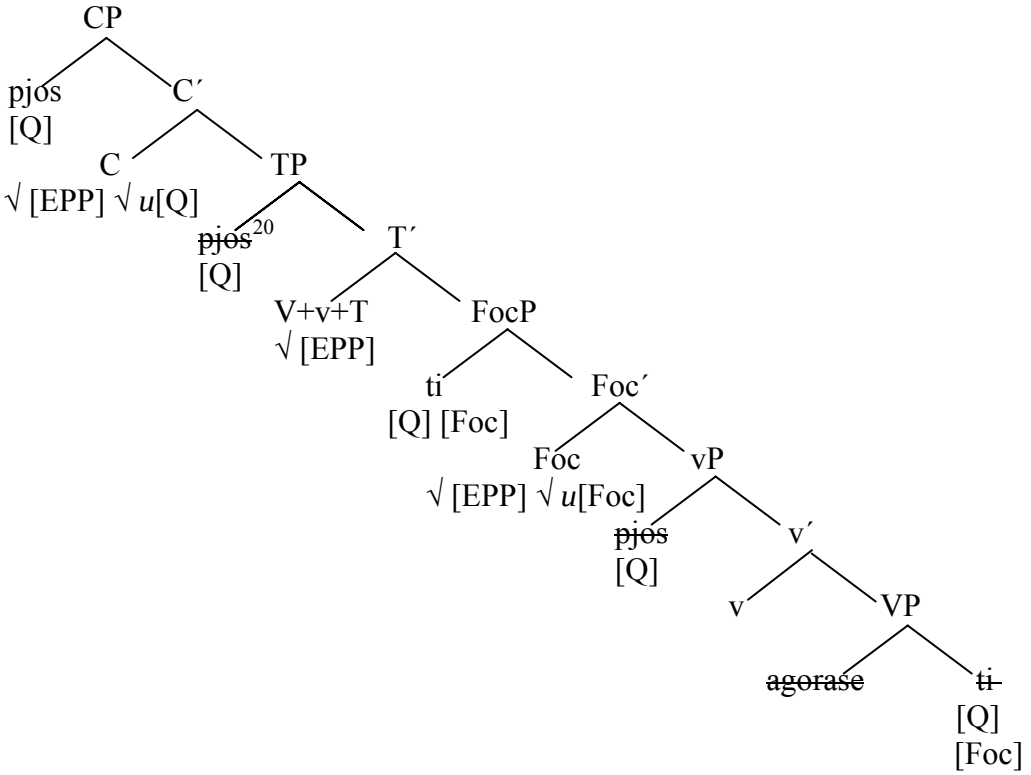
Along these lines, the short-distance matrix multiple question in (44) has the structure schematically represented in (45) (irrelevant features and derivational steps are omitted):[19]

(44) Pjos agorase ti?
who.NOM bought.3RD.SG what.ACC
'Who bought what?'

[18] In Chomsky (2000:128) it is argued that *wh*-elements also bear an uninterpretable *wh*-feature that renders them 'active', i.e., visible to the C-head and available for movement. Here, I will disregard this feature, as it does not directly affect the proposed analysis.

[19] In the diagram, strikethrough denotes movement. The symbol √ is used to denote feature checking.

(45)



The two *wh*-phrases differ in that only one (*ti*) bears a focus feature. The focus head agrees with the focused *wh*-phrase (i.e. *ti*) and the u[Foc]-feature is checked. The EPP-feature of the focus head triggers overt movement of the *wh*-in situ to SpecFocP. Likewise, the C-head probes for a matching element and agrees with the *wh*-subject *pjos*. Q-agreement is established and the *wh*-phrase fronts via *wh*-movement triggered by the EPP-feature of C. As far as the semantic interpretation of multiple questions is concerned, I assume that the pair-list reading, which is the canonical reading of Greek multiple questions, arises through a mechanism that somehow associates the C-head with *wh*-in situ.[21] In other words, the pair-list reading arises, when both *wh*-phrases are associated with the same C.

A prediction of the proposed analysis is that there should be no superiority effects in Greek. Interestingly, this prediction is verified by data such as (46):

(46) Ti agorase pjos?
what.ACC bought.3RD.SG who.NOM
'What did who buy?'

[20] For expository purposes, the subject *wh*-phrase (*pjos*) is shown here to pass through SpecTP, before reaching the left periphery. Note, though, that movement of the subject to SpecTP does not take place in the framework of analyses that either dispute the existence of the SpecTP position in Greek (cf. Kotzoglou 2005) or counterpropose that the EPP-feature of T is checked by the verbal ending (cf. Alexiadou & Anagnostopoulou 1998). For the syntactic position of the subject in Greek, see also section 2 (fn. 1).

[21] The association of *wh*-in situ with the interrogative C could be achieved by unselective binding (see Pesetsky 1987) or by existential closure involving a choice function interpretation for *wh*-in situ (see Reinhart 1998). In both cases, the moved *wh*-in situ does not need to undergo further movement (overt or covert) for semantic reasons, i.e., to get wide scope.

In (46), the *wh*-subject (*pjos*) is focused. As expected, it moves to the low focus position, while the non-focused *wh*-element fronts.[22]

So far, I have limited my attention to short-distance multiple questions. Long-distance multiple questions are also possible in Greek, as shown by the data under (47).

(47) a. Pjos theli na didaksi ti?
who.NOM want.3RD.SG to teach.3RD.SG what.ACC
'Who wants to teach what?'

b. Pote pistevis oti tha figi pjos?
when believe.2ND.SG that will leave.3RD.SG who.NOM
'When do you believe that who will leave?'

c. Pjos efige [$_{AdjP}$ xoris na xeretisi pjon]?
who.NOM left.3RD.SG without to greet.3RD.SG who.ACC
'Who left without greeting whom?'

Extending the analysis developed for short-distance multiple questions to these data, I propose that *wh*-in situ moves overtly to the low focus position of the embedded clause. The long-distance multiple question in (47c) differs from (47a) and (47b) in that it disallows the pair-list reading. Note that *wh*-in situ is inside a strong adjunct island in (47c) but not in (47a) and (47b). This asymmetry indicates that the mechanism responsible for the pair-list reading (see fn. 21) is blocked whenever a strong island intervenes between the matrix interrogative C and *wh*-in situ.[23]

Finally, under the proposed analysis, the ambiguity of (48) finds a natural explanation.

(48) Pjos kseri pou tha vroume ti?
who.NOM know.3RD.SG where will find.1ST.PL what.ACC
'Who knows where we will find what?'

Example (48) has two readings, depending on the scope of *wh*-in situ: (i) a matrix multiple question reading, which arises when *wh*-in situ takes wide scope, and (ii) a single *wh*-question reading, which arises when *wh*-in situ takes narrow scope. The two readings are reflected by the answers in (49a) and (49b), respectively:

(49) a. O Janis kseri pou tha vroume <u>kafe</u>,
the Janis.NOM know.3RD.SG where will find.1ST.PL coffee.ACC
o Petros kseri pou tha vroume <u>krasi</u>…
the Petros.NOM know.3RD.SG where will find.1ST.PL wine.ACC…
'John knows where we will find <u>coffee</u>, Peter knows where we will find <u>wine</u>…'

b. <u>O Janis</u> kseri pou tha vroume ti.
the Janis.NOM know.3RD.SG where will find.1ST.PL what.ACC
'<u>John</u> knows where we will find what.'

[22] However, the picture is more complicated, as there are restrictions that regulate the order of *wh*-elements, especially when adverbial *wh*-phrases are involved. *Wh*-adverbs like 'when' (*pote*), 'how' (*pos*) and 'why' (*jati*) are not allowed in situ. Similar restrictions have been repeatedly noted to hold for other languages as well. This phenomenon can be due to purely semantic reasons, as suggested by Reinhart (1998), who argues that adverbial *wh*-phrases are not interpretable in situ via choice functions. Superiority and semantic interpretation of Greek multiple questions need to be investigated further in future research.

[23] For similar observations about the readings of long-distance multiple questions in English, see Dayal (2002).

According to the analysis defended here, the wide scope reading arises from a construction where the in situ *wh*-element (*ti*) is focused. The narrow reading arises when the fronted *wh*-element (*pjos*) is focused. The outcome in this case, is a multiple question embedded under a single *wh*-question. Note also that there are two different prosodic contours, corresponding to the two constructions under discussion. In each case, the main stress of the sentence falls on the focused constituent, namely the fronted (*pjos*) or the in situ (*ti*) *wh*-element. If this line of reasoning is correct, the ambiguity of (48) finds a straightforward explanation.

In conclusion, the analysis proposed for short-distance multiple questions can be directly extended to long-distance multiple questions. In the following section, I review and dismiss two alternative analyses for multiple questions.

7. Alternative analyses

The idea that the in situ *wh*-phrase only apparently resides in situ has been previously proposed for a variety of languages. There are two alternative analyses that could be argued as applicable to the Greek data. The first is the multiple *wh*-topics analysis, proposed by Grohmann (2000, 2003, 2006) to account for German multiple questions. The second is the remnant movement analysis, proposed to account for in situ questions in a number of Romance languages. In this final section of the paper, I will argue that neither of these analyses can be extended to Greek.

7.1. The multiple wh-topics analysis

According to Grohmann's (2000, 2003, 2006) analysis, German is a multiple *wh*-fronting language, much like Bulgarian and the other languages of this category (see section 1). In German multiple questions, all *wh*-elements are *wh*-topics (i.e. d-linked[24]) and move overtly to the left (articulated) periphery of the clause.

More specifically, the use of multiple questions in German is regulated by the "Discourse-Restricted Quantification", which is stated as follows:

(50) *Discourse Restricted Quantification* (Grohmann 2000:269): Questions involving two *wh*-expressions are well-formed if the value of both *wh*-expressions is determined by the context; determination of values is satisfied by providing a set of at least two possible referents in the discourse.

What (50) says is that all *wh*-phrases in a German multiple question must be d(iscourse)-linked. However, this felicity condition is not operative in Greek, as shown by (51):

(51) A: Sto collegio tha didaksoun o X, o Y ke o Z.
at-the college.ACC will teach.3RD.PL the X.NOM, the Y.NOM and the Z.NOM
'X, Y and Z will teach at the college.'
B: Pjos tha didaksi ti?
who.NOM will teach.3RD.SG what.ACC
'Who will teach what?'

[24] For the notion of d-linking, see Pesetsky (1987).

A: O X tha didaksi sidaksi, o Y fonologia ke o
the X.NOM will teach.3RD.SG syntax.ACC the Y.NOM phonology.ACC and the
Z morfologia.
Z.NOM morphology.ACC
'X will teach syntax, Y (will teach) phonology and Z (will teach) morphology.'

The use of the multiple question 'Who will teach what?' is felicitous in this context, even though the in situ *wh*-object (*ti*) is not d-linked. Thus, it is not the case that all *wh*-elements in Greek multiple questions are necessarily *wh*-topics, as proposed by Grohmann for German. For this reason, it would not be plausible to suggest that *wh*-in situ moves to a left-peripheral topic position in Greek.

Furthermore, there are purely syntactic arguments against the multiple *wh*-topics analysis. Given that the verb raises only as far as T in Greek *wh*-interrogatives (see the references cited in section 2), there can be no way for *wh*-in situ to move to any position in the left periphery of the clause. Grohmann's account thus leads to the false prediction that *wh*-in situ has to surface to the left of the inflected verb. Moreover, in multiple questions with periphrastic verbs, *wh*-in situ follows both the inflected auxiliary and the participle, which is lower than T.[25] Consider the contrast between (52a) and (52b) from German:

(52) a. Pjos exi kalesi pjon?
who.NOM have.3RD.SG invited who.ACC
'Who has invited whom?'
b. Wer hat wen eigeladen?
who.NOM have.3RD.SG who.ACC invited
'Who invited whom?'

Finally, as argued by Lasnik & Stowell (1991), foci and topics differ in that only the first give rise to WCO effects. If this distinction is real, the fact that the Greek *wh*-in situ triggers WCO effects (see (40) above) shows that it cannot be a topic, as Grohmann's analysis presumes.

To conclude this subsection, the Greek data cannot be accommodated under the multiple *wh*-topics analysis.

7.2. The remnant movement analysis

The remnant movement analysis has been proposed for in situ interrogatives in Romance languages (see Uribe-Etxebarria 2002, for Spanish; Ambar & Veloso 2001 for Portugese, French, Hungarian and Tetum; Munaro et al. 2001; Poletto & Pollock 2004a, 2004b for French, Bellunese and Italian, among others). According to this analysis, *wh*-in situ moves overtly to the left periphery of the clause. This movement is followed by remnant TP-movement over the *wh*-phrase. For example, the in situ question in (53) is derived via the two steps shown in (54) (data from Reglero 2005:335):

(53) [Y] Juan compró qué?
and John bought what?
'What did John buy?'

[25] For the syntactic position of the auxiliary and the participle, see Alexiadou (1997) and references cited therein.

(54) a. [$_{CP}$ qué$_i$ [$_{IP}$ Juan compró t$_i$]] 1st step: movement of *wh*-in situ
b. [$_{XP}$ [$_{IP}$ Juan compró t$_i$]$_j$ [$_{CP}$ qué t$_j$]] 2nd step: remnant TP-movement

An analysis along these lines can, in principle, be extended to multiple questions. On this approach, the derivation of the multiple question in (44) (repeated below) proceeds as shown in (55) and gives rise to the attested word order.

(44) Pjos agorase ti?
who.NOM bought.3RD.SG what.ACC
'Who bought what?'

(55) a. [$_{CP}$ ti$_i$ [$_{IP}$ pjos agorase t$_i$]]
b. [$_{XP}$ [$_{IP}$ pjos agorase t$_i$]$_j$ [$_{CP}$ ti$_i$ t$_j$]]

One problem with this kind of approach is that it predicts that in situ *wh*-elements are not allowed within islands. This is confirmed by the ungrammatical (56) from Spanish (data and glosses from Munaro et al. 2001:157):

(56) *Ho-e da telefonarte invece de'ndar andé?
have-I to phone you instead of going where?
'Where do I have to phone you instead of going?'

However, this prediction is not verified by the Greek data. Island effects, normally exhibited in single *wh*-questions with a fronted *wh*-element (see 57a), are obviated when the *wh*-element is left in situ, as in the long-distance multiple question in (57b):

(57) a. *Pjon$_i$ efige i Maria xoris na xeretisi t$_i$?
who$_i$.ACC left.3RD.SG the Maria.NOM without to greet.3RD.SG
'Who$_i$ did Mary leave without greeting t$_i$?'
b. Pjos efige xoris na xeretisi pjon?
who.NOM left.3RD.SG without to greet.3RD.SG who.ACC
'Who left without greeting whom?'

The grammaticality of (57b) is unexpected under the remnant movement analysis.

A second problem is posed by multiple questions with two in situ *wh*-phrases, like (58). The relevant derivational steps are illustrated in (59a) and (59b):

(58) Pjos edose ti se pjon?
who.NOM gave.3RD.SG what.ACC to who.ACC
'Who gave what to whom?'

(59) a. [$_{CP}$ ti$_i$ se pjon$_j$ [$_{IP}$ pjos edose t$_i$ t$_j$]]
b. [$_{XP}$ [$_{IP}$ pjos edose t$_i$ t$_j$] [$_{CP}$ ti$_i$ se pjon$_j$]]

Under the assumption that every derivational step has to be legitimate, (59a) requires that multiple *wh*-fronting is allowed in Greek, as in Bulgarian-type languages. This, of course, is not the case (recall the ungrammatical (6b) from section 1).[26]

[26] For similar arguments against the remnant movement analysis of Spanish *wh*-in situ see Reglero (2005).

A third problem arises when the word order facts observed in section 2 are taken into consideration. The remnant movement analysis predicts that *wh*-in situ normally surfaces in sentence final position.[27] This is certainly not the case with the Greek multiple questions, where *wh*-in situ precedes vP-internal constituents.[28]

To conclude, there is strong evidence that neither the multiple *wh*-topics analysis nor the remnant movement analysis fare well with respect to the Greek data.

8. Summary

In this paper, the word order exhibited by the Greek multiple questions has been examined. It has been observed that *wh*-in situ precedes other vP-internal constituents in these constructions. Building on the well-known similarities between CP-peripheral focus and *wh*-constructions, I have aimed to analyze multiple questions as focus constructions. First, I have argued that clause-internal focus constructions involve a low focus position. Subsequently, I proposed that *wh*-in situ moves to this clause-internal focus position, due to its focal status. Finally, I have shown that alternative analyses, such as the multiple *wh*-topics and the remnant movement analysis, cannot adequately account for the Greek data.

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Ourania Sinopoulou
University of Athens
ouransin@phil.uoa.gr

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[27] See the "Sentence Final Requirement" proposed by Uribe-Etxebarria (2002) to account for the word order of in situ *wh*-questions in Spanish.

[28] Under the remnant movement analysis, the attested word orders can be derived, if the constituents following *wh*-in situ undergo movement before the application of remnant movement. See the relevant discussion with respect to clause-internal focus constructions in section 4.2.

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Voicing and the Skeleton

Márton Sóskuthy

The main goal of this paper is to show that the behaviour of voicing in obstruents can better be accounted for if we assume that voicing is represented by a specific skeletal configuration rather than by phonological features. It will be shown that previous analyses of voice phenomena run into serious problems, especially when it comes to the representation of voice assimilation and intervocalic voicing. The analysis outlined in the final section of this paper gives a representationally motivated account of voice phenomena in CVCV and manages to unite the effects of voice assimilation, word-final devoicing and intervocalic voicing. The representation proposed here also makes a number of predicitions, which may well prove to be correct: (i) languages with prevoicing in initial stops necessarily have regressive voice assimilation (ii) progressive assimilation and coda devoicing appear only in languages with a contrast based on different phonetic properties (e.g. aspiration).

1. *Introduction*

Ever since the publication of SPE, there has been a marked tendency in phonological thinking to reduce the number of features employed in the description of speech sounds and to devise a more articulate theory of suprasegmental structure. As a result, some traditional features such as [long], [syllabic], and [stress] have been relegated to skeletal and suprasegmental structure. The main benefit of this approach is that it gives a plausible explanation for why certain phonetic properties of sounds (e.g. syllabicity) seem to be so closely tied up with prosodic structure and that it allows us to make a clear distinction between quality and quantity. One set of features whose melodic status has recently been challenged are MANNER FEATURES (for detailed discussion see Szigetvári to appear), as opposed to PLACE and LARYNGEAL features, which arguably have a genuine featural representation. This line of research seems to me as a very promising enterprise, as it helps to build a more streamlined representational vocabulary and it explains the differential behaviour of distinct classes of features.

In this paper, I will argue that a similar alternative is available for the representation of voicing in obstruents. More specifically, I will demonstrate that the feature [voice] (regardless

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of whether it is interpreted as binary or unary) is inadequate for the characterisation of voicing and that the phenomena traditionally associated with [voice] can better be explained by means of skeletal configurations. The paper is structured as follows. In section 2, I will set the scene for the discussion in the rest of the paper by defining the range of phenomena—phonological and phonetic as well—which are relevant to the representation of voicing. In section 3, I will show that previous analyses of voice phenomena are seriously flawed and that the reason why they fail on both theoretical and empirical grounds is that they assume a featural representation for voicing. In section 4, I will give a brief outline of the main assumptions of CVCV, since the following section draws heavily on concepts advocated in this theoretical framework. Finally, in section 5, I will present my analysis and discuss some of its implications.

2. *The preliminaries*

The main goal of this section is to define the range of phenomena which are unambiguously related to voicing. First of all, I will provide a list and a short description of those processes that will be referred to as voice phenomena throughout this paper. Then, I will show that there are two different interpretations of voicing in the literature—a broad and a narrow one—and that the narrow one can make better predictions with regard to voice phenomena in different languages. Finally, I will argue that although voice effects are phonetically motivated, they have to be accounted for in the domain of phonology.

2.1. *Voice phenomena*

As the present paper intends to provide a unified solution to a number of different phenomena related to voicing, I will first have to clarify which phonological events are relevant from the perspective of the analysis to be presented. There are four different patterns that will be referred to under the label 'voice phenomena' in the rest of the paper: VOICE ASSIMILATION, WORD-FINAL DEVOICING, SYLLABLE-FINAL DEVOICING (or CODA DEVOICING) and INTERVOCALIC VOICING.[1] All of these phenomena can be interpreted as cases of neutralisation, although the range of environments in which they occur and their effects are rather diverse. In what follows, I will point out the defining properties of these processes and show how they can interact with each other in different languages.

VOICE ASSIMILATION is a cross-linguistically well-attested process, whereby one of two adjacent obstruents loses its original specification for voice and assumes that of the other one. This can be formulated as the following SPE-type rule:

(1) $[+\text{obstruent}] \rightarrow [\alpha \text{ voice}] \;/\; __ \begin{bmatrix} +\text{obstruent} \\ \alpha \text{ voice} \end{bmatrix}$

[1]These patterns may manifest themselves in the form of phonologically conditioned alternations, distributional restrictions (i.e. even though the language does not have the morphological mechanisms which would create the relevant environment for a neutralisation pattern to show itself in the form of an alternation, it cannot maintain a voice contrast in weak positions, e.g. Thai (Lombardi 1995)) and diachronic processes.

It should be pointed out that the above rule exemplifies REGRESSIVE voice assimilation, in which case it is the second obstruent that determines the voicing of the cluster. Although PROGRESSIVE voice assimilation is also attested in a number of languages, it appears that these two phenomena are rather different in nature. Crucially, progressive voice assimilation is (i) much rarer than its regressive counterpart, (ii) very often morphologically conditioned (e.g. the English plural suffix) and (iii) more closely connected to aspiration than to actual voicing (see van Rooy & Wissing 2001:312ff; for a discussion of what is meant by 'actual voicing' see 2.2). A few examples of regressive voice assimilation taken from Hungarian are shown below in (2):

(2)	keré[k]	'wheel'	keré[gb]en	'in the wheel'
	ala[p]	'base'	ala[bz]at	'plinth'
	veré[b]	'sparrow'	veré[pt]ől	'from the sparrow'
	gő[z]	'steam'	gő[sf]ürdő	'steam-bath'

WORD-FINAL DEVOICING is another frequent and well-documented phenomenon connected to voicing. As is suggested by the name of this process, obstruents can never surface as voiced at the end of the word in languages with word-final devoicing. We can express this generalisation as follows:

(3) $[+\text{obstruent}] \rightarrow [-\text{voice}] \,/\, __\ \#$

Word-final devoicing differs from voice assimilation in two important respects: it is restricted to the end of the word and the affected consonant loses its voice specification entirely—that is to say it does not assimilate to the following consonant. This complete loss of contrasts along a given dimension in a certain position is called REDUCTIVE NEUTRALISATION in Trubetzkoyan terms, as opposed to ASSIMILATIVE NEUTRALISATION, which is exemplified by voice assimilation. Dutch is a typical example of languages which suppress voicing in word-final position:

(4)	hui[z]en	'houses'	hui[s]	'house'
	kra[b]en	'to scratch'	kra[p]	'scratch'
	lie[v]eling	'(my) love'	lie[f]	'lovely'
	le[z]en	'to read'	lee[s]	'I read'

SYLLABLE-FINAL DEVOICING resembles word-final devoicing in quite a number of respects: it is also an example of reductive neutralisation and the environment in which it operates overlaps with the environment of the latter. Actually, the structural description of word-final devoicing is a proper subset of the structural description of syllable-final devoicing, which can immediately be seen if one compares the rule in (3) with the one below:

(5) $[+\text{obstruent}] \rightarrow [-\text{voice}] \,/\, __ \begin{Bmatrix} \text{C} \\ \# \end{Bmatrix}$

However, syllable-final devoicing seems to have a number of properties which clearly mark it off from its word-final congener and make it rather similar to progressive voice assimilation. We will return to this issue in section 5.6, where it will be discussed in a more detailed fashion. For the meantime, here are a few examples of this process taken from German:

(6)	run[d]e	'round pl.'	Run[tg]ang	'stroll'
	lö[z]en	'to loosen'	lö[sl]ich	'soluble'
	We[g]e	'way dat.'	We[k]	'way nom.'
	Grä[z]er	'grass pl.'	Gra[s]	'grass sg.'

Finally, INTERVOCALIC VOICING is also one of the processes which affect voicing, although in this case the distinction is neutralised to the seemingly more marked value of the feature [voice]. Languages with intervocalic voicing cannot have plain voiceless[2] obstruents between two vowels:

(7) [+obstruent] → [+voice] / V_V

It is necessary to point out that intervocalic processes whereby voiceless obstruents become sonorants (e.g. flapping in English) do not count as genuine instances of voicing from the point of view of the present paper. The reason for this is that sonorants lack active voicing, which means that they are not specified for the feature responsible for voicing in obstruents.[3] As the emergence of sonorants from underlying voiceless obstruents in intervocalic position does not produce active voicing, the feature [voice] seems not to be involved in this alternation—therefore, such processes are completely irrelevant to the present discussion, since they do not tell us anything about the representation of voicing in obstruents.

One might also wonder whether this process should be understood as an instance of assimilative or reductive neutralisation. Although traditional analyses formalised in the spirit of SPE might claim that the obstruent actually assimilates to the flanking vowels, such an approach seems rather dubious in view of what we have just established about the difference between passive voicing in sonorants (including vowels, of course) and active voicing in obstruents. More specifically, it is impossible to say that the obstruent takes on the voice specification of any of the neighbouring vowels, as these cannot convincingly be argued to be specified for this feature. Hence, one is forced to stipulate that this process is a case of reductive neutralisation. However, it will be shown in section 3.4 that this conclusion is also not plausible in frameworks where voicing is represented by a privative feature (and, more generally, in any framework where voicing in obstruents is considered to be marked *per se*). To conclude the discussion of intervocalic voicing, a few examples from the evolution of Spanish are given below:

[2]It is important to note that voiceless aspirates normally remain unaffected by this process, German and Korean being two prime examples in point (these two languages are usually argued to have a contrast based on aspiration instead of voicing).

[3]For more on passive or spontaneous voicing in sonorants see Harris (1994:135).

(8)

LATIN		SPANISH	
lupu	>	lobo	'wolf'
vi:ta	>	vida	'life'
fi:ku	>	higo	'fig'

It remains to be seen how these phenomena can combine with each other in different languages. First of all, voice assimilation can appear on its own (e.g. in Hungarian) or accompanied by word-final devoicing (e.g. in Dutch). Syllable-final devoicing is obviously almost entirely incompatible with voice assimilation since there is a considerable amount of overlap between their domains (i.e. both affect obstruents in the coda). There is, however, one case where a language with voice assimilation can, in fact, have reductive neutralisation in the coda: when the following consonant is a heterosyllabic sonorant.[4] Since word-final devoicing and syllable-final devoicing seem to be in a subset-superset relationship, it is not surprising that syllable-final devoicing implies word-final devoicing. On the other hand, there is another, much more interesting implicational relationship, stated explicitly by Steriade (1997): 'voicing neutralisation never occurs finally without also occurring in pre-obstruent position' (ibid. 7). This actually means that a language with word-final devoicing must also have either syllable-final devoicing (e.g. German) or voice assimilation (e.g. Russian). Finally, intervocalic voicing may freely combine with each of the processes mentioned above, which is just what one would expect, given that its structural description does not overlap with that of the others at all.

2.2. Two interpretations of voicing

The quotation below is a typical textbook definition of the feature [voice]:

> Voiced/voiceless: [+/−voice]. Sounds produced with vibrations of the vocal cords are voiced; voiceless sounds are produced with a glottal opening so wide that it will prevent vocal vibration if air flows through it. (Durand 1990:54)

This definition clearly exhibits a bias towards articulation as opposed to acoustic characteristics, which is far from surprising given that the original feature system of SPE was based on articulatory notions. Although the representation of laryngeal activity proposed in Halle & Stevens (1971) offers a somewhat more sophisticated solution to the encoding of voicing, the essence of the analysis remains the same: voicing equals vocal cord vibration.[5] The crucial problem with this assumption is that it disregards the fact that the voice value of stop consonants seems to depend more on the relative timing of laryngeal and supralaryngeal events than the presence or absence of phonation *per se*.

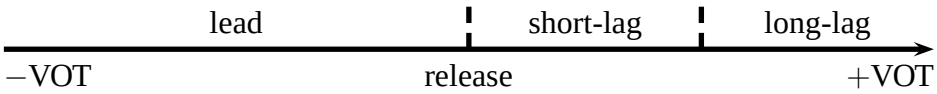
There is, however, an alternative to the interpretation of the feature [voice] which captures the temporeal aspects of voicing better than the traditional articulatory definition: the dimension of

[4] An example in point is Dutch, where syllable-final obstruents cannot surface as voiced before a heterosyllabic sonorant.

[5] For an overview see Durand (1990:54-57).

Voice Onset Time (VOT).[6] According to this assumption, voicing is a function of the amount of time between the onset of voicing and the release of the stop. This can be illustrated as follows:

(9)



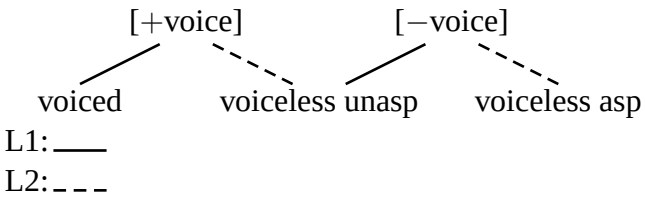
(10)

lead VOT	=	voiced	
short-lag VOT	=	voiceless unaspirated	
long-lag VOT	=	voiceless aspirated	

The chart in (9) shows how the dimension of VOT can be divided into three distinct intervals. If the onset of voicing precedes the release phase of the stop there is closure voicing which makes the stop likely to be perceived as voiced (e.g. [b]). If phonation starts shortly after the release the consonant is perceived as voiceless unaspirated (e.g. [p]). Finally, if there is a considerable lapse between the release and the onset of voicing the consonant is interpreted as voiceless aspriated (e.g. [p^h]). One of the main advantages of this approach is that VOT can be made use of both as the articulatory and the auditory correlate of the underlying feature [voice].

However, there is little agreement on how VOT and the feature [voice] should be matched up. One possible approach is to claim that the underlying feature can correspond to different VOT values in different languages or even in different environments (Keating 1984). This is shown in (11) below:

(11)



According to the diagram above, certain languages like French, Hungarian or Russian (L1) realise [+voice] obstruents as voiced and [−voice] obstruents as plain voiceless, whereas other languages like German, English or Mandarin Chinese (L2) interpret [+voice] as voicelessness without aspiration and [−voice] as voicelessness with aspiration. The crucial insight behind this analysis is that, whatever the actual phonetic interpretation of the underlying feature is, its phonological behaviour will be very similar in all of the languages which possess it. Unfortunately, however, this empirical claim seems to be rather questionable, as will be shown in 5.6.

Others like van Rooy & Wissing (2001), Ringen & Helgason (2004) and Petrova et al. (2006) argue for a narrow interpretation of [voice], according to which only languages with lead VOT values in initial voiced obstruents have the feature [voice]. This suggests that [voice] will be

[6]This interpretation of voice figures prominently in the following works: Lisker & Abramson (1971); Keating (1984); van Rooy & Wissing (2001); de Carvalho (2002); Ringen & Helgason (2004); Petrova et al. (2006); for a somehat more detailed discussion of VOT, see Ladefoged (2001:119-121).

phonologically inert in fortis-lenis systems like German or English. If this prediction is right, these languages will not show the processes characteristic of languages with an active feature [voice] — which may not be such an outlandish claim given that neither of these languages has regressive voice assimilation. In this paper, I will adopt the latter interpretation, since I believe that it mirrors certain finer distinctions between laryngeal features which are lost if one goes for the broad interpretation.

2.3. Voice phenomena – Phonology or Phonetics?

There seems to be wide agreement on the assumption that voice phenomena are phonetically motivated. For instance, voice assimilation easily lends itself to an analysis which makes use of the phonetic notion of COARTICULATION. This has led several researchers to incorporate these insights into their proposed systems as OT constraints such as AGREE (Lombardi 1999; Petrova et al. 2006), thereby giving their analysis a firm grounding in phonetics. However, I believe that this approach is an untenable one for several reasons.

First of all, phonology and phonetics are very often treated as two separate modules with non-overlapping domains (e.g. Prince & Smolensky 1993). It is not clear how phonetics could reach into phonology from down below when it is assumed that independent modules cannot feed information back into other modules which are activated earlier in the course of the derivation (e.g. phonology cannot perform syntactic operations). Therefore, the phonetically grounded approach needs a highly sophisticated and intricate theory of the phonology-phonetics interface, which is, however, usually lacking.[7]

Moreover, the present analysis is to be couched in the framework of strict CV phonology or CVCV, which explicitly rejects the possibility of having an autonomous phonetic interpretation module. Scheer (1998) claims that there are no 'purely phonetic' effects, since there is a biunique relationship between phonological structures and their phonetic manifestation (ibid. 141–142). In effect, this means that no phonological representation can correspond to two different surface forms, and no single surface form can be encoded in two different ways underlyingly, which implies that phonetic implementation is entirely automatic and universal. If the phonetic module plays no distinct role in the derivation, it cannot be argued to provide the motivation for phonological processes or constraints: phonology has to account for everything. Although this model may be somewhat too restricted, the main insight that underlies it seems to be quite appealing: phonological problems should not be ignored simply because they may have something to do with phonetics.

3. Problems with the feature [voice]

In the following section, I will provide a critique of previous analyses of voice phenomena which assume either a unary or a binary feature for the representation of voicing. First, I will show that analysing contrasts along the dimension of voicing as equipollent in nature makes

[7] One exception to this is Steriade's (1997) manuscript, in which she proposes a very explicit model to handle the issue of how phonetics and phonology communicate with each other.

no predictions as to the direction of voice neutralisation. Second, I will try to elucidate the anomalous relationship between voicing on the one hand and manner and place features on the other. Then, I will show that previous accounts of voice assimilation are all arguably arbitrary from a representational point of view. Lastly, the solution to the encoding of voicing chosen in Government Phonology will be examined and shown to be inadequate for several reasons.

3.1. Binary [±voice]

In the descriptive, SPE-type rules of section 2.1, [voice] was treated as a simple binary feature. Although some authors argue that it is indeed necessary to maintain a binary analysis of voicing distinctions (Wetzels & Mascaró 2001), it seems quite clear that a unary solution should be preferred if one wants to make any predictions concerning the naturalness of different voice phenomena. For example, the representation of voicing should make it possible to determine whether coda voicing is more marked than coda devoicing. Unfortunately, a binary feature [±voice] seems to be unable to do this.

Let us see whether the formulations of voice phenomena as given in 2.1, repeated here for convenience' sake, tell us anything about the naturalness of these processes:

(12) $[+\text{obstruent}] \rightarrow [\alpha \text{ voice}] \text{ / } __ \begin{bmatrix} +\text{obstruent} \\ \alpha \text{ voice} \end{bmatrix}$

(13) $[+\text{obstruent}] \rightarrow [+\text{voice}] \text{ / V}__\text{V}$

(14) $[+\text{obstruent}] \rightarrow [-\text{voice}] \text{ / } __ \#$

(15) $[+\text{obstruent}] \rightarrow [-\text{voice}] \text{ / } __ \left\{ \begin{matrix} \text{C} \\ \# \end{matrix} \right\}$

The non-arbitrariness of voice assimiliation is mirrored by the fact that the structural description (SD) and the structural change (SC) of (12) is linked by the same feature [α voice], although there is nothing in the SPE system that would formally necessitate such a relationship (i.e. there may be some rules whose SD and SC do not overlap at all). Intervocalic voicing, as formulated in (13), may also be motivated to some extent, given that vowels are argued to be specified as [+voice] in SPE.[8] However, devoicing appears as a completely arbitrary process in (14) and (15): a change from [−voice] to [+voice] would be equally natural in the binary notation, where plus and minus specifications can be switched without restriction. This prediction is obviously wrong, since no language has final voicing, whereas final devoicing is a completely natural and wide-spread process. The unary approach could clearly achieve better results in this case, since the delinking of a feature in final position (final devoicing) is obviously more natural than the

[8] Although it has already been established in 2.1 that we now see a crucial difference between the active voicing of obstruents and the passive voicing present in sonorants.

spontaneous addition of a feature in the same position (final voicing).

3.2. Voicing and other features

The set of distinctive features in generative phonology can be divided into larger classes on the basis of the relations among different features. Generally speaking, there seem to be three major groups, whose existence was already alluded to in SPE:[9] MANNER FEATURES, PLACE FEATURES and LARYNGEAL FEATURES (see also Clements 1985). Szigetvári (to appear) further elaborates this classification by demonstrating that place and laryngeal features show a rather uniform behaviour as opposed to manner features, which suggests that the former two might actually constitute a larger class together.[10] He assigns this distinction a formal status by arguing that the representation of manner contrasts is crucially different from that of place and laryngeal features. In what follows, I will show that although laryngeal features and voicing in particular do pattern with place features in certain respects, it appears that it is necessary to make a representational distinction between these two sets of features too in the spirit of Szigetvári's proposal.

However, before moving on to the discussion of why voicing is different from both place and manner features, I would like to point out the main advantages of expressing differential phonological behaviour by representational means. It seems obvious that distinctive features are no more than descriptive categories: they denote natural classes of speech sounds established on the basis of phonological behaviour and phonetic properties. For example, actively voiced consonants arguably belong to the same set of sounds, which one might label [+voice], since they all instantiate regressive spreading of voicing in a considerable proportion of the languages of the world. Nevertheless, distinctive features alone fail to provide an explanation for the phonological processes in which they are involved. It does not matter whether the class of voiced segments is characterised as [+voice], [−voice], [+red] or [−Alfred the Great]: the feature itself is just a label, which makes no predictions about the behaviour of the class of segments it stands for.

On the other hand, if we give up the assumption that phonetic properties and paradigmatic relations among sounds can only be expressed by distinctive features, we may get one step closer to explanatory adequacy (for a similar approach, see van der Hulst 1996). For instance, Jensen (1994) and Szigetvári (to appear) propose that stopness should be represented by skeletal relations rather than features. Although space restrictions preclude any detailed discussion of their approach, one important aspect of their analyses is worth mentioning: they both explain the fact that manner features do not normally participate in assimilation by pointing out that skeletal relations are incapable of spreading. In this case, the difference between the representation of manner features on the one hand and place and laryngeal features on the other aptly mirrors the differences in the behaviour of these classes of features.

As it has already been mentioned, there are some crucial differences between the behaviour

[9] Although this classification was assigned no formal status there.

[10] In feature geometry, this is usually achieved by linking manner features (or at least some of them) directly to the root node, while laryngeal and place features are grouped together under separate nodes (e.g. Clements & Hume 1995).

of voicing and that of place features. This is well exemplified by the differential treatment of laryngeal features in Szigetvári (to appear) and de Carvalho (2002). The diagram below shows the domain of the three classes of features established above (i.e. whether they can appear only in consonants or in consonants and vowels as well) as is defined in the two different models:

(16)

	Place	Laryngeal	Manner	Def. of voice
Szigetvári (to appear)	*C's & V's*	*C's & V's*	*only C's*	F_0
de Carvalho (2002)	*C's & V's*	*only C's*	*only C's*	VOT

According to Szigetvári (to appear), laryngeal features pattern with place features, since these two classes show a similar affiliation towards consonants and vowels. However, de Carvalho (2002) claims just the opposite: in his view, the class of laryngeal features patterns with that of manner features, as both of them are incompatible with vowels. The reason for this apparent contradiction is that the two authors use different definitions of voicing: Szigetvári assumes that the invariant cue to voicing is a change in fundamental frequency (see also Brockhaus 1995:119-123), whereas Carvalho holds that underlying voice distinctions are cued mainly by VOT values. It is clear that the reason why they can have such largely differing views on the behaviour of voicing is that laryngeal features do not unambiguously pattern with either place or manner features.

It may also be interesting to see how voice phenomena fit into the classification of lenition processes offered by Ségéral & Scheer (1999) and Szigetvári (to appear). Both of these articles point out that there are two different kinds of lenition: C-lenition, which results in the loss of place and laryngeal contrasts in the coda and V-lenition, which brings about a rise in the sonority of intervocalic segments. This is summarised below:

(17) C-lenition: affects place & laryngeal specification __ {C, #}
V-lenition: affects manner specification V__V

As I have shown above, Szigetvári expresses this difference by arguing that manner distinctions are encoded by skeletal relations while place and laryngeal features are represented by phonological primes. The only problem with this approach is that voicing seems to undergo both types of lenition: it is lost in the coda (C-lenition) and it appears spontaneously in intervocalic position (V-lenition) — that is to say it patterns with both place and manner features. This can be seen in (18) below:

(18) loss of voice in __{C, #} → C-lenition (cf. place features)
voicing in V__V → V-lenition (cf. manner features)

This ambiguous behaviour suggests that the representation of voicing may be different from that of either place or manner of articulation.

3.3. Arbitrariness of spreading in voice assimilation

There are quite a number of contrasting accounts of voice assimilation, but they all seem to share one feature: the spreading of voicing is not motivated in the phonological component itself. Although recent analyses are crucially right in that they make it possible to derive certain conditions on spreading from more general principles of the grammar, they are incapable of expressing the naturalness of spreading itself. In the following paragraphs, I will briefly review some of the approaches to voice assimilation and point out their shortcomings.

First of all, it has already been established in 3.1 that binary features do not make any real predictions as to which rules will qualify as natural and which of them will never appear in natural languages. The same goes for SPE-type rules: there is no phonological motivation for their existence, since a rewrite rule is no more than the formal expression of an empirical observation. There is only one respect in which SPE-type rules approach explanatory adequacy: the general rule template of assimilation seems more natural than that of dissimilation, since it contains one symbol less. This is illustrated in (19):

(19) assimilation: $[F] \rightarrow [\alpha F]/__\ [\alpha F]$
dissimilation: $[F] \rightarrow [-\alpha F]/__\ [\alpha F]$

However, the actual value of this observation is rendered rather questionable by the fact the feature-counting evaluation metric of SPE is not an organic part of the phonological theory presented there and does not actively participate in the description of phonological processes (i.e. it will never block rules that contain too many features).

Lombardi (1995) presents a theory of laryngeal neutralisation based on the notions of delinking and spreading. In her view the ‘spreading of voicelessness’ is a natural consequence of the diminished autosegmental licensing potential of the coda (cf. Goldsmith 1990:123ff): the autosegment responsible for voicing is not licensed in the coda, so it is delinked.[11] The autosegmental chart in (20) below illustrates this:

(20)
```
C     C
|
|
[voice]
```

However, there is no licensing constraint that would force out the spreading of the feature [voice]. In fact, it seems somewhat counter-intuitive to claim that an inherently weak position like the coda has to be linked to a feature licensed by the following onset. The spreading of voicing is shown below:

[11]This, of course, raises the question of why [voice] does not become delinked in the coda when it is also attached to the onset (i.e. when the feature [voice] is shared by both consonants). The answer to this may be that the feature is actually licensed by the onset, which makes delinking unnecessary.

(21) C C

[voice]

Thus, the spreading of [voice] in standard autosegmental analyses of voice assimilation is no more than a stipulative and parametric rule which fails to capture the near-universal nature of voice assimilation.

An OT analysis of voice phenomena is presented in Lombardi (1999), in which she accounts for assimilation by using the phonetically grounded constraint AGREE, whose status has been discussed in 2.3. Even if we disregard the difficulties that arise when phonetics is permitted to reach into the domain of phonology, it is clear that the option of using constraints which embody generalisations external to phonology is unavailable in a representationally oriented model like CVCV, where phonological processes are the direct result of the interaction of different representational units. Therefore, we can conclude that although the constraint AGREE does serve as the motivation for voice assimilation, the constraint itself is arbitrary, at least from a representational point of view.

Finally, Government Phonology (GP) also cannot account for what leads to the spreading of **L**, the representative of active voicing in this framework. Harris (1994) proposes a definition of spreading which rules that the source of this process has to be a licensor and the target a licensed position (ibid. 167). In effect, this means that GP does predict *where* voice assimilation will take place, but it cannot explain *why* it should happen. This is also reflected by the coda parameter proposed in Brockhaus (1995:136), which is supposed to account for the presence or absence of voice assimilation in different languages:

(22) **Coda Parameter II**
A coda position may share the LARYNGEAL node of its governing onset: ON/OFF

Once again, this parameter does not mirror the unmarked nature of regressive voice assimilation. In fact, the solution of GP is not much different from that of Lombardi (1995) — which is not surprising in view of the fact that both of them rely heavily on the notion of autosegmental licensing.

3.4. GP and the element L

Since the present paper intends to provide an alternative to the representation of voice within GP, it is necessary to show how this framework fares with respect to the description of voice phenomena. To begin with, Kaye et al. (1990) propose an individual element for the representation of voicing which they refer to as **L**. Later analyses of voice phenomena (e.g. Harris 1994 and Brockhaus 1995) have all been based on this element, which means that the representation of voicing has not changed much since the birth of GP. However, it will be shown below that the

elemental representation of voicing has a considerable number of drawbacks which are often overlooked in GP analyses, but which should by no means be completely disregarded.

However, before showing why GP cannot come to grips with voice phenomena, I will briefly discuss the definition of markedness offered in Harris (1994) and Harris & Lindsey (1995). Harris claims that phonological COMPLEXITY can be directly read off from GP representations, by counting the number of elements that are involved in the composition of a given speech sound, which implies that markedness correlates with elemental complexity in this particular framework. An important consequence of this is that lenition can now be made sense of as elemental simplification, which manifests itself in the form of delinking. For example, the lenition trajectory from [t] to nothing through [s] and [h] can be illustrated as follows (Harris 1994:124):

(23)

t	→	s	→	h	→	ø
x		x		x		x
|		|		|		
h		**h**		**h**		
|		|				
R		**R**				
|						
?						

As can be seen in (23), at each consecutive step of the lenition trajectory one of the elements is lost, until the skeletal slot becomes devoid of all melodic content (the exact identity of the elements involved in this particular case of lenition need not concern us here).

It has been shown in 2.1 that devoicing and intervocalic voicing can and should be interpreted as cases of reductive neutralisation, which basically corresponds to lenition in the present context; the question is whether the notation introduced above can account for both of these types of voice neutralisation. Devoicing and intervocalic voicing allow us to make the following generalisations: voicelessness is unmarked in the coda (cf. C-lenition) and voicing is unmarked intervocalically (cf. V-lenition). This suggests that the analysis of devoicing as elemental loss is crucially right. However, intervocalic voicing cannot be analysed along the same lines, since the obstruent targeted by this process seems to acquire an additional prime (**L**) instead of losing one, which clearly contradicts Harris' definition of lenition. The only way out of this situation would be to stipulate that intervocalic voicing is realised by a completely different mechanism and it does not involve element addition. This, however, would leave us with two distinct representations for the same phonetic property, which is clearly an undesirable state of affairs (cf. 2.3).

Another problem with the spontaneous appearance of **L** in intervocalic position is that it is not clear where this element comes from.[12] This may not be so embarrassing for a theory which allows the insertion of default feature values under certain conditions, but GP explicitly rejects this possibility. The following quotation from Kaye et al. (1990) is very revealing as to the range of possible phonological processes in GP: 'there is a direct relation between the phonological process and the context in which it occurs' (ibid. 194), that is to say the only operations allowed

[12]Obviously enough, it cannot originate in the neighbouring vowels, since they do not have active voicing.

in this framework are spreading and delinking. Elements emerging out of nothing are not countenanced by GP, which suggests that intervocalic voicing may need a different interpretation in this framework.

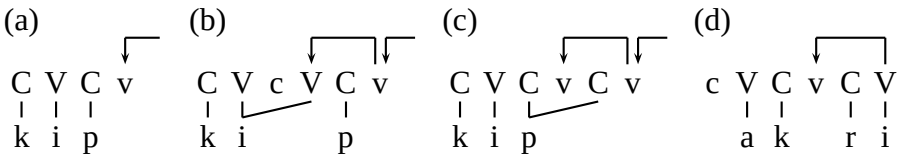
Lastly, the behaviour of **L** also seems to be in sharp contradiction with the AUTONOMOUS INTERPRETATION HYPOTHESIS of GP (Harris & Lindsey 1995). The point of this principle is that the primes of phonological representations should all enjoy 'stand-alone phonetic interpretability' (Harris & Lindsey 1995:34). Both Szigetvári (1996) and de Carvalho (2002) point out that **L** has no such individual realisation in GP (as opposed to **A**, for instance, which is realised as [a] when it stands on its own).

I believe that all of the problems outlined above may be solved if we give up the assumption that voicing is represented by an element. A claim like this, of course, has a considerable number of consequences, which should all be tested so as to see whether a solution along these lines is superior to previous analyses. This task will be undertaken in section 5 — but before that, we need to see what the most important assertions made in the framework of CVCV are, since the actual analysis will take these for granted.

4. *What is CVCV?*

In this section I will very briefly review the main assumptions of CVCV, a relatively recent upshot of standard GP (Kaye et al. 1985, 1990; Harris 1994) based on Jean Lowenstamm's seminal article (Lowenstamm 1996) which carries some ideas already present in standard GP to the extreme. All representations in CVCV are entirely lateral in the sense that 'phonological constituent structure [is] reduced to a strict sequence of non-branching Onsets and non-branching Nuclei' (Scheer 2004:40). By way of illustration, let us see how the hypothetical words *kip*, *kiip*, *kipp* and *akri* can be represented (lowercase **v** represents a mute vowel and lowercase **c** a mute consonant):

(24)



The reader will have noticed that the representation of long vowels and consonant clusters requires the postulation of empty positions and additional syllables (or rather CV units), which might be seen as a serious shortcoming of the theory. However, empty positions do not come for free in this framework: they must be subject to GOVERNMENT, a certain type of skeletal relation between two V slots (this is indicated by the arrows above the skeleton).[13] For further discussion of these issues, I refer the reader to Scheer (2004).

[13]Apparently, empty C slots do not need government to be able surface as mute; Szigetvári (to appear) claims that the reason for this is that the defining property of consonants is muteness, as opposed to vowels, which are characterised by high sonority. Therefore, it is natural for a consonant to surface as mute without the involvement of any extra mechanism, whereas vowels will always need government—which is a disruptive force by definition—to be muted.

There is one further property of CVCV and Government Phonology in general which I need to mention here: the outstanding role that they assign to representation in phonology. GP seems to be strongly committed to the idea that explanatory adequacy can only be achieved through representational means. There are no rules or constraints in GP, which means that problems that are solved procedurally elsewhere often receive a representational reinterpretation in this framework. As the scope of this paper does not allow us to delve any deeper into this issue, I refer the interested reader to an article in which this line of reasoning can easily be detected: Lowenstamm (1999).

5. *Voicing and the Skeleton*

In the remainder of the paper I will present my alternative to the representation of voicing and see how it can cope with the voice phenomena described in 2.1. The main assumptions of the analysis will be outlined in 5.1 and further elaborated in 5.3. In 5.2 and 5.3, I will test my hypothesis against the empirical observations made in 2.1 and show that it can give a unified explanation for the characteristic properties of voice phenomena. In 5.4 and 5.5, I will examine some of the more questionable details of the analysis and provide a number of further arguments in support of the solution advocated here. In 5.6, I will show that this model makes a number of empirical predictions which have received little or no attention in the literature, but which appear to be crucially right.

5.1. *The proposal*

As may be seen from the discussion above, the solution to the representation of voicing has to be:

(i) representational
(ii) economical
(iii) phonetically motivated
(iv) empirically motivated.

Being exclusively representational it should not make use of any rules or arbitrary constraints. It has to be economical, that is it cannot give a disjunctive account of voice phenomena (e.g. we cannot assume that voice assimilation is a phonological process and intervocalic voicing a phonetic one[14]). Furthermore, it has to be demonstrated that it mirrors the actual phonetic reality of voicing (phonetic motivation). Finally, it cannot contradict the empirical observations which relate to voicing (empirical motivation).

With these provisos in mind, I now turn to the actual analysis of the representation of voicing. I propose that the phonological identity of voicing is a specific SKELETAL CONFIGURATION:

[14] As is done in Szigetvári (1996), for instance.

(25) **Voicing in obstruents** (first definition)
(a) obstruents are voiced between two ungoverned V slots
(b) obstruents are voiceless elsewhere.

In the first place, it should be noted that this generalisation holds only at the level of abstract phonological structure as conceived of in CVCV, which means that it is not necessarily surface true in a strict phonetic sense. The importance of this reservation is easier to understand if we consider the relationship between CV phonological representations and their phonetic realisation. For instance, a word with the surface pattern CVCCV (e.g. [tɔrkɔ]) is represented as CVCvCV (where the lowercase **v** once again denotes a governed vowel which does not surface phonetically) which means that all of its consonants except for the first one are flanked by vowels on both sides.[15] Therefore, the crucial difference between voiced and voiceless obstruents as defined in (25) cannot be that the former are in intervocalic position as opposed to the latter, which are not: all consonants are enclosed between vowels in CVCV. What will really matter is whether these vowels are governed or not. We will see in 4.3 that this assumption has an important bearing on the encoding of voicing in consonant clusters.

5.2. Intervocalic voicing and word-final devoicing

The immediate advantage of this analysis is that it makes it unnecessary to burden the grammar with any special provisions in order to account for intervocalic voicing and word-final devoicing. In (26) below we can see the representation of a voiced obstruent in intervocalic position:

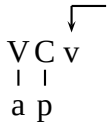
(26)
```
V C V
| | |
a b a
```

It should be remarked that an underlying structure like (26) will never contain a voiceless consonant on the surface. The reason for this is that the particular skeletal configuration it illustrates is directly responsible for voicing: the consonant is between two ungoverned vowels. If any of the vowels were subject to government the consonant would not be in intervocalic position anymore and would surface as voiceless. Thus, one of the main benefits of this analysis is that it establishes a non-arbitrary formal relationship between the environment of intervocalic voicing and the process itself.

Word-final devoicing also gains a natural interpretation if we assume that voicing is encoded along the lines of (25). An important assumption of GP (dating back to Kaye 1990) is that words that are consonant-final on the surface end in an empty nucleus which has to be muted by means of a special type of government.[16] As final empty nuclei (FEN) are supposedly always subject to government, word-final obstruents are predicted never to surface as voiced. This is shown in (27):

[15] The status of word-initial consonants in this model will be discussed in 4.4.
[16] For a discussion of the theoretical status and relevance of final empty nuclei, see Scheer (2004, 2006:103ff).

(27)



Clearly enough, the predictions of the present model with regard to the voice phenomena discussed in this section seem to be somewhat too strong. After all, both intervocalic voiceless obstruents and word-final voiced obstruents are amply attested in the languages of the world. If, however, we disregard these seeming contradictions for the moment we may make a very important observation in connection with the representations in (26) and (27): they aptly mirror the fact that voicelessness is marked intervocalically and voicing word-finally.

It seems to me that there is something inherently appealing in this way of approaching markedness and neutralisation. As it has already been mentioned, a representation which mirrors the behaviour of different phonological units must be seen as superior to a representation which serves only to distinguish between natural classes. This implies that unmarked phenomena should have simpler representations than marked ones (this is the main insight underlying Harris' conception of complexity). Therefore, the foundation stone of any analysis which involves markedness considerations should be the unmarked case; everything else has to be built on top of that. Marked configurations have to be incorporated into the representation by means of additional mechanisms. In this particular case, this means that we first have to account for why voicing is marked in one position and unmarked in another. It is only after this that we can turn to structures that violate the generalisations about the positional markedness of voicing. Of course, the model should not be allowed to undergenerate either—in 4.4–4.6 I will show that the present model lives up to this expectation. But before that, I will have to attempt to find a solution to another important—and apparently unmarked—facet of voicing, namely voice assimilation.

5.3. Voice assimilation

It is not immediately obvious how the present model could handle voice assimilation given that it excludes the possibility of analysing assimilation as spreading, which clearly contradicts our intuitions. This seems to be highly problematic indeed in view of the fact that this process is no less widespread than intervocalic voicing or word-final devoicing. In order to see how this contradiction can be resolved, we first have to consider the status of consonant clusters and word-internal empty nuclei in CVCV.[17]

In CVCV there is no constituent corresponding to the traditional coda, which means that heterosyllabic consonant clusters have to be represented with a governed empty nucleus sitting in the middle. An example of this can be seen in (28):

[17]In this paper, I will only consider coda-onset clusters, since GP does not allow obstruent clusters to be dominated by a single constituent. However, it should be noted that voice agreement restrictions also seem to hold inside branching constituents (Kehrein & Golston 2004).

(28)

```
V C v C V
| |   | |
a p   t a
```

On the basis of this, one would predict that consonant clusters must be uniformly voiceless, since superficially adjacent consonants are always separated by a governed V slot. This prediction is clearly wrong, which means that either (25) has to be modified or we have to reinterpret the relationship between empty nuclei and government. Since I believe that the explanatory power of the present model would be significantly reduced if we made any changes to the definition of voicing in (25), I will opt for the latter solution.

It should be clear from the preceding discussion that there are at least two different kinds of nuclei in CVCV: governed empty nuclei, which are never realised phonetically and ungoverned nuclei, which always make it to the surface. Actually, there is also a third type which we have not mentioned yet: nuclei with alternating vowels, which can be realised phonetically but may also be muted by government. Scheer (2004) argues that this three-way classification of nuclei is rooted in the lexicon. In the case of full vowels (i.e. vowels that are never governed) the melody is underlyingly associated to the V-slot, while alternating vowels have floating melodic elements which may be associated to the skeleton provided that the vowel remains ungoverned. Non-alternating governed nuclei (i.e. those that never surface; for example, the vowel between the two consonants in (27)) have no melodic content at all. This is summarised in (29), where (a) is a full vowel, (b) an alternating one and (c) a mute one:

(29)

```
(a)        (b)        (c)
C V C      C V C      C v C V
| | |      |   |      |   | |
α β γ      α β γ      α   γ δ
```

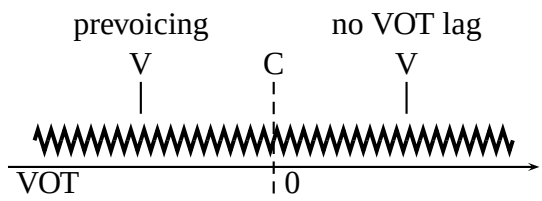
There is, however, an important question in connection with this classification: how can we ensure that a mute vowel trapped between two consonants (as in [apta]) will always be governed? Obviously, the only way to solve this problem is to stipulate that an empty vocalic position always has to be subject to government. This requirement has no grounding in the phonological component: there is no theory-internal reason for assuming that governed empty nuclei are less marked than ungoverned ones. In fact, empty nuclei did have a phonetic manifestation in standard GP: they could surface as schwa or as [ɨ], the cold vowel of Kaye et al. (1985). Apparently, the only reason for the existence of this stipulation is that there seems to be no other way to incorporate the traditional coda into this framework.

Therefore, I will assume that there is no such restriction and that a word-internal empty nucleus may be either governed or ungoverned. This means that this kind of government has to be specified in the lexicon—which is clearly not such an unorthodox view given that Kaye et al. (1990) originally specified government as a relation ‘defined at the level of lexical representation’ (ibid. 221). Now, if the empty nucleus can remain ungoverned it has to have an individual phonetic manifestation. Once again, there is some reason to believe that this observation is crucially right, since certain aspects of the actual phonetic realisation of a speech sound depend

on whether it is associated with an onset or a nucleus (e.g. the elements **U** and **I** are realised as glides when dominated by an onset, and as vowels when dominated by a nucleus). In this respect, the V-slot itself (henceforth **V**) seems to behave rather like an element. The question is what the actual phonetic realisation of **V** is. Clearly enough, the phonetic event corresponding to an empty nucleus has to be common to all vowels, since **V** is present in every vocalic expression. One such defining property of vowels is periodicity, which makes it reasonable to suppose that the phonetic identity of **V** is PERIODIC SOURCE or PHONATION. This conception of the central characteristic of nuclei is not entirely new to the field of phonology: the component |V| in Dependency Phonology was defined as 'relatively periodic' (van der Hulst 1996:328), which clearly resembles our formulation of **V**.

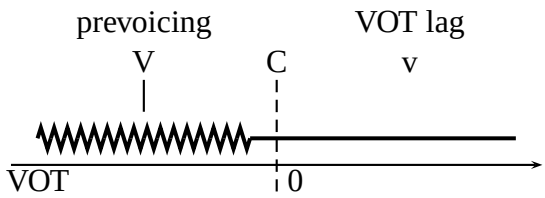
At this point we may return to our original topic, that is the representation of voicing in obstruents. The advantages of interpreting phonation as the phonetic manifestation of **V** will become more obvious if we consider the possibility of relating the presence or absence of a phonetically realised nucleus to VOT values.[18] The following schematic diagram serves to illustrate how such a relationship should be conceived of in the case of an intervocalic voiced obstruent:

(30) VOICED OBSTRUENT (as in [aba]):



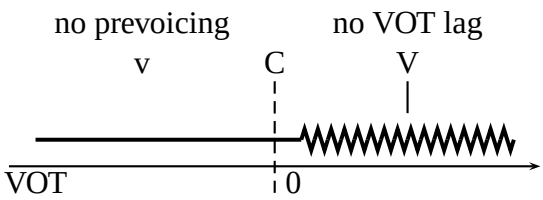
In (30) both nuclei are realised phonetically which results in the obstruent being voiced throughout the closure and the release phase. It is important to see that voicing does not originate in the consonant itself: it comes from the neighbouring vowels, which is in line with the assumption presented in (25). The next two diagrams illustrate two voiceless consonants, one of which is followed and the other preceded by a mute empty nucleus:

(31) VOICELESS OBSTRUENT I (as in [ap]):



[18]As it has already been mentioned, VOT values may be taken to be the invariant cues to voicing. However, it should be remarked that there are quite a number of additional phonetic events which may also help to cue voicing; for an overview of the cues to voicing, see Raphael (2005:189-193) and Raphael et al. (2003:173).

(32) VOICELESS OBSTRUENT II (as in [pa]):



Again, what we see is that the voicelessness of these consonants has nothing to do with their internal featural content. Instead, voicing appears to be a function of their vocalic context: if the following vowel is mute there is a VOT lag, and if the preceding vowel is mute there can be no prevoicing. Both the absence of prevoicing and a lag in the onset of voicing exclude the possibility of interpreting the consonant as voiced. Of course, the main advantage of this analysis is that there is a very obvious connection between the diagrams in (30)–(32) and the definition of voicing in (25). Thus, we can see that there is indeed a direct relationship between the phonological representation and VOT values, which is summed up below:

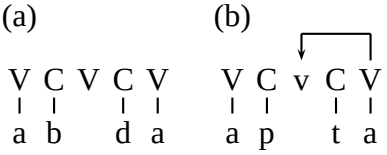
(33)

	PREVOICING	VOT LAG	VOICING
V C V	+	–	voiced
v C V	–	–	voiceless
V C v	+	+	voiceless

Let us briefly summarise what we have seen so far in this section. I have shown that word-internal empty nuclei need not always be governed. Moreover, I have identified phonation as the acoustic and articulatory correlate of **V** and the stand-alone phonetic interpretation of ungoverned empty nuclei. Finally, I have demonstrated that there is a close relationship between the presence or absence of phonetically realised nuclei on the one hand and VOT values on the other. In the remainder of this section I will show how these three seemingly unconnected observations may help us understand how voice assimilation can be analysed in the model advocated here.

The chunks of phonological representations in (34) illustrate two structures in which the consonants agree in voicing:

(34) (a) (b)



In (34a) both consonants surface as voiced, since they are both flanked by ungoverned vowels, which means that they satisfy (25a). On the other hand, both consonants are voiceless in (34b), since the nucleus that sits between them is governed by the vowel following the second consonant.

It is important to see that this representation incorporates all the observations made earlier in this section. First of all, the two structures differ only in that the second has lexically specified government, which the first one obviously lacks. Then, the vowel in the middle of (34a) is realised phonetically as phonation, and thus serves to maintain the voicing in both obstruents. Finally, the diagram in (30) can be taken to illustrate both of the obstruents in (34a), while (31) corresponds to the first obstruent in (34b) and (32) to the second one.

The representation of voice assimilation outlined above has two further important aspects, which should be discussed here. First, it seems that two adjacent obstruents can never have different voice values, since the voicing of both consonants is determined by whether the vowel in the middle surfaces phonetically or not. It is impossible to envisage a situation in which they could contrast with each other in terms of voicing, since the representation clearly excludes this possibility. Second, the voicing of the cluster depends on whether the vowel after the second obstruent is a governor or not, which follows from the fact that the direction of government is always right to left in CVCV. Therefore, the predominantly regressive nature of voice assimilation can actually be derived from a more general principle of CVCV.

The careful reader will have noticed that the predictions about the universality and the direction of voicing seem to be contradicted by a considerable number of languages. For instance, German obstruent clusters may differ along the dimension of voicing (e.g. Run[tɡ]ang) and Swedish has bidirectional voice assimilation. In 5.6 I will show that there is a possible explanation for the existence of such seeming counterexamples. For the meantime, I would like to quote the title of one of my sources (van Rooy & Wissing 2001), which may help to convince the reader about the plausibility of the predictions of my model: 'Distinctive [voice] implies regressive voicing assimilation'.[19]

Finally, let us take a look at how the new insights gained in this section may help us in rephrasing the definition of voicing in (25) in a formally more adequate way. As it has already been shown, the voicing of obstruent clusters is determined by whether the vowel following the second consonant is a governor or not. This is the observation that serves as the basis of the following definition:

(35) **Lexical Governor**
A vowel specified as a governor in the lexical representation

The definition of voicing can thus be reinterpreted as follows:

(36) **Voicing in $\mathbf{C_1V_1}$**
(a) C_1 is voiced if V_1 is not a lexical governor (*abda*-type)
(b) C_1 is voiceless if V_1 is a lexical governor (*apta*-type)

[19] Although it should be noted that there exists another article (Ringen & Helgason 2004) which bears the title 'Distinctive [voice] does not imply regressive voicing assimilation', which makes the previous argument rather less forceful.

5.4. Word-initial and word-final voiced obstruents

The representation of word-initial and word-final voiced obstruents is rather troublesome from the perspective of the present analysis, since neither of these consonants is situated between two ungoverned vowels. The only way out of this situation is to posit that word-initial consonants are actually preceded by an empty nucleus which may be ungoverned, and that word-final consonants may be followed by an ungoverned FEN. Although this step may give the impression of being completely arbitrary, it is actually far less so than one would expect.

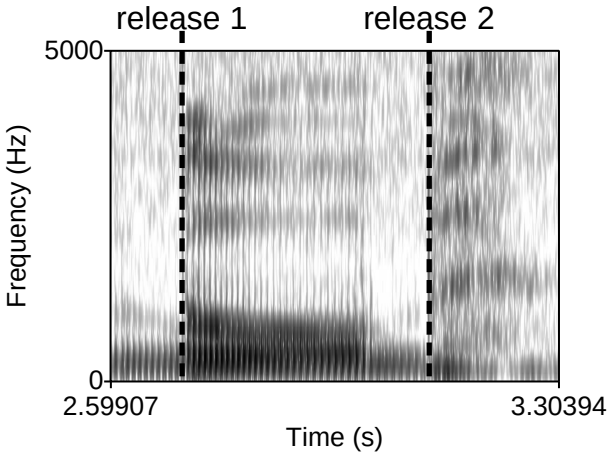
In the first place, both final empty nuclei and initial empty CV slots have been argued for on independent grounds by Kaye (1990) and Lowenstamm (1999) respectively. Therefore, it seems natural that the points made with regard to the possibility of having ungoverned empty nuclei should be extended to the beginning and the end of the word as well. The following two diagrams illustrate the representations I propose for voiced consonants in initial and final position:

(37) (a) (b)

```
c V C V        V C V
      |  |     |  |
      b  a     a  b
```

Moreover, there are a number of indications that the present approach is far closer to the actual phonetic data than its apparent abstractness would suggest. Provided that the phonetic manifestation of empty nuclei is phonation, we can interpret the initial nucleus in (37a) as prevoicing and the final nucleus in (37b) as the kind of audible voiced release that can be heard at the end of utterance-final words after voiced obstruents in French or Hungarian for example. This is also supported by spectrographical evidence from Hungarian:

(38)



The spectrogram of the Hungarian word [buːb] shows two things very clearly: there is a rel-

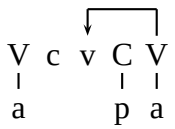
atively long period of phonation before the release of the first consonant and after that of the second one. The presence of periodic source before the word-initial consonant and after the word-final one correlates with the presence of an ungoverned empty nucleus in the representation.

5.5. Voiceless obstruents in intervocalic position

Languages that tolerate voiceless obstruents in intervocalic position also seem to contradict the predictions of the present model. However, I believe that the analysis pursued here is essentially right, since it correctly accounts for the fact that voiceless consonants are marked intervocalically by showing that we need some kind of additional mechanism in order to be able to represent this kind of configuration.

One possible solution to this problem is to claim that voiceless consonants that do not undergo intervocalic voicing have the following rather geminate-like structure:

(39)



However, it has to be admitted that this is just a provisional account — it remains to be seen whether the predictions made by this particular representation are correct or not.

5.6. Coda devoicing

In 5.3, I noted in passing that German final devoicing may be difficult to implement in the present model, since the particular solution to the representation of voicing adopted in this paper does not allow adjacent obstruents to be have different voice specifications. The same objection holds for any language with syllable-final devoicing. As the model has to be able to account for all the phenomena associated with voicing, we have to briefly examine the validity of this counterargument.

The fact that there can be no voiced obstruents in the coda is problematic only inasmuch as we can prove that the language in question has a contrast based on voicing (cf. the narrow interpretation of voicing in 2.2). However, German apparently has no real voicing contrast: all obstruents in this language are either plain or aspirated (although the plain series may be subject to intervocalic voicing). Similarly, Korean and Maidu—two languages which are argued to have syllable-final devoicing in Lombardi (1995) — do not have underlyingly voiced consonants (Korean: plain–aspirated–ejective; Maidu: plain–implosive–glottalised). Although this by no means proves that the model is right, it does not disprove it either. Therefore, the only way to decide whether syllable-final devoicing really threatens to invalidate the present analysis would be to examine all the languages which are reported to have syllable-final devoicing on a case by

case basis and see whether any of them has a real voiced series of obstruents.[20]

6. *Conclusion*

Let me conclude my analysis with a brief summary of its main findings. First of all, I have given a preliminary classification of voice phenomena, which has served as a basis for all consequent investigations. Then, I have shown that previous accounts of processes related to voicing are incapable of capturing the unmarkedness of voice phenomena, and that the main reason for this is their commitment to feature-based analyses. Finally, I have provided an analysis of voice phenomena based on skeletal configurations, and demonstrated the potential of this approach.

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Márton Sóskuthy
Eötvös Loránd University (ELTE), Budapest
mrhowardppa@yahoo.com

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[20]It should be noted that this does not apply to word-final devoicing: there are indeed languages with a real voicing contrast, which cannot have voiced obstruents word-finally. This is also reflected by the representation, which rules out syllable-final devoicing but has nothing against word-final devoicing (cf. 5.2).

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The source of *wh*-morphology in questions and relative clauses

Radek Šimík

This paper proposes a solution to three related phenomena: (i) an asymmetry in scopal behavior of *wh*-phrases in questions and relatives, (ii) a symmetry between resumption (in Czech, Hebrew, and Greek relatives) and *wh*-relatives (in English), and (iii) a symmetry between gaps (as opposed to resumptives) and *that*-relatives. I make an explicit proposal concerning the fine-structure of operator DPs and argue that *wh*-morphology in questions and relatives is indicative of DP-internal quantification.

1. Introduction

This paper gives an account of certain unexpected behaviors concerning relative clauses and questions in English and languages which make use of resumptive pronouns (Czech, Hebrew, and Greek).

Firstly, the English *wh*-pronoun *which* does not have the same scopal properties in questions and relative clauses:

(1) a. Which book should every student read? ($\exists > \forall$; $\forall > \exists$)
b. the book which every student should read ($\exists > \forall$; $*\forall > \exists$)

The question in (1a) has two possible readings: an individual reading (there is a book x such that every student should read x) and a pair-list reading (for every student there is a (different) book that they should read). The relative clause in (1b), on the other hand, only has the individual reading.

The pair-list reading, however, is preserved when a different type of relative clause is used, namely a *that*-relative (null operator relative):

(2) the book that every student should read ($\exists > \forall$; $\forall > \exists$)

For a more detailed discussion, see sections 2.1 and 2.2.

Secondly, there are other examples showing that *wh*-relatives in English have a more limited distribution than *that*-relatives (see 2.3). For instance, only *that*-relatives are allowed to function as a comparison class for superlatives:

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(3) *Borat* is the most boring film that/*which I've ever seen.

The picture becomes even more interesting when we take resumption into consideration (section 2.4). I will show that the relative pronoun *which* patterns with resumptive pronouns, whereas the null operator in *that*-relatives patterns with gaps in all relevant respects.

In the analysis I employ a version of head-raising for relative clauses (e.g. Bianchi 1999), combined with the theory of movement and resumption of Boeckx (2003). From a more general perspective, I adopt the idea that both interfaces (LF and PF, including the insertion of phonological/morphological forms) make a maximal use of syntactic information. While for LF this idea has generally been accepted within the minimalist inquiry, the effect of syntactic configurations for PF has been subject to much dispute. Here, I adopt the approach that lexical (phonological/morphological) insertion takes place after the syntactic derivation (advanced by Halle & Marantz 1994; for an interesting alternative see Caha 2007, this volume).

These general considerations lead us to the core proposal of this paper. I argue that quantification is a relation of narrow syntax and is therefore expected to have not only semantic but also morphological consequences:

(4) *wh*-morphology (in English) is licensed by DP-internal quantification in its spell-out position.

In other words, a *wh*-feature gets morphologically visible if it (or the associated NP) is operated on by a DP internal quantifier in the position where this *wh*-feature is supposed to be spelled-out (e.g. in SpecCP). The abstract *wh*-feature itself is indicative of an operator-variable relation in syntax. Thus, it still comes as natural that its presence triggers *wh*-movement. The absence of *wh*-morphology in some apparent *wh*-movement (operator movement) cases (e.g. in *that*-relatives) is then explained by the fact that there is no DP-internal quantification involved.

The article consists of two main sections. Section 2 discusses the data and reveals the relevant empirical pattern. Section 3 proposes a syntactic solution to this pattern. Section 4 is the conclusion of this paper.

2. Data

This section presents the following facts: 2.1 *wh*-questions involving *wh*-object and a universally-quantified subject may yield three different interpretations; 2.2 in certain (comparable) relative clauses one of the interpretations is unavailable; 2.3 this seems to generalize to the unavailability of narrow scope readings in the given class of relatives; 2.4 equivalent phenomena have been observed for relatives involving resumptive pronouns; the subsection 2.5 gives a summary.

2.1. Three interpretations of wh-questions

It is a well-known fact (see e.g. Chierchia 1993; Aoun & Li 2003) that *wh*-questions in which a universal quantifier in the subject position c-commands the *wh*-trace in the object position yield three possible interpretations: an individual interpretation, a pair-list (distributive) interpretation, and a functional interpretation. The readings may be exemplified by giving possible answers to the question in (5).

(5) Which man did every woman invite?
  a. Paul. [individual]
  b. Mary invited Paul, Ann invited Steve, Jane invited Mark, etc. [pair-list]
  c. Every woman invited her husband. [functional]

At least to some extent, the ambiguity may be seen as following from scopal interactions between the constituents *every woman* and *which man*. Thus, the individual reading (5a) is derived when the *wh*-phrase is interpreted scopally specifically (wh > ∀), whereas the readings in (5b) and (5c) are derived from the opposite scope (∀ > wh). Under a variant of the copy-theory of movement, the scope ambiguities are generated automatically (there is a copy of *which man* in the complement position of *invite*) and thus we do not have to postulate quantifier raising in this case.[1] In fact, a solution based on quantifier raising seems undesirable because we would have to account for its unavailability in questions where the Q-wh positions are inverted (see Chierchia 1993 for discussion):

(6) Which man invited every woman?

Question (6) has only the individual reading, presumably because there is no licit LF representation where ∀ > wh. Without going into details, I will assume here that the universal quantifier in questions can stay in-situ at LF (or at least does not raise high enough so as to take scope over the subject).

2.2. Wh-relatives lack the pair-list reading

A more intricate state of affairs can be observed in relative clauses. While *that*-relatives produce exactly the same pattern as questions, *wh*-relatives disallow the pair-list reading; observe the contrast between (7) and (8).

(7) The man **that** every woman invited, namely…
  a. Paul.
  b. Paul in case of Mary, Steve in case of Ann, etc.
  c. her husband.

(8) The man **who** every woman invited, namely…
  a. Paul.
  b. *Paul in case of Mary, Steve in case of Ann, etc.
  c. her husband.

In the preceding section I suggested that pair-list readings and functional readings may both be attributed to the fact that the universal quantifier scopes over the *wh*-phrase. However, *wh*-relatives bar only one of these narrow-scope readings, namely the pair-list reading. Thus, there must be an additional difference between the syntactic representation of the two. Consider the following example:

[1] Technically, the universal quantifier enters into a scope-relation either with the variable produced by the *wh*-movement or with a default existential closure, which binds (a part of) this variable and is located somewhere in the sub-subject domain (VP).

(9) Q: Which book did everyone read?
A: His own book.

Following Chierchia (1993) and others, I suggest that the functional reading, illustrated by a question-answer pair in (9), is represented as follows. The *wh*-phrase *which book* denotes a functional variable *f(x)* from individuals to individuals, e.g. *x's own book*, i.e. a function, which assigns individuals to books of their own. The functional variable is bound by the *wh*-operator and therefore what we really ask about is the identity of the function and not of the individual himself. The argument of this function *x*, an individual variable, is bound by the universal quantifier.

In order to keep the functional and pair-list reading apart, I do not take the pair-list reading to be a subcase of a functional reading (cf. Engdahl 1986) and will further assume that it is a simple case of narrow scope reading, where no functional variable is in play.

Now, we can reformulate our problem in the following terms: the narrow-scope reading is barred in relatives if a *wh*-determiner is used unless there is a functional variable present. This problem will be resolved by the analysis proposed below (see section 3.5 in particular).

For the sake of completeness, I should mention that the *wh*-determiner in relative clauses is not the only trouble-maker for the pair-list reading. As noted by Honcoop (2000), the same effect is observed in relative clauses with an indefinite external determiner.[2,3] These are his examples (Honcoop 2000:170–171):

(10) Which book did every politician read?
a. individual reading (everybody read a specific b)
b. pair-list reading (X read b1, Y read b2, etc.)
c. functional reading (X read X's b, Y read Y's b, etc.)

(11) There is a (certain) book that [/which] every politician read, namely…
a. individual reading
b. *pair-list reading
c. functional reading

The following example (one of my own) shows that the same holds for indefinite (bare) plurals:

(12) There are books that/which every politician read, namely…
a. individual reading
b. *pair-list reading
c. functional reading

Obviously, (11) and (12) are not reducible to the constraint associated with the *wh*-determiner because the same effect arises when a *that*-relative is used, as in Honcoop's examples. I believe that it is descriptively adequate to say that relatives with an indefinite external determiner, e.g. (11), pattern with *wh*-relatives with a definite external determiner, e.g. (8), as opposed to *that*-relatives with a definite external determiner, e.g. (7). More evidence is given in the following section.

[2] Honcoop attributes this property to relative clauses in general (using examples with indefinite determiners). As we see here, this is not the whole truth.

[3] The term 'external determiner' refers to the determiner associated with the surface position of the head.

To the best of my knowledge, there is no explanatory account of this interesting contrast (Honcoop does not discuss the nature of this contrast, focusing on the functional reading and its (un)availability under extraction out of weak islands). At this point, I do not have an explanation of my own. In the following section, however, I will use this kind of relatives in order to emphasize the empirical generalization.

2.3. When narrow scope is barred

The preceding sections provided us with the following descriptive pattern:

(13) a. Which books should every student read? (wh > ∀; ∀ > wh)
b. … the books (that) every student should read (∃ > ∀; ∀ > ∃)
c. … the books which every student should read (∃ > ∀; *∀ > ∃)
d. … ∅ books that/which every student should read (∃ > ∀; *∀ > ∃)

Questions pattern with *that*- or *0*-relatives[4] and *wh*-relatives pattern with relatives with an indefinite external determiner. In the present section we provide some more evidence in favor of the descriptive generalization for relative clauses in (13b–d).

Carlson (1977) observed that there are some relative clauses which force a definite external determiner and at the same time cannot involve a *wh*-determiner. These kinds of relative clauses have a special interpretation and denote e.g. amounts, degrees, or kinds. They have further been discussed e.g. in Safir (1982), Heim (1987), and most recently and very extensively in the work by Alexander Grosu (see Grosu 2002 for overview and references). Summarizing this literature would lead us far astray. I will provide here only a number of cases which support the generalization in (13).

The relevant cases, respectively illustrated below, are the following: (i) relativization out of *there*-constructions, i.e. maximalizing relativization in the sense of Grosu & Landmann (1998); (ii) predicate relativization; (iii) cases where the relative clause forms a comparison class to a superlative contained in the head; (iv) some cases of relativization of objects of idioms.

(14) Let us play with the/*∅ cards that/*which there are on the table.

(15) Peter is not the/*an idiot that/*which we took him for.

(16) Anna Karenina is the/*a best book that/*which I've ever read.

(17) The/*a headway that/*which we made yesterday is astonishing.

Putting any alternative partial explanations aside (e.g. that superlative DPs cannot be headed by an indefinite determiner anyway[5]), we may ask what the examples (14) through (17) have in common. Notably, they all involve an indefinite or non-specific (and plausibly both) DPs in

[4] I suppose English *that*-relatives and *0*-relatives behave alike in the relevant respects and therefore I do not always give examples of both.

[5] By the way, we may reverse the explanation: a superlative DP must have a definite determiner because it always involves some kind of a relative clause, or more neutrally, a comparison-class which may be analyzed as a (reduced) relative clause. This seems to be a natural conclusion taking into account that the only indefinite superlatives are so-called 'elatives', which lack a comparison-class (*she is a most beautiful young woman*).

the target of relativization. The existential construction in (14) is the best-known instance of a context observing definiteness effects. Predicates as in (15) denote properties and as such must be expressed by indefinite DPs. The comparison class in (16) talks about (any) books specified only by the fact that I read them. Objects in idiom structures, as in (17), mostly do not have referential qualities, rather they are semantically fully dependent on the verb that heads them. From this perspective, they are non-specific.

A standard treatment of indefinites (dating back to Heim 1982; Kamp 1981) is that they lack any quantificational power and represent 'open' properties which are to be 'closed' by a c-commanding quantifier. Here I will make the rather common assumption that the quantifiers which quantify over the indefinite DPs in (14) through (17) are closely related to the verbal projection and are therefore rather low in the structure. If we were to express this in terms of scope, we could say that these quantifiers obligatorily take narrow scope.

To sum up, a *wh*-determiner and an indefinite relative external determiner force a wide-scope reading of the relative head within the relative clause. This state of affairs calls for explanation.

2.4. Resumptives

In the preceding sections I discussed a rather mysterious property of *wh*-determiners (as opposed to 'null operators') in English relative clauses and I concluded that it forces a wide-scope reading. Before I turn to the analysis, I will show that there is another relativization strategy with exactly the same consequences for interpretation, namely resumption. It is well-documented in the literature (e.g. Sharvit 1999; Bianchi 2004) that resumptive pronouns force a specific reading on the relative head within the relative clause. To keep the picture nice and tidy, I will use analogous data to the ones presented above.

Czech is one of the languages where a resumptive pronoun bearing a structural Case (accusative for our purposes) alternates with a gap. Observe the following examples, which are analogous to the ones in (15) through (17) (there is no analogy to (14) because Czech lacks existential constructions and standard examples of definiteness effects).[6]

(18) a. *Petr není takový idiot, co ho za něj měli.
Petr is not such idiot COMP him for him(RES) had.3PL
'Peter is not the idiot who they took him for'

b. Petr není takový idiot, za jakého ho měli.
Petr is not such idiot for who(REL.PRON.) him had.3PL
'Peter is not the idiot (that) they took him for'

(19) a. Anna Karenina je nejlepší kniha, co jsem (*ji) kdy četl.
Anna Karenina is best book COMP AUX.1SG her(RES) ever read
'Anna Karenina is the best book that/which I've ever read'

(20) a. ten hold, co jsme (*ho) vzdali padlým vojákům
the tribute COMP AUX.1PL him(RES) paid dead soldiers
'The tribute that we paid to the dead soldiers'

[6] Unfortunately, I did not find a felicitous example with a structural accusative for the case of predicate relativization. Thus, there is no minimal pair available as in the other two cases. Still, the relevant contrast may be observed between resumptives and another kind of gap relativization, as illustrated in (18).

Example (18) shows that predicate relativization cannot involve resumption; (19) makes the same point for comparison-class relatives, and (20) for the relativization of (non-specific) objects of idioms. All of these contexts require a gap in the target of relativization.

The situation is similar in the case of interacting quantifiers. While gap relatives enable a narrow reading of the head within the relative clause, resumptive pronouns always force a wide scope with respect to a universal quantifier.[7,8]

(21) Přemýšlel jsem o těch knížkách, co by každý student měl přečíst.
thought AUX about the books COMP AUX every student had read
'I thought about the books that every student should read.'
(∃ > ∀; ∀ > ∃)

(22) Přemýšlel jsem o těch knížkách, co by je každý student měl přečíst.
thought AUX about the books COMP AUX them(RES) every student had read
'I thought about the books which every student should read.'
(∃ > ∀; *∀ > ∃)

There is one more thing to check in order to get a near-perfect analogy between resumptive pronouns and *wh*-determiners in English, more precisely an analogy concerning their syntactic and semantic behavior. At the beginning of section 2.2 we saw that *wh*-determiners disallow the pair-list reading but keep the functional reading intact, presumably when the syntactic context allows this reading. As expected, the functional reading is available also with resumptive pronouns.

(23) Ta žena, co (ji) každý muž pozval, byla jeho manželka.
the woman COMP her(RES) every man invited was his wife
'The woman every woman invited was his wife.'

Sharvit (1999: section 3.2), following the observations of Doron (1982), gives analogous examples from Hebrew.

(24) Ha-iSa Se kol gever hizmin (ota) hayta iSt-o.
the-woman COMP every man invited her(RES) was wife-his
'The woman every woman invited was his wife.'

The examples above show that both resumptive pronouns and gaps can be read functionally in Czech and Hebrew. Importantly, resumptives (as opposed to gaps) do not allow pair-list readings, exactly as English *wh*-determiners (see Sharvit 1999 for relevant data).

[7] Judging these sentences may be rather delicate for some speakers since there are other things playing a very important role, namely information structure, coded by constituent order in Czech (which is quite free in Czech, a permutation of the three constituents in the relative clause yields six felicitous orders, each of which seems to have a slightly different reading). Nevertheless, there is a contrast between resumption and gaps.

[8] Ourania Sinopoulou (review) informs me that the same pattern is observed in Greek gap/resumptive relatives. On the other hand, the functional reading with resumptive pronouns is less readily available than in Czech or Hebrew (see (23)/(24) below). At the moment, I have nothing to say about this fact.

2.5. Summary

The main goal of this section was to show that *wh*-determiners (as opposed to 'null operators') in English relative clauses have identical semantic consequences as resumptive pronouns in Czech and Hebrew (and presumably resumptive pronouns in general). These semantic effects may be designated as specificity or wide scope effects; in particular, English *wh*-determiners and resumptive pronouns in Czech and Hebrew force a specific/wide scope reading of the relative head within the relative clause. The picture gets more complicated when we consider English questions, in which the *wh*-determiners freely allow for scope ambiguities. The next section is devoted to solving this contrast.

3. Analysis

This section is organized as follows. First I will outline a theory of displacement, as proposed by Boeckx (2003), who captures resumption in terms of stranding (section 3.1). Section 3.2 discusses the head-raising analysis and provides a rather straightforward but novel argument in its favor. Section 3.3 contains the actual proposal regarding the structure of *wh*-phrases (operator phrases) in questions and relative clauses. In section 3.4 I go through the structures under discussion one-by-one and show how the proposed analysis works for the data that have been discussed. Section 3.5 discusses relative clauses involving the functional reading of the operator phrase and provides a syntactic representation yielding the desired semantics. Section 3.6 briefly deals with appositive relativization and Greek relative clauses.

3.1. Movement and resumption as stranding

I adopt a minimalist account of displacement, as proposed in Boeckx (2003).[9] In his theory, movement is represented as a chain containing one or more copies. A chain is unambiguously defined by a set of *occurrences* in the technical sense of Chomsky (2000:115), where an occurrence of α is the sister of α. To give a simple example, the structure in (25a) contains a chain defined by the set in (25b); $<x_n>$ will be the notation of an unpronounced copy where *n* is the identification of a chain (copies with the same *n* belong to one chain).

(25) a. $[_{CP2}$ who$_1$ did Peter say $[_{CP1}$ $<$who$_1>$ that he $[_{VP}$ loves $<$who$_1>]]]$?
b. CH(*who*) = {C1', C2', V} = {did, that, loves}

On the standard assumption that *did* as well as *that* in (25a) appears in C, they are the sisters of the matrix and intermediate SpecCP positions (ignoring bar-levels). Thus, a standard example of successive cyclic A-bar movement produces a chain defined by a set of three occurrences in this case. Furthermore, every chain contains a *strong occurrence* (designated by *), corresponding to a head containing an EPP-feature. The major point of Boeckx's proposal is that a chain can have one strong occurrence at maximum: the *Principle of Unambiguous Chains* (PUC). The chain in (25b) is therefore properly restated in (26).

(26) CH(*who*) = {did*, that, loves}

[9] An important part of Boeckx's proposal concerns the locality of movement. This matter is rather marginal for the reasoning here so I am not going to discuss it and refer the reader to the original literature.

A strong occurrence bears PF-relevant information, in the sense of pronouncing the copy defined by this occurrence. Thus, a chain containing two strong occurrences would crash (at least) at PF. The ungrammatical question in (27a) involves the chain in (27b).

(27) a. *Who did Peter say who that he loves?
b. *CH(*who*) = {did*, that*, loves}

In my proposal I extend an idea which is rather implicit in Boeckx (2003). The strong occurrence (EPP) is not only information for PF but also serves to LF. Namely, the copy defined by the strong occurrence has to be semantically 'relevant' for the interpretation of the chain. Semantic relevance can be defined in terms of a contribution to the meaning of the XP involved in the chain. For example, a *wh*-movement yields a chain CH(DP), where the DP involved is interpreted as an open variable (and not as a referring expression); scrambling yields a chain in which a DP is interpreted as referentially/scopally specific; contrastive-focus movement creates a presupposition of alternatives to the DP involved.

Note that successive cyclic movement (as in (25) and (27)) is in accord with this approach since the intermediate copy does not contribute anything to the meaning of the chain. In fact, a contrary state of affairs would force us to conclude that every intermediate movement changes the interpretation of the chain, which is intuitively nonsensical. Note that I do not claim that the intermediate copy is not present at LF, e.g. for the purposes of scope and/or binding (arguably, it can be bound and it can bind). Of course, this is a semantic contribution in a sense, however, only with respect to other elements in the structure.[10]

Let us now see what such an assumption gives us. Boeckx notes that there seems to be a correlation between the availability of resumption and (perhaps long) scrambling within a language. Note that resumption and scrambling also share the basic semantics: they produce specific readings.[11] Translated into the theory of chains just outlined, we can represent scrambling as a chain CH(DP) which is interpreted as specific at LF. Such a chain is defined by a strong occurrence located somewhere higher than the subject position. Now, because this chain has been 'closed up' by a strong occurrence, it cannot be 'meaningfully' extended anymore (it cannot contain another strong occurrence). But this is exactly what needs to be done in the case of relativization, which arguably involves a chain containing a (strong) occurrence in SpecCP; in other words, there must be a relative operator related by a movement-like relation with the base position (the position of the argument variable). These assumptions yield the following representation of resumptive relative clauses (to be modified below):

(28) NP_{HEAD} [$_{CP\text{-}REL}$ whP_2 [… [D <whP_2>]$_1$ [… <[D [whP]]$_1$> …]]

The relative operator is generated as a 'big DP', for our purposes an operator whP headed by an abstract determiner D. This structure undergoes scrambling and produces a chain, call it

[10] See Rizzi (2006) for a compatible view. He claims that "Intermediate positions are not assigned special interpretive properties; nevertheless, they are visible at the interface level […]" (p. 107).

[11] Ourania Sinopoulou (review) points out that Greek may be a problem for the present assumption (namely that scrambling is a prerequisite for resumption) since the availability of scrambling in Greek has been questioned. Furthermore, even if Greek DPs can scramble, the semantic effects of such a process is unclear since also indefinite DPs can be involved (Alexiadou 1997; 1999). I believe that the present analysis is saved if such scrambled indefinite DPs in Greek outscope a universal quantifier in subject.

CH_1(DP).[12] Because this chain already contains a strong occurrence, it cannot be extended any further. But there is a strategy that can save our derivation/representation. When the D-layer is stranded and only whP moves we create another chain, CH_2(whP). We end up with a structure involving two separate chains, each containing one strong occurrence, as required by the PUC. Thus, stranding is one of the strategies of 'disambiguating chains' (in Boeckx's terminology), i.e. avoiding chains with more than one strong occurrence. [13]

In this section I set the theoretical background which accounts for displacement phenomena and their semantic effects in general. The following section will give the background for analyzing relative constructions in terms of movement of the relative head.

3.2. Head-raising for relative clauses

I adopt a version of head-raising analysis for relative clauses which most closely resembles the one of Bianchi (1999; 2004). (29b) provides a simplified analysis of an English restrictive relative clause in (29a). For the purposes of illustration, the clause involves a zero complementizer and a zero relative determiner:

(29) a. the woman I love
b. [$_{DP}$ the [$_{CP\text{-}REL}$ woman$_1$ [$_{TP}$ I love <woman$_1$>]]]

The NP head of the relative clause *woman* is generated in the argument position within the relative clause and then it is 'raised' to SpecCP, its 'surface position'. The whole CP is selected by an external determiner *the*.

The head-raising analysis has mostly relied on arguments based on reconstruction phenomena, i.e. examples where the DP/NP head of the relative clause (along with its subparts) must be interpreted within the relative clause itself (for a nice overview of the relevant discussion and references see Bianchi 2002a; 2002b). Here, I am not going to discuss this in detail. Let me just provide a novel argument in favor of the raising analysis, one which does not rely on reconstruction (for other arguments of the non-reconstruction kind see Zwart 2000).

Since Chomsky (1977) it has been standard to treat relative clauses and questions alike because both arguably involve *wh*-movement. If this is correct then we have an empirical point where the head-external and head-raising analyses make different predictions. The head-external analysis predicts that the *wh*-movement in relative clauses is like *wh*-movement of simple *wh*-phrases in questions (like *Who did you meet?*). The head-raising analysis predicts the opposite — the *wh*-movement in relatives should resemble the *wh*-movement of complex *wh*-phrases (like *Which man did you meet?*). There is a well-known test where the complexity of a *wh*-phrase appears to play a role, namely extraction out of weak islands. Note that only complex *wh*-phrases are fully felicitous if extracted out weak islands.

(30) a. Which book do you wonder whether I read yesterday?
b. ??What do you wonder whether I read yesterday?

[12] I will make no strong claims about what projection is targeted (below I label it 'XP'). As far as I can see, this is a non-trivial and plausibly language-specific issue. For Czech, this movement could correlate with clitic-movement—perhaps a movement to a Topic projection.

[13] The other strategy is agreement (in a technical sense) between two strong occurrences. Note that this requires the PUC to have a subcondition. I do not need to use this here.

Importantly, *wh*-movement in both kinds of relative clauses that we have discussed patterns with the movement of complex *wh*-phrases.

(31) a. The book which you wondered whether I read yesterday
b. The book that you wondered whether I read yesterday

Some people argue that this is not a DP-complexity matter but rather a semantic/pragmatic effect called 'D-linking' (cf. Pesetsky 1987). I believe these two views are not incompatible; it has been argued that D-linking may semantically be represented as an existential presupposition, which in turn may stem from the presence of an NP in syntax (cf. Reinhart 1992).[14]

The syntactic argument may be supported by a lexical/morphological one. Namely, if relative clauses involve a full NP in the target of relativization then we expect the *wh*-word (if it is used at all) to resemble an interrogative *wh*-word from complex *wh*-phrases. In Czech, this is indeed the case. Note that if we use the *wh*-word normally occurring in simple *wh*-phrases, it leads to ungrammaticality.

(32) a. Kterému vtipu jste se smáli?
which joke AUX REFL laugh
'Which joke did you laugh about?'
b. Čemu jste se smáli?
what AUX REFL laugh
'What did you laugh about?'

(33) Ten vtip, kterému/*čemu jsme se smáli…
the joke which / what AUX REFL laugh
'The joke that we laughed about'

The situation in English is more intricate. Even though it makes use of interrogative *wh*-forms for expressing relativization, the relation between interrogative and relative pronouns is not as straightforward as in Czech. Consider the following paradigm.

(34) a. **Who** did you invite?
b. **What** did you read?

(35) a. **Which** student did you invite?
b. **Which** book did you read?

(36) a. The student **who** we invited cannot come
b. The book **which** we read is not bad

It is often noted that the head-raising analysis makes a wrong prediction concerning the morphological form of the [+human] relative pronoun; the *wh*-determiner heads a full NP and thus one can expect it to match the interrogative pronoun in complex interrogative *wh*-phrases. However, note that the same objection holds against the head-external analysis as well. If the

[14] There will be more non-terminological use of 'D-linking' in this paper (see the following section). For the sake of completeness, let me refer to yet another analysis of D-linking, which was pointed out to me by Ourania Sinopoulou (review), namely Hirose (2003).

wh-determiner in relatives does not head an NP, we expect it to surface in the same way as in questions with simple *wh*-phrases. This is indeed the case for [+human] heads but it fails to account for all the others since *which* can never stand without an NP in questions.

English morphology therefore does not seem to provide good grounds for deciding the raising vs. external matter. For both analyses, there are more or less plausible technical solutions.

3.3. Head-raising as another instance of stranding and generalized 'big DP'

Let us now turn to the main proposal of this paper. Note that it is just a small (rather technical) step from the structure proposed in (28) for resumptive relatives to a head-raising structure. Observe the following derivation.

(37) $[_{\text{CP-REL}}\ \text{NP}_3\ [\text{wh}\ <[\text{NP}]_3>]_2\ [_{\text{XP}}\ \ldots\ [\text{D}\ <[\text{wh}\ [\text{NP}]]_2>]_1\ [_{\text{TP}}\ \ldots\ <[\text{D}\ [\text{wh}\ [\text{NP}]]]_1>\ \ldots]]]$

A full DP is generated in the argument-/theta-position. The first movement step is a case of scrambling, as discussed above, let us say to a position above the subject, which gives us the scopal specificity w.r.t. a universal quantifier in subject position (thus, XP may be a segment of TP (a case of adjunction) or perhaps a functional layer above TP, plausibly TopP). It is followed by operator (*wh*-) movement to the CP domain, stranding the D-layer. The last step of a resumptive RC derivation is the movement of the head NP to some higher layer within the CP domain, stranding the *wh*-layer.[15] Note that the reasoning concerning the D-stranding above naturally applies to the *wh*-stranding and thus gives a strong semantic motivation for this step. We saw that the resumptive pronoun is stranded because a further movement of the whole DP would yield an illicit chain (a chain with two strong occurrences). I also said that a strong occurrence must have consequences for semantic interpretation. From the analysis in (37) it follows that the *wh*-position in the CP domain is also a strong occurrence (because of the stranding) and therefore it should be an LF interpretable position. In fact, this brings us to the standard semantic analysis of relative clauses where a *wh*-operator in the SpecCP position creates a predicate of the <e, t> type out of an expression denoting a truth value (cf. Heim & Kratzer 1998). Stranding of the *wh*-layer thus follows naturally. The moved NP then intersects (by the rule of predicate modification) with the RC-predicate created by the *wh*-movement.

Now, let us move further on and try to generalize the 'big DP' approach to all relatives involving specificity effects. We should mention that a big DP structure has already been proposed for the so-called D-linked *wh*-phrases in questions (cf. Rullmann & Beck 1998). The presence of a D-projection above the whP seems to be a virtual necessity for some languages, which display definite morphology on *wh*-words (e.g. French or Italian). Therefore, it seems natural to say that there is an equivalent underlying structure even for English interrogative *wh*-phrases that are specific. However, we still need to account for the fact that *wh*-phrases in questions do not have to be interpreted specifically, as opposed to *wh*-phrases in relative clauses. And in fact, as we saw in the descriptive sections above, if we want to obtain the same interpretive possibilities in relatives as in questions, we must not use a *wh*-phrase.

[15] An analogous structure (not involving the scrambling step) is proposed by Bianchi (1999 and her subsequent work) and Zwart (2000).

I propose the following structure for operator phrases[16] whose involvement in the structure yields *wh*-relatives, *that*-relatives, and *wh*-questions respectively:

(38) *Wh*-relatives
[D [wh [NP]]]

(39) *That*-relatives
[wh [NP]]

(40) Questions
[Q [wh [NP]]][17]

The operator phrase in *wh*-relatives obtains the same structure as the one yielding a resumptive pronoun (cf. (37)). The operator phrase in *that*-relatives does not contain the D-layer and therefore is not confined to be interpreted specifically (or be licensed in a higher position than subject). The operator phrase in questions has essentially the same structure as the one in *that*-relatives; the only difference is the Q-quantifier, which binds the *wh*-variable. Presumably, its only function is to conform to the bijection principle according to which every variable needs to be bound by exactly one quantifier and every quantifier needs to bind exactly one variable. If the literature is right on the point that *wh*-phrases are interpreted as variables in *wh*-questions (thus providing the space for possible answers), then the Q-quantifier is purely formal and has no semantic import (it only allows a licit open-variable interpretation of an XP). Nevertheless, I will argue that it has morphological consequences.

To sum up, we get a desirable difference between *wh*-relatives on the one hand an *that*-relatives and questions on the other: the presence/absence of the D-projection above the whP. If the projection is present, the operator phrase is to be interpreted specifically (in some languages resulting in scrambling). If the projection is absent, scope ambiguities arise.

Let us now turn to the explanation regarding the presence of the *wh*-morphology in *wh*-relatives and its absence in *that*-relatives. Note that I treat quantification (of Q and D for our purposes) as a relation in narrow syntax. I have already suggested that apart from having a clear semantic import (specificity), quantified expressions (NPs) are also sensitive to some syntactic processes (scrambling). Under the general view of language faculty which I briefly touched upon in the introduction, we expect quantification to have some PF (morphological) consequences as well. I propose the following principle concerning the realization of *wh*-morphology:

(41) *wh*-morphology must be licensed by DP-internal quantification in its spell-out position.

In other words, there must be a quantifier in the upper DP-layers which c-commands the *wh*-projection in the position where it is expected to be realized (e.g. in SpecCP). Technically, this is achieved by any mechanism that relates heads within an extended projection (e.g. overt/covert head-movement). Such an approach gets support from the fact that there are a number of quantifying indeterminate DPs which involve *wh*-morphology:

[16] I will use the 'operator phrase' as a convenient term covering all kinds phrases which *wh*-move to SpecCP in questions and relative clauses. Note that I accept the head-raising analysis and the operator phrase is therefore a full DP also in relative clauses.

[17] An equivalent structure would hold for simple *wh*-words (like *what* in English), where the NP position would be a set of abstract φ-features, potentially determining the form of the *wh*-word.

(42) a. who-ever, what-ever, which-ever, where-ever, when-ever, how-ever, etc.
b. *every-who, *every-what, *every-which, every-where, *every-when, *every-how, etc.
c. *some-who, some-what, *some-which, some-where, *some-when, some-how, etc.

(43) ně-kdo, ně-co, ně-který, ně-kde, ně-kdy, ně-jak, etc.
some-who, some-what, some-which, some-where, some-when, some-how

Some of these non-interrogative *wh*-words seem quite productive (as in (42a)); some are quite exceptional (42b); some involve semantic shifts (42c). The Czech examples in (43) display a productive pattern (analogous to (42a)) where an existential quantifier expressed by the prefix *ně*- unexceptionally selects a *wh*-word.

An approximate analysis of the productive pattern in (42a) may be as follows (I ignore word-order complications):

(44) [ever [wh- [(NP)]]]

The (universal/definite) quantifier *ever* heads a *wh*-phrase and arguably quantifies over it, cf. Tsai (1994). We can see that the structure in (44) is identical to (38), i.e. the one proposed for *wh*-relatives. Importantly, there is also a syntactic parallel between these two, since the quantifiers in (42a) (as opposed to free choice DPs like *anyone*) necessarily involve a relative clause, namely a free relative:

(45) a. I am ready to meet whoever *(comes to the party).
b. I am ready to meet anyone (who comes to the party).

Note that in the light of the principle (41), it is the quantifier itself, i.e. *ever* in English or *ně*- in Czech, which forces the *wh*-morphology to be realized.

If the arguments above are on the right track, we have another reason to accept the big DP for *wh*-relatives: not only is it needed for deriving the correct semantics but also the *wh*-morphology, which arises because of the interaction with the c-commanding quantifier, an abstract definite determiner.

What happens in *that*-relatives? As I proposed in (39), they involve a *wh*-projection as well. In the preceding section we saw that this projection enables the operator DP to raise into a SpecCP position where it semantically transforms the proposition into a predicate. However, this *wh*-projection is not headed by a quantifier of the (38)/(44) type and therefore it does not get morphologically realized.

For questions, represented in (40), it seems straightforward that the Q-quantifier bears the responsibility for realizing the *wh*-morphology. From this it follows that in languages where no *wh*-morphology is present (i.e. where *wh*-words are morphologically identical to indefinites, e.g. in Chinese or Japanese), there is no DP-internal Q-quantifier and indefinites are quantified at distance, presumably through unselective binding from the C-position (Cheng 1997).

Note that this analysis of *wh*-phrases in questions can be made compatible with the big DP analysis for D-linked *wh*-phrases, as suggested above. On the assumption that a variable may

be quantified over (modified) more than once (as argued for e.g. by Kratzer 2005),[18] then nothing seems to prevent us from assigning the D-linked *wh*-phrases the following structure.

(46) Questions with D-linked *wh*-phrases
[D [Q [wh [NP]]]]

Below I show that this structure neatly explains some phenomena related to resumption in questions.

3.4. Applying the analysis

In this section I show that the analysis proposed above derives the correct results for all kinds of constructions discussed.

First, consider the structural difference between resumptive relatives of the Czech/Hebrew type ((47a) is identical to (37)) and *wh*-relatives of the English type (47b).

(47) a. $[_{\text{CP-REL}}$ NP$_3$ [wh <[NP]$_3$>]$_2$ $[_{\text{XP}}$ … [D <[wh [NP]]$_2$>]$_1$ $[_{\text{TP}}$ … <[D [wh [NP]]]$_1$> …]]]
b. $[_{\text{CP-REL}}$ NP$_2$ [D [wh <[NP]$_2$>]]$_1$ $[_{\text{TP}}$ … <[D [wh [NP]]]$_1$> …]]

Note that the underlying representation of the *wh*-phrase and the resumptive pronoun is identical (as proposed) in the argument position. The difference is in the missing movement (scrambling) in the case of English *wh*-relatives. The absence of a scrambling type of movement in English is hardly surprising. Consequently, there is nothing to strand in the lower position and the whole complex D-wh-NP moves directly to SpecCP. Note that the motivation for this movement lies in the *wh*-projection (it is a *wh*-chain), the D-layer is simply pied-piped along. Next, as the NP moves in order to become the argument of the sentential predicate, the *wh*-projection is stranded (together with D), exactly as in (47a).

Now, we can see that the *wh*-projection is headed by a quantifying D-head in (47b) but not in (47a). This configuration, in connection with the principle (41), gives us the correct result as for the morphological realization of the CP-domain: while resumptive relatives are introduced by an invariable complementizer, *wh*-operator relatives are introduced by a pronominal-like *wh*-determiner (possibly reflecting φ-features of the NP which it heads). It follows straightforwardly that *wh*-pronominals should be complementary with resumptive pronouns. As far as I know, this seems to hold for (restrictive) relative clauses but it does not hold for questions. Sharvit (1999: 594ff.) gives a Hebrew example of a question, given in (48), where a gap after *wh*-movement may alternate with a resumptive pronoun. It is significant that if the resumptive pronoun is present the pair-list reading disappears (and the functional is retained), exactly as in corresponding relative clauses (recall the discussion in section 2.4).[19]

(48) Ezyo iSa kol gever hizmin (ota)?
which-FEM.(SG) woman every man invited her(RES-3SG.FEM)
'Which woman did every man invite?'

[18] Kratzer argues that a class of quantifiers modifies the properties of the set denoted by the variable (determiners) and another class determines its referential/quantificational properties (true quantifiers). This would require a more detailed specification of the bijection principle.

[19] I remain silent about the problem why some languages use resumption only in relatives but not in questions (as in Slavic languages). De Vries (2002) has an account of this but he fails to note that resumption in questions is actually attested in some languages so his account turns out to be too restrictive.

How can we explain the double φ-feature marking in Hebrew resumptive questions, given our current analysis? In fact, it follows straightforwardly from the structure proposed in (46). Consider the following derivation.

(49) $[_{CP\text{-}Q}$ [Q [wh [NP]]]$_1$ $[_{TP}$ … [D <[Q [wh [NP]]]$_1$>] …]]]

Suppose that as the D-linked *wh*-phrase moves to SpecCP it leaves its (structurally highest) D-layer behind, similarly as in the cases described above. The stranded D is realized as a resumptive pronoun but the *wh*-word in SpecCP is still headed by a Q-quantifier which renders the *wh*-morphology active. If the *wh*-morphology in the given language obligatorily displays φ-features (as in Hebrew) then the result is expected.[20]

Let us return to a question involving a non-D-linked *wh*-phrase, i.e. the representation in (40)—[Q [wh [NP]]]. We correctly predict that no resumptive pronoun surfaces, as in English:

(50) $[_{CP\text{-}Q}$ [Q [wh [NP]]]$_1$ $[_{TP}$ … <[Q [wh [NP]]]$_1$> …]]]

The last case to discuss is represented by English *that*-relatives or by gap relatives with an invariant complementizer in Czech, i.e. the 'poorest' structure, given in (39) — [wh [NP]]. The derivation looks as follows:

(51) $[_{CP\text{-}REL}$ NP_2 [wh <[NP]$_2$>]$_1$ $[_{TP}$ … <[wh [NP]]]$_1$> …]]

Because the *wh*-projection is not headed by a quantifier, the *wh*-morphology remains unrealized. As a consequence, the CP-domain contains an invariant complementizer.[21]

To sum up, I argued that the grammar provides us with the following fine-structured operator DPs:

(52) a. [wh [NP]] gap-relatives introduced by an invariant complementizer
b. [D [wh [NP]]] gap-relatives introduced by a pronominal, or resumptive relatives
c. [Q [wh [NP]]] gap-questions
d. [D [Q [wh [NP]]]] questions with resumptives or *wh*-words with definite morphology

The following sections extend the analysis in order to account for the behavior of relatives which involve the functional reading of the operator phrases and some phenomena concerning appositive relative clauses.

3.5. Functional readings

So far, my analysis addressed only the distinction between the individual and the pair-list reading. I argued that the difference between these two is basically one of scope: in the

[20] The derivation in (49) provides us with another prediction: if a language marks D-linking directly on the *wh*-word (as in Romance languages), it follows that the D-layer moves up with the *wh*P and consequently there should be no resumptive pronoun. This could be tested on a language which allows both resumption and definiteness marking on *wh*-expressions. I am not aware of such a language.

[21] This result is slightly blurred by the fact that in some Slavic languages (Czech, Polish) the invariant complementizer, being different from a declarative complementizer, has a *wh*-form, namely *co* 'what'. This suggests that the principle (41) could be restated in terms of φ-features (or φ-marked *wh*-words).

individual reading the operator phrase receives a (scopally) specific interpretation; the pair-list reading, on the other hand, is derived by interpreting the operator phrase in its narrow-scope position, which is impossible if the D-head is present.

As suggested in section 2.2, relatives involving a functional reading are ambivalent in a way: semantically, they behave like relatives with the pair-list reading because the individual variable is bound by a universal quantifier in the subject position, however, from the morphological viewpoint, they may resemble relatives with the individual reading, i.e. they allow resumptives and *wh*-operators. How can this seeming paradox be resolved?

Recall the standard semantic analysis of the functional reading: the NP is reinterpreted as a function which relates individuals with individuals. So *which man* (as in example (55) below) is interpreted as a function which relates men with some other individuals, e.g. their wives. Then what we really ask about or what we relativize (generally, what is bound by the *wh*-operator) is the function and not the individual variable, which in turn remains available for being bound by the universal quantifier. How can we implement this semantic analysis in the syntax? Apparently, there is more structure involved in the functional reading than in the individual or pair-list readings. I propose that the structure of an operator phrase which is assigned the functional reading is as follows:

(53) $[D_{ARG}$ [wh [F [NP]]]]

I suggest that F is a functional head which transforms the NP into a function (from individuals to individuals). D_{ARG} is then the individual variable which serves as the argument for the function FP (assuming, as above, that the *wh*-projection is semantically vacuous). A derivation of a relative clause involving the operator phrase in (53) looks as follows:

(54) $[_{CP\text{-}REL}$ [F [NP]]$_2$ [wh <[F [NP]]$_2$>]$_1$ $[_{TP}$ … $\forall_i$ … $[D_i$ <[wh [F [NP]]]$_1$>]…]]

The structure in (54) is a representation of a relative clause, illustrated e.g. in (7c), here repeated as (55).

(55) the man that every woman invited, namely her husband

Note that the D_{ARG}, which represents here the individual variable, is stranded in its base position and is thus available for the binding by the universal quantifier. The functional operator phrase raises into SpecCP and 'opens' the proposition which subsequently takes the FP as its argument. This relative clause derivation is parallel to the one proposed in 3.4.

Now, note that nothing in principle prevents us from assuming that the function (functional variable) FP may be specific. The structure of a specific functional operator phrase looks as follows:

(56) $[D_{ARG}$ $[D_{SP}$ [wh [F [NP]

In (56) D_{SP} refers to a determiner with specificity features. I assume that the resulting $D_{SP}P$ 'inherits' the functional reading and still requires the presence of an argumental D. The structures below show how a resumptive relative and a *wh*-relative involving the functional operator phrase are derived:

(57) a. $[_{\text{CP-REL}}$ [F [NP]]$_3$ [wh <[F [NP]]$_3$>]$_2$ $[_{\text{XP}}$ … [D_{SP} <[wh [F [NP]]]$_2$>]$_1$ $[_{\text{TP}}$ … $\forall_i$ … D_{ARGi} <[D_{SP} [wh [F [NP]]]]$_1$> …]]]
b. $[_{\text{CP-REL}}$ [F [NP]]$_2$ [D_{SP} [wh <[F [NP]]$_2$>]]$_1$ $[_{\text{TP}}$ … $\forall_i$ … D_{ARGi} <[D_{SP} [wh [F [NP]]]]$_1$> …]]

The structures above are underlying representations of the examples (23) and (8c) respectively, both repeated in (58):

(58) a. Ta žena, co (ji) každý muž pozval, byla jeho manželka.
the woman COMP her(RES) every man invited was his wife
'The woman every woman invited was his wife.'
b. the woman who every woman invited, namely her husband

Again, the structures in (57) are completely parallel to those in (47), section 3.4. The individual variable is in both cases bound by the universal quantifier and the specific function yields the same desired morphological results: a resumptive pronoun in (57/58a) and a *wh*-phrase in (57/58b).

In this section we resolved the seeming paradox of functional reading by assuming that the function within the operator phrase may be specific (a 'big DP') or non-specific (a 'bare' whP). Crucially, the specificity of the function does not tamper with the narrow reading of the individual variable, an argument of this function.

3.6. Appositive relativization

In this section I address some relevant differences between restrictive and appositive relativization in English and Greek. The defining difference between restrictive and appositive relatives is that the relative clause does not semantically intersect with the head in appositives. Rather, the relative clause only 'specifies' the meaning of the head and the *wh*-operator functions as a pronominal anaphor. That is why some appositive relative clauses can be paraphrased as separate sentences containing an anaphoric pronoun. Consider the following paraphrases:

(59) a. Mary, who I met a year ago, is a good friend of mine.
b. Mary is a good friend of mine. I met her a year ago.

This property of appositive relative clauses, namely its affinity to coordination, has been reflected in some analyses, starting with Emonds (1979) and recently proposed by de Vries (2006), who treats appositive relatives as a case of apposition, which in turn is analyzed in terms of 'specifying coordination' (see also Koster 2000, who introduced the 'colon phrase' as a subcase of coordination).

Let us assume that an analysis based on coordination is on the right track. In such an account we need to capture the fact that the *wh*-phrase is actually a pronominal anaphor. Pronouns are usually analyzed as D-heads (or some reduced DPs). I suppose (with de Vries 2006) that appositive relatives can be represented as a kind of free relative represented as a DP (see also Caponigro 2000), containing a full DP head (again a version of raising), which is anaphorically related to an external head. The external head and the appositive relative are

related by a coordinating head &: and the internal NP head is deleted (if it is identical with the external one).[22]

(60) [D [NP_i]] &: [D [$_{CP\text{-}REL}$ [D [wh ~~[NP$_i$]~~]]]$_1$ [$_{TP}$ … <[D [wh [NP]]]$_1$> …]]

Note that we end up with a double DP layer at the left periphery of the relative clause: the highest (possibly abstract) D creates a nominal out of a CP and the head in SpecCP has a DP status for reasons discussed above: it behaves as a pronominal anaphor. This structure makes a correct prediction concerning English appositives, which are obligatorily introduced by a *wh*-determiner:[23]

(61) Mary, who/*that/*0 I met a year ago, is a good friend of mine.

The reason for this is that the *wh*-projection in SpecCP is obligatorily quantified over by a DP-internal determiner. The principle (41) takes care of the correct morphological realization.

I also make a prediction concerning resumption in appositives. If the relation between the external nominalizing D-head and the internal relative DP-head in SpecCP is as close as some authors assume (Bianchi 1999 argues that the lower D incorporates into the external D), we expect that some interactions between the external D and the relative head in SpecCP are in principle possible. Now, suppose that there is a language which makes use of resumption in appositives. In our approach, this means stranding of the D layer in a scrambling position. We end up with a 'bare' whP in SpecCP and therefore the *wh*-morphology should be unrealized. However, there is still an adjacent quantifier, namely the external D, which may, under a slight stretching of the principle (41), cause the visibility of the *wh*-morphology. If this is a correct assumption, we predict the existence of languages where (φ-marked) relative *wh*-operators are compatible with resumptive pronouns in appositive relatives but not in restrictive relatives.

Indeed, Alexopoulou (2006) reports the predicted state of affairs for Greek. Greek has two ways of forming restrictive relative clauses: either there is a relative pronoun in SpecCP, which is then obligatorily associated with a gap (62a), or there is an invariant complementizer, which is associated either with a gap (in structural Cases) or with a resumptive pronoun (in non-structural Cases) (62b). Note that a combination of a relative and resumptive pronoun is ungrammatical in Greek restrictives. The examples come from Alexopoulou (2006:pp. 68–70).

(62) a. To pedi tu opiu (?*tu) zitises danika ine o yos
the kid the who.GEN his.GEN(RES) asked.2SG loan-money is the.NOM son.NOM
mu.
my
'The kid you asked to borrow money from is my son.'

b. To pedi pu *(tu) danises lefta ine o yos mu.
the kid COMP it.GEN lent.2SG money is the.NOM son.NOM my
'The kid you lent money to is my son.'

[22] Note that this analysis straightforwardly accounts for the fact that appositive relatives may have a full NP head:

(i) Da Vinci Code, which book I've read several times, was written by Dan Brown.

[23] As pointed out by Mark de Vries to me, other Germanic languages (Danish, Swedish) have a weaker condition for appositive relatives: as opposed to restrictives, the CP-domain must be phonologically realized, i.e. a complementizer is sufficient. I have no explanation for this state of affairs.

In appositive relatives, however, the relative pronoun can be combined with a resumptive pronoun. Furthermore, resumptive pronouns are obligatory even in structural Cases.

(63) O Petros, ton opio/pu *(ton) agapo poli, me
the.NOM Petros.NOM the.ACC who.ACC/comp him(RES) love.1SG a lot me.ACC
ehi stenahorisi.
has.3SG upset
'Petros, whom I love a lot, has upset me.'

Notably, Greek can use the invariant complementizer *pu* in appositives, too, which suggests that the relation between the external D and the operator phrase in SpecCP is somewhat weaker than predicted. Still, the contrast between Greek restrictives and appositives can be straightforwardly accounted for by the analysis proposed.

To sum up, the anaphoric properties of relative and resumptive pronouns in appositive relative clauses lead us to postulate an obligatory D-head on top of the operator phrase (an obligatory 'big DP' in appositives). This in turn gives us the correct results concerning the morphological realization of these pronominals: they must be overt, either as *wh*-determiners in English or as resumptive pronouns in Greek. Apart from that, I make a correct prediction about the co-occurrence of relative and resumptive pronouns in appositives, as opposed to restrictives.

4. Conclusion

In this paper I argued that operator phrases involving overt *wh*-morphology should be analyzed as phrase-internally quantified expressions. In questions, *wh*-phrases are invariably headed by a DP-internal question-operator and therefore the *wh*-morphology always gets morphologically visible. In relative clauses the relative-operator phrase is subject to referential variability. If specific operator phrases are represented as 'big DPs', i.e. *wh*-phrases headed by a specific head D, then the visibility of *wh*-morphology in these cases follows. Non-specific operator phrases, on the other hand, lack the quantificational D-layer and the *wh*-morphology remains unrealized.

The analysis also accounts for some less frequent phenomena, like resumption in questions (Hebrew), or obligatory resumption in appositive relatives, as opposed to restrictive relatives (Greek). Furthermore, I proposed an explicit syntactic analysis of functional readings in questions and relative clauses and showed why functionally-read operator phrases may behave like specific operator phrases morphologically and at the same time like non-specific ones from the semantic viewpoint.

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Radek Šimík
University of Groningen
r.simik@rug.nl
http://www.let.rug.nl/p250477/

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Pseudo-partitives and (silent) classifiers in Romanian

Mihaela Tănase-Dogaru

This paper addresses the question of classifiers in languages with plural morphology. I will propose that pseudo-partitives of the quantitative type (see Selkirk 1977) consist of a classifier-noun sequence, where the classifier is a semi-lexical or functional noun. The second section of my paper posits a classifier phrase for all languages. The ClasP will be conceived of as emerging above NumP in all 'count' situations (see Kayne 2003). The head of the ClasP in languages with plural morphology may be filled with semi-lexical material (see van Riemsdijk 1998, 2003) – as in the case of pseudopartitive constructions – or, building on Kayne's (2003) proposal, with an abstract noun NUMBER.

1. What classifiers classify

In the recent literature it has been often pointed out that according to the way they express grammatical number, languages fall into two categories:

a. classifier languages, i.e. languages with a classifier morpheme ranging over the noun (areal feature of languages in Asia and Southeast Asia).
b. languages with plural morphology

It has been suggested (see Borer 2005) that the absence of plural inflection correlates with the existence of classifiers. The absence of plural marking correlated with the absence of number inflection is illustrated in (1) – examples from Chen (2003):

(1) a. Qianmian turan tiao chulai yi zhi laohu
Front suddenly jump out one CL tiger
'suddenly a tiger jumped out in front of us'
b. Ta mai le yi zhuang fangzi
he buy PERF.ASP one CL house
'he has bought a house'

In languages with plural morphology, such measure phrases are required by mass nouns in order to be rendered countable. Examples in (2) show such classifiers at work in English and Romanian:

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(2) a. two grains of sand / three drops of whisky / a loaf of bread
b. două boabe de orez / trei pahare de lapte / un cub de zahăr
two grains of rice / three glasses of milk / a cube of sugar

The main question at this point is: are these measure words/ partitive expressions/ amount quantifiers the same as classifiers in Chinese? The major difference is that classifiers in Chinese are required both for what is generally called 'mass' nouns (like *rice*, *water*, etc) and for count nouns (*pen*, *book*, etc) while in languages like English they are required only for mass nouns. This has led some linguists to propose that in Chinese all nouns are mass nouns (Chierchia 1998). Another important observation is that in languages with plural morphology, mass nouns *can* receive plural suffixes in order to become countable as an alternative to classifier inflection, while in Chinese they cannot.

(3) două zaharuri trei ceaiuri multe săruri
two sugars three teas many salts

1.1. Classifying classifiers

It has been argued (see Cheng & Sybesma 1999 and references there) that classifiers can be divided into two classes:

- classifiers that create a unit of measure

(4) san ping jiu
three bottle liquor
'three bottles of liquor'

- classifiers that name the unit in which the entity denoted by the noun naturally occurs

(5) san ge ren
three CL person
'three persons'

I will follow Cheng & Sybesma in calling the first type of classifiers – massifiers and the second – count-classifiers. There are two important distinctions between massifiers and classifiers. First, massifiers allow the appearance of a modification marker *de*, which may intervene in the [massifier + N] sequence, while count-classifiers do not (6). Secondly, massifiers allow the modification of the massifier head with a limited number of adjectives ('da' / big, 'xiao' / small), while count-classifiers do not (7):

(6) a. san bang (de) rou
three CL-pounds DE meat
'three pounds of meat'

b. ba tou (*de) niu
eight CL-head DE cow[1]
'eight cows'

(7) a. yi da zhang zhi
one big CL-sheet paper
'one big sheet of paper'
b. *yi da zhi gou
one big CL dog
'one big dog'

On the basis of such evidence, Cheng & Sybesma (1999) conclude that the count-mass distinction is lexically encoded on Chinese nouns. Following in essence Chierchia (1998), the noun does have a mass denotation and is inserted in the structure where the massifier or count-classifier takes over the job of 'encoding' countability or divisibility.

Coming back to the question of the status of classifiers in English and Romanian, it seems safe to assume that they behave like Chinese massifiers. Applying Cheng and Sybesma's (1998) criteria of discrimination, it is obvious that both English and Romanian massifiers allow markers of nominal boundary *of* and *de* respectively (8a) and allow modification by adjectives (8b):

(8) a. trei kilograme de carne
three kilos of meat
a'. three pounds of meat
b. o foaie mare de hârtie
a sheet big of paper
b'. a big sheet of paper

The next section analyzes the so-called 'quantitative pseudo-partitives' when functioning as classifiers employed to identify portions of mass nouns. As a preliminary remark, Romanian has a different strategy for marking 'true' partitivity – the prepositions *din / dintre*, as opposed to the preposition *de*, which is involved in pseudo-partitives.

1.2. Classifiers and pseudo-partitives

1.2.1. Classifiers and mass nouns

In Romanian, characteristic of mass nouns are classifiers, which individuate a certain portion of the stuff designated by the mass noun. In (9) there are examples of classifiers used with mass nouns:

(9) a. o picătură de sânge – a drop of blood
b. un deget de whisky – a shot of whisky (lit. a finger of whisky)
c. un grăunte de sare – a grain of salt
d. un cățel de usturoi – a clove of garlic (lit. a puppy of garlic)

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[1] I thank the two anonymous reviewers for pointing out the example (6b).

All these amount quantifiers operate as partitioning expressions of the whole N (Q N) designating a portion of the respective stuff.

According to the criterion of degrees of semi-lexicality (which will be dealt with in section 2 of this paper) of the noun functioning as N_1 in a pseudo-partitive construction, Vos (1999) distinguishes six subtypes of such classifiers:

(10)	a.	een	aantal	voorbeelden	QUANTIFIER NOUN
		a	number	examples	
	b.	drie	liter	melk	MEASURE NOUN
		three	liter(s)	milk	
	c.	een	snee	brood	PART NOUN
		a	slice	bread	
	d.	die	krat	bier	CONTAINER NOUN
		that	case	beer	
	e.	een	kudde	olifanten	COLLECTIVE NOUN
		a	herd	elephants	
	f.	vijf	soorten	zoogdieren	KIND NOUN
		five	types	mammals	

The same classification is to be found in the Modern Grammar of Dutch (MGD), with the only difference that kind nouns are assumed to be non-quantificational, while the other five types vacillate between quantificational and referential interpretations. It is not clear whether this classification (or any other, for that matter) is exhaustive and it is often difficult to decide to which particular class a certain N_1 belongs. As MGD states: 'N_1s tend to shift from one class to another (especially into the direction of quantifier nouns) when their referring force weakens'.

Therefore, a very important dimension of study has been introduced: that of analyzing N_1s in pseudo-partitive constructions as oscillating between a referential and a quantificational interpretation. This dimension will help us determine that N_1s in pseudo-partitives have semi-lexical status.

Another classification of N_1 in pseudo-partitives is provided by Stavrou (2003) for Greek. What is of interest in this classification is that the author stresses the progressive loss of lexical meaning with several classes of such nouns:

(11)	a.	ekatosti,	duzina	CARDINAL NOUN
		a hundred	a dozen	
	b.	zevgari,	arithmos	QUANTIFIER-LIKE NOUN
		pair	number	
	c.	kuti,	bukali	CONTAINER NOUNS
		box	bottle	
	d.	plithos		COLLECTIVE / GROUP NOUNS
		crowd		
	e.	buketo,	matsaki	CONSISTIVE / MATERIAL NOUNS
		bunch	small prig	
	f.	kilo		MEASURE / UNIT NOUN
	g.	komati,	feta	PARTITIVE NOUN
		piece,	slice	

It is of interest to notice that some noun classes, such as a, b, and f, are clearly closed classes, as they cannot freely register new members, while the rest of the classes allow creative use as in *tria tsigara dromos* (literally *three cigarettes way*, meaning a distance that takes the smoking of three cigarettes to be covered). As the next sections will show, at least some of these noun classes have become grammaticalized, i.e. have covered the way from the fully lexical to the functional end of the continuum.

Another point of interest is that container and consistive nouns are usually called 'classifiers', which is the same term used in the case of classifier languages. Chierchia (1998) distinguishes classifiers from measure nouns on the basis of their semantics but he also notes that the two classes are similar in that both are relational and both allow quantification of a certain domain of objects.

The next section will continue in this vein – that of treating N_1 in pseudo-partitives as 'classifiers'. In this respect, I will show that recent analyses of predicate inversion cannot apply to this domain; moreover, pseudo-partitives involve a single projection with one semi-lexical (or functional) head, i.e. the classifier, and one lexical head.

1.3. Why pseudo-partitive constructions are neither pseudo nor partitive

In this section I claim that the so-called pseudo-partitive constructions in Romanian actually involve a classifier and a lexical noun that the classifier 'classifies'. The description of the classifier will overlap Cheng & Sybesma's description of 'massifiers' in Chinese, with the important difference that in Romanian, classifiers are themselves marked for number.

Nevertheless, what I maintain is that classifiers in Romanian are semi-lexical nouns, i.e. the functional nature of these nouns justifies my claim that they can be grouped together with 'purely functional' classifiers in languages like Chinese. Inasmuch as they are semi-lexical or functional nouns, a predicate inversion analysis cannnot account for their status.

In what follows, I will briefly present the main tenets of the most influential analyses of pseudo-partitive constructions and try to show why a unified approach to the study of quantitative and qualitative pseudo-partitives in terms of predicate inversion does not hold water. My main claim will be that qualitative constructions are based on a relation of predication while quantitative constructions are underlain by a different semantic relation which I will call classificatory. The following section will draw up a list of features (by no means, exhaustive) that converge to an analysis of the nouns heading a pseudo-partitive construction as semi-lexical.

1.3.1. Predication and classification: why quantity is not quality

Insights from Zamparelli (1995), Bennis et al. (1998), Moro (1997), Corver (1998), Den Dikken (2006) may lead to the idea that the pseudo-partitive (quantitative) structures in Romanian are derived via predicate raising and the preposition *de* 'of' is a nominal copula.

Initially, the rule of predicate raising was applied to the domain of copular sentences and was characterized as A-movement of a predicate to subject position, around the position occupied by the subject (Moro 1997). For copular constructions like these, it has been argued that they underlyingly feature a small clause (SC) in the complement of the copula *be*, a head triggering raising to subject position of a constituent contained within the small clause.

(12) John is the best candidate.
The best candidate is John.

(13) a. [$_{IP}$ … be [$_{XP}$ John X [$_{Pred}$ the best candidate]]] (cf. Bennis et al. 1998)
b. [$_{IP}$ John$_i$ … be [XP t$_i$ X[$_{Pred}$ the best candidate]]]
c. [$_{IP}$ the best candidate$_j$… be [$_{XP}$ John X [Pred t$_j$]]]

As Moro (1991) pointed out, Predicate Inversion sometimes leads to the obligatory presence of the copula (14a), phenomenon which is likened to the obligatory presence of the 'functional' preposition 'of' in 'inverse' nominal structures (14b). The assumption following naturally from these considerations would be to regard the preposition 'of' as a nominal copula:

(14) a. I consider John (to be) the best candidate / I consider the best candidate *(to be) John.
b. The village is like a jewel / the jewel *(of) a village

The next step was the application of this rule to the nominal domain, in the spirit of Abney (1987) and Szabolcsi (1994) who extensively argue for a solid parallelism between the structure of the sentence and the structure of the nominal domain. The application of predicate inversion to the nominal domain has mainly concerned itself with the pseudo-partitive qualitative constructions, or $N_1$of N_2 constructions.

(15) a. that barge of a woman (ex. from Den Dikken 2006)
b. some rotten little fig of a human being
c. a colorless mouse of a woman
d. some shrinking violet of a civil servant

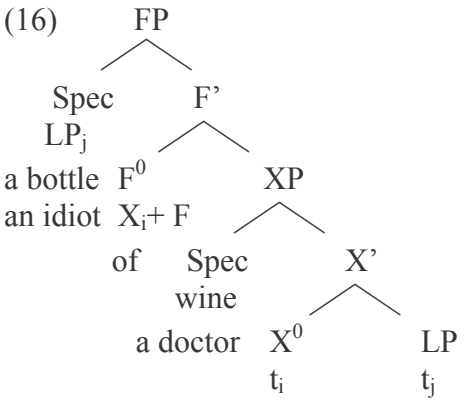
Regarding the structure of Predicate Inversion in the nominal domain, I will start from the one put forward by Bennis et al. (1998) and Corver (1998) – similar to the one implicit in Den Dikken (2006) – and discus to what extent it can accommodate Romanian data.

1.3.1.1. Bennis et al. (1998), Corver (1998)

Starting from Moro's studies of predicate inversion in equative sentences and Den Dikken's idea of predicate movement within nominal phrases for qualitative predicates such as *idiot* in *that idiot of a doctor*, Corver (1998) extends this framework to nouns denoting quantity or measure in pseudo-partitive constructions such as *a bunch of flowers* or *a bottle of wine*.

In the structure in (16), LP is the raising predicate and XP is the SC containing the predicate and its subject. The SC head, X, undergoes a domain extending movement to a higher head (the head in whose specifier position the predicate lands) in order to render the position Spec XP and Spec FP equidistant from the extraction site of the predicate.

(16)



The analysis presented in (16) entails that the nouns are related by the relation of predication. It follows that in the structure *a bottle of wine*, the measure noun *bottle* is base-generated as a predicate whose subject is the measuree *water*, while the preposition *of* being the nominal counterpart of the copula.

Corver's analysis is supported by a number of properties which characterize predicate nominals and also apply to measure phrases:

(i) measure phrases can be linked to the subject by a copular verb like *become*

(ii) measure phrases can be used as an answer to *what…like* questions, which typically ask for a property

(iii) they can be coordinated with APs – typical examples of predicative phrases (as in *The range of these guns is only 200 meters but nevertheless sufficient*).

But before starting to integrate massifiers in predicate inversion structures it is indispensable to answer the following questions: 1. what arguments compel one to consider such structures as based on predicate inversion? and 2. what compels the predicate itself to raise?

Starting with the first question, there are two main arguments that could prompt one to view pseudo-partitive quantitative structures as based on predicate inversion. The first has to do with the meaningless preposition *de* / *of*, which surfaces in pseudo-partitive constructions and which qualifies as nominal copula:

(17) a. o sticlă de vin
a bottle of wine
b. o ceaşcă de ceai
a cup of tea

Romanian has two 'specialized' prepositions to express partitivity; these are *din* and *dintre*, both of which can be paraphrased as 'of' in English:

(18) unul dintre studenții lui / o sticlă din vinul acela
one of students-the his / a bottle of wine-the that
'one of his students' / 'a bottle of that wine'

Therefore, it may be argued that the preposition *de* does not express a partitivity relation. The mass noun can be seen as inserted in a syntactic structure above a massifier – which then undergoes predicate inversion (the reflex of which is the nominal copula *de*) and performs the divisibility function.

The second argument concerns the interpretation of the sentences in (19):

(19) a. Am băut o sticlă de vin / *Am băut o sticlă /
have drunk $_{1st\ pers.sg}$ a bottle of wine/ have drunk $_{1st\ pers.sg}$ a bottle/
Am băut vin
have drunk wine
'I have drunk a bottle of wine / I have drunk a bottle / I have drunk wine'

b. Am adăugat la mâncare un vârf de sare. /
have added $_{1st\ pers.sg}$ at food a tip of salt.
*Am adăugat la mâncare un vârf. / Am adăugat la mâncare sare.
have added $_{1st\ pers.sg}$ at food a tip / have added at food salt
'I have added the food a tip of salt / I have added the food a tip / I have added salt'

The interpretation of such sentences points to the fact that the true 'subject' in this relation of predication is the mass noun and not the massifier, which surfaces above the subject after predicate inversion.

The second question related to the mechanism that forces the predicate to raise. When discussing qualitative binominal structures, Den Dikken (2006) argues that the raising of the predicate is driven by a property of the raised predicate, i.e. the fact that it has an empty head. This empty predicate head is in need of licensing and predicate inversion is the mechanism that satisfies this need. For qualitative binominal structures (*a jewel of a child*), he argues that the empty predicate head structurally encodes a semantic aspect of comparison (*the child is compared to a jewel*) and can be paraphrased as SIMILAR.

The main problem with this structure is the following: if we assume that the raising predicate is actually a classifier, then why would a classifier raise at all? In other words, a raising structure needs a licensing mechanism, i.e. something to force the predicate to raise. In addition, it is not clear when and why syntactic number (represented by the cardinal one, indefinite article 'a', or plural morphology) should be generated in the structure. Consider examples (20):

(20) a. o sticlă de vin
a bottle of wine

b. două sticle de vin / *două sticlă de vin
two bottles of wine / *two bottle of wine

There is an important difference between classifiers in Chinese and plural marking on the one hand, and quantity-designating nouns which are used in the so-called pseudo-partitive constructions, on the other. Apart from a few lexically marked exceptions such as *three head of cattle / una bucată student (one piece student)*, these quantity-designating nouns must themselves be marked for number.

If we opt for predicate inversion as the underlying structure of quantitative pseudo-partitives there is another problem concerning syntactic Number that should be answered. It is not clear why the number morpheme should be generated above and detached from the structure of the classifier. Since Number is not generated in the absence of a noun to which it

applies, it seems counter-intuitive to argue for a structure in which a classifier, i.e. understood as a semi-lexical noun, raises to attach to an independently generated Number projection.

On the other hand, if we take these classifiers to actually represent semi-lexical categories, then the fact that they may be pluralized follows.

Before I engage on presenting the pieces of evidence in favor of considering pseudo-partitives as Classifier Phrases, let me dwell on another framework that has proven influential in the study of both quantitative and qualitative pseudo-partitives. The framework proposed by Doetjes and Rooryck (2003) has the great merit of attempting a unifying approach to the study of these constructions and of introducing a distinction in terms of 'comparative' and 'pure degree' interpretations, which I will refine in terms of degrees of semi-lexicality of the noun which comes first in pseudo-partitives, i.e. N_1.

1.3.1.2. Doetjes and Rooryck (2003)

Another framework that argues for a unified approach to the study of quantitative and qualitative pseudo-partitives is the one implicit in Doetjes (1997) and Doetjes & Rooryck (2003).

Starting from the observation that in both quantitative and qualitative constructions, agreement can be triggered by the element preceding *of* or by the element following *of*, i.e. by either N_1 or N_2 (21-22), Doetjes & Rooryck (2003) correlate this difference in agreement with differences in the interpretive nature of the quantitative/qualitative element (23).

(21) QUANTITATIVE

a. Beaucoup de livres sont / *est tombé(s)
A lot of books are / is fallen

b. Une montagne de livres *sont / est tombée
a mountain of books are / is fallen

(22) QUALITATIVE (ex. from Hulk and Tellier 1999)

a. Ton phénomène de fille est distrait*(e)
Your phenomenon.MASC of daughter.FEM is absent-minded.FEM/*MASC

b. Ce bijou d'église romane a été reconstruit(*e)
That jewel.MASC of roman church.FEM was rebuilt.MASC/*FEM

(23) THE QUANTITATIVE / QUALITATIVE AGREEMENT PRINCIPLE

1. In quantitative / qualitative constructions, the quantified / qualified element determines agreement if the quantifier / qualifier has a 'pure degree' interpretation of quantity / quality = the 'degree' interpretation
2. The quantifier / qualifier determines agreement iff the relation between the quantified / qualified noun and the quantifier / qualifier is paraphrasable in terms of a comparison in which the quantifier / qualifier keeps its lexical interpretation = the 'comparative' interpretation

The 'pure degree' interpretation is to be found in contexts such as (21a) in which *beaucoup* has completely lost its original lexical meaning and indicates a quantity of high degree. In (21b), however, *montagne* still retains part of its lexical meaning and its relation with the quantified element can be paraphrased in terms of comparison: *the quantity of books is such that it resembles a mountain*.

The 'pure degree' construction do not involve predicate inversion, but a syntactic structure containing an adverbial functional projection expressing Evaluation in the sense of Cinque (1999). The quantifying/qualifying noun is base-generated in Spec, EvalP and assumes the interpretation of 'pure degree' associated with Eval^0, losing its original lexical meaning.

(24) a. [$_{EvalP}$ ce phénomène Eval^0 [$_{DP}$ _____ de [$_{NP}$ fille]]]
that phenomenon of girl
b. [$_{EvalP}$ beaucoup Eval^0 [$_{DP}$ _____ de [$_{NP}$ livres]]]
a lot of books

The analysis has the great merit of offering a uniform treatment of the data; another element for which it deserves credit is the intuition that some distinctions must be operated within the class of quantifying (or qualifying nouns). Not all quantifying nouns behave the same with respect to agreement phenomena, a case in point being collective nouns used as N_1 in pseudo-partitives. However, it is my claim that differences in agreement within the class of pseudo-partitives do not stem from differences in syntactic structure but from differences in the syntactic status of the noun that comes to be used a classifier – N_1 in pseudo-partitives. This noun has either semi-lexical or lexical status, which accounts for variations in agreement (see van Riemsdijk 1998).

What this framework cannot account for is the fact that, there are variations in agreement like the ones in (25), in which case neither postulating radically different syntactic structures, nor the semantic distinction between 'pure degree' and 'comparative' readings is of much help:

(25) a. Un grup de studenți au cerut învoire. (Romanian)
A group of students have asked leave
'a group of students have asked for a leave'
b. Un grup de studenți a cerut învoire.
A group of students has asked leave.
'a group of students has asked for a leave'

I will show that what triggers differences in agreement with the same or different quantifiers is not a radically different syntactic structure but a difference in the syntactic status of the quantifier itself. The noun functioning as 'quantifier' in pseudo-partitives has functional status in some contexts (26a) – in which case agreement is with the quantified noun – and semi-lexical status in others (26b) – in which case agreement is with the quantifier itself. As for variations like those in (25), they will be ascribed to a process of grammaticalization that affects these nouns and which, in such cases, is not complete.

(26) a. O grămadă de cărți au fost citite pentru examen.
A lot of books.FEM have been read.FEM for exam.
'a lot of books have been read for the exam'
b. Un munte de cărți a fost citit pentru examen.
A mountain.MASC of books.FEM has been read.MASC for exam.
'a mountain of books has been read for the exam'

In conclusion, I adopt Doetjes & Rooryck's intuition of a difference between a 'pure degree' or grammaticalized use of quantifiers and a less grammaticalized or lexical use of quantifiers.

I depart from this framework, however, in that this difference is not ascribed to major differences in syntactic structure but to different syntactic status of the quantifier: functional or semi-lexical.

2. The lexical-functional continuum: hybrid semi-lexical heads

The distinction between lexical and grammatical / functional categories is at the heart of modern grammatical theory. Starting from the intuitive difference between lexical and functional categories, namely that lexical categories have descriptive content while functional categories have the role of connecting lexical items into articulated discourse, in the course of time, various diagnostic criteria have been proposed to distinguish one class from the other:

a. functional categories are closed classes, seldom having more than twenty-thirty members
b. functional categories are usually phonologically and morphologically dependent; they do not carry stress and often develop weak, contracted forms; they may be realized as clitics or affixes (see Cornilescu 1995 and the references therein)
c. functional elements are characterized by 'unique morpho-syntactic behavior' (Emonds, 1985), i.e. the members of different classes of functional elements cannot be differentiated from each other only by means of descriptive semantic features

Although there are clear-cut cases instantiating the fundamental opposition between functional and lexical categories or heads, such as the distinction between noun and determiner, there are many other instances for which it is more difficult to decide whether they side with the lexical or the functional part.

One such case is instantiated by the category P (prepositions and postpositions), which seems to constitute an intermediate category between open classes and grammatical categories. Since they make up a closed set, they should be viewed as grammatical items. On the other hand, what justifies their grouping together with lexical categories is the fact that they can assign theta-roles directly or in conjunction with a lexical category. In a sentence like *John always relies on me*, 'me' is assigned the Theme theta-role by the preposition 'on' in conjunction with the verb.

Starting from Emonds' (1985) discussion of grammatical nouns, verbs, adjectives and prepositions, or 'disguised lexical categories', van Riemsdijk (1997) and Corver & van Riemsdijk (2001) turn their attention to SEMI-LEXICAL heads, conceived as hybrid categories, i.e. categories exhibiting both lexical and functional/grammatical features.

Besides the category P, there are also other possible candidates for the status of semi-lexical category. Within the verbal domain, semi-lexical candidates might be auxiliary verbs (see Emonds 1985), certain verbs featuring in verb clusters in Germanic Verb Raising (see van Riemsdijk 2002), certain verbs that allow restructuring in Italian, like *sembrare* (see Haegeman 2005), etc.

For the nominal domain, Emonds (1985) refers to the pro-form 'one' in *the good ones*, the reflexive 'self'/'selves', and 'thing' in *something good*. We are now in a position to add classifiers like the Chinese 'ge' in *san ge ren* (three CL person). The task is now to prove that nouns used as N_1 in pseudo-partitive constructions are also semi-lexical. Before engaging on that track, I will attempt to present a few facts that make the difference between functional and (semi)lexical categories.

2.1. What makes the difference between functional and (semi)lexical categories – a peek at agreement

Linguists have treated classifiers as either lexical instantiations of functional categories (Löbel 1997; Li 1999) or as semi-lexical heads which exhibit both functional and lexical properties (Van Riemsdijk 1998). In Van Riemsdijk (1998), quantifier nouns such as *number* in *a number of examples* and *couple* in *a couple of cigarettes* are considered to be functional heads, by virtue of their being closed-class items, while other type of nouns which may be used in pseudopartitive constructions (measure nouns, partitive nouns, container nouns, collective nouns, kind nouns) are semi-lexical heads. The difference between functional and semi-lexical heads is reflected in verb agreement and gender agreement with the determiner. As Löbel (2001) points out, especially agreement is taken as evidence that some measure nouns 'may waver between functional and semi-lexical status' (Van Riemsdijk 1998); in (27a), the measure noun *kilo* is functional, in (27b) it is semi-lexical:

(27) a. Er zit drie kilo heroine in die zak
Theresits three kilo heroin in that bag.
b. ?Er zitten meerdere kilo's heroine in die zak
There sit several kilos heroin in that bag.

The noun *number* itself - which is said to be a functional noun – sometimes oscillates between a functional (28a) status and a semi-lexical one (28b):

(28) a. a number of examples
b. the number five

As Löbel (2001) emphasizes, what seems to be decisive for the status of *number* as a functional head is its use as a relational noun (*a number of examples*). This argument also applies to container nouns such as *bottle (of wine)*. These nouns may be used both as semi-lexical nouns (*a bottle of wine*) and in a non-relational fashion (*a green bottle*).

Van Riemsdijk's (1998) overall purpose in analyzing pseudo-partitive constructions is that of arguing for a single (extended) projection that could account for such constructions. In Dutch, partitive constructions can be divided into two major groups: Direct Partitive Constructions (DPC 29a) – with no intervening material between the container and the containee - and Indirect Partitive Constructions (IPC 29b):

(29) a. een bus toeristen / een pan soep
a bus tourists / a pan soup
'a bus of tourists / a pan of soup'
b. een bus met toeristen / een pan met soep
a bus with tourists / a pan with soup

DPCs are argued to involve a single projection in which N1 is a semi-lexical noun. Vos (1999) restates the analysis by considering DPCs as involving a kind operator (represented by the functional noun) that requires a lexical noun. Together, they form an extended nominal projection. Pseudo-partitive constructions in English and Romance languages are treated in Van Riemsdijk (1998) as disguised DPCs because they behave like DPCs with respect to selection, as shown in (30):

(30) a. Mary ate a whole tray of / *with pastries.
b. Jean a dilue plusieurs bouteilles de vin / * avec du vin.
Jean has diluted several bottles of wine / with wine.

In view of these data, partitives in Romance are analyzed as single projections and the status of the prepositional element intervening between N_1 and N_2 is that of a functional element making the transition between the two nouns.

2.2. N_1 in pseudo-partitives as semi-lexical heads

So-called pseudo-partitive constructions equivalent to English *a bottle of wine* or *a lump of sugar* are believed to occur in all languages while numeral classifier constructions equivalent to *one living being fish* or *two fruit orange* are confined to classifier languages which lack number morphology. My task is now to prove that these nouns that head pseudo-partitive constructions behave like functional nouns.

It is a well-known fact that most nouns that are involved in pseudo-partitive constructions (where they have functional status) also appear as full lexical nouns. Consider the following examples from English and Romanian:

(31) a. a green bottle
a'. o sticlă verde
a bottle green
'a green bottle'
b. a bottle of wine
b'. o sticlă de vin
a bottle of wine
c. *a green bottle of wine
c'. *o sticlă verde de vin
a bottle green of wine
'a green bottle of wine'

In (31a), *bottle* / *sticlă* is lexical noun, while in (31b) it is a semi-lexical noun, fact which is emphasized by the ungrammaticality of (31c). However, this dies not relate to a general exclusion from such structures. An example like *a big bottle of wine* is fine because *big* modifies the quantifier status of *bottle* not its qualitative properties.

Thus, a first characteristic of semi-lexical and functional heads emerges: they become semi-lexical (a feature linked to semantic 'bleaching') when they are used as relational nouns.

This idea is reinforced by Cheng & Sybesma (1998, 1999) who, in discussing cases like (6), repeated here for convenience as (32), point out the interpretational differences between *de* and *de*-less structures:

(32) a. san bang (de) rou
three CL-pounds DE meat
b. liang xiang (de) shu
two CL-box DE book

In the absence of *de*, *xiang* (box) receives a more concrete interpretation, relating to its being an actual box, while in the context of *de* a measure interpretation is favored, i.e. boxful. We may conclude, therefore, that *de* signals when the noun is used as relational.

A second characteristic is that in the case of nouns used as heads of pseudo-partitives, they presuppose a 'somewhat reduced lexical meaning in comparison to the quantified noun to which they are a sister' (Löbel 2001). Thus in the Romanian examples in (33), the noun *vârf* used in a pseudo-partitive construction becomes semantically 'bleached', i.e. does not retain its original meaning of 'summit / peak':

(33) a. am ajuns în vârf (ul muntelui)
(I) have reached in peak (the mountain-the$_{GEN}$)
b. am pus la mâncare un vârf de sare
(I) have put at food a little salt (lit. a peak of salt)

Bhattacharya (2001) also acknowledges the fact that a criterion for the functional character of the classifier is the lack of descriptive content. 'This holds as well for the complex (i.e. the Num-Cla complex) as it does not pick out a class of objects but elaborates some property of the complement noun' (Bhattacharya 2001).

In close connection to their reduced lexical meaning, these nouns also exhibit features that are known to pertain to semi-lexical categories (see Emonds 1985; Bhattacharya 2001). Thus, they constitute a closed class, i.e. they are limited in productivity[2], possess a small number of members and do not encourage novel coinages. Similarly, classifiers are universally derived from nouns, which enables one to view them as disguised nouns. Yet, some classifiers belonging to this closed class can have unique usage and meaning. For example, quantifier nouns like *pereche* / *pair* are mostly employed to quantify over lexical plurals. The plural form of these nouns denotes pairs:

(34) pantaloni / ochelari / foarfece(i) / cleşti
trousers / spectacles / scissors / tongs

Despite their defectiveness, the nouns that head the first constituent of pseudo-partitive constructions sometimes trigger the selectional restrictions on the verb and agreement in number:

(35) a. Two pounds of sugar *was / were strewn / thrown on the floor
b. Two lumps of sugar were *strewn / thrown on the floor.
c. două kilograme de zahăr erau / *era vărsate /
two kilos.FEM-PL of sugar.MASC-SG were / *was spilled.FEM-PL /
*vărsat pe podea
*spilled.MASC-SG on floor
'two kilos of sugar were spilled on the floor'

[2] One may wonder whether Romanian nouns used as N_1 in pseudo-partitive constructions are really limited in productivity as there are clear differences between the restricted distribution of a purely functional noun (e.g. *pereche* 'pair') and the freer distribution of a semi-lexical noun like *sticlă* 'bottle'. However, it is precisely this distinction in terms of distribution that allows for different degrees of lexicality.

The fact that these nouns sometimes trigger agreement not only points to their headedness but may also indicate their lexical nature. However, a noun that exhibits both lexical (agreement) features and functional (closed set, semantic 'bleaching') characteristics may be best viewed as semi-lexical. In the words of Bhattacharya (2001), while facts pertaining to quantifier-float and agreement make the complex Num-Cla in Bengali lexical, 'its relative closed class properties and lack of descriptive content makes it functional. This ambiguity in status confirms its semi-lexicality'.

Having thus established the semi-lexical nature of N_1 in pseudo-partitive constructions in Romanian and showing that it may be viewed as a classifier, I now turn to two problems that do not follow from the theory. One regards the status of the preposition *de* / *of*, which so far has not received an account. The other regards the co-occurrence of the classifier and the number morpheme. The next section undertakes to gather the evidence in favor of the view that Romanian pseudo-partitives are single extended projections with one lexical and one semi-lexical head.

2.3. Romanian partitives as single extended projections
2.3.1. Evidence coming from agreement

The discussion of classifiers used in the so-called pseudo-partitive constructions has hinted so far that agreement phenomena are one of the most powerful tools that can be employed to demonstrate the functional or semi-lexical nature of N_1.

Agreement is important at this point in the analysis because it helps to demonstrate that, although consisting of two members, pseudo-partitive constructions are single projections with a single referent (see van Riemsdijk 1998; Löbel 1999; Stavrou 2003).

The verb selects either N_1 or N_2, as shown by the fact that it can agree in number with either of them:

(36) a. Un număr de studenți mă aşteptau pe hol.
A number.$_{SG}$ of students.$_{PL}$ me were expecting on hallway.
'a number of students were waiting for me on the hallway'
b. Un număr mare de studenți a venit.
A number.$_{SG}$ big of students.$_{PL}$ has come.
'a big number of students have come'

The same variation in agreement is observed by Stavrou (2003), who discusses Greek pseudo-partitives like (37):

(37) a. Iparhun /iparhi mia sira diavathmisis
are /is a range.$_{SG}$ gradations.$_{PL}$
'there is a ramge of gradations'
b. Ena buketo luludja itan pesmen-o/-a sto patoma.
A bunch flowers was/were thrown on.the floor.
'a bunch of flowers were thrown on the floor'

This kind of variation is expected if we assume that pseudo-partitives constitute a unitary phrase involving two nominal constituents. This 'freedom' of choice (see Stavrou, 2003) of the verb to select either of the two nouns within a single projection can only be accounted for if we take into consideration the categorical nature of the first noun, which is conceived of as

neither fully lexical nor entirely functional. Another prediction is that the lack of agreement between the verb and N_1 is more evident if the noun is closer to the functional end of the lexical-functional continuum.

To put it simply, we would expect N_1 in pseudo-partitive constructions to trigger agreement when N_1 has semi-lexical status; on the other hand, N_2 is expected to trigger agreement when N_1 has functional status. This distinction mirrors the one proposed by Doetjes & Rooryck (2003) between 'pure degree' and 'comparative' interpretations of pseudo-partitives. In (38a), the noun *vârf* 'peak' triggers agreement on the adjective and is thus assigned semi-lexical status, while in (38b), the noun *sare* 'salt' triggers agreement on the adjective, which is a clue to the functional or 'pure degree' status of *pic* 'a little'. In other words, in (51a) the classifier is in the middle of the lexical-functional continuum and it is not fully grammaticalized, while in (38b) the classifier is fully grammaticalized and has reached the functional end of the continuum.

(38) a. Un vârf de sare e suficient.
A peak.MASC of salt.FEM is sufficient.MASC
'a sprinkle of salt is sufficient'
b. Un pic de sare e suficientă.
A little.MASC of salt.FEM is sufficient.FEM.
'a little salt is sufficient'

Other similar examples in Romanian may point to the fact that N_1 container nouns trigger agreement and are, therefore, interpreted as semi-lexical (39a-b), while N_1 quantifier-like nouns (see van Riemsdijk 1998) are less likely to trigger agreement and are, therefore, interpreted as functional (40a-b).

(39) a. Un pahar / degetar / țap / butoi / borcan de bere este
a glass / thimble / mug / barrel / jar.MASC of beer.FEM is
suficient.
sufficient.MASC
b. o damigeană / canistră / sticlă / cană de vin este suficientă.
A demijohn / canister / bottle / mug.FEM of wine.MASC is sufficient.FEM

(40) a. un strop de mândrie e necesară.
a drop.MASC of pride.FEM is necessary.FEM
'a little pride is necessary'
b. o grămadă de orgoliu e nenecesar.
A pile.FEM of pride.MASC is unnecessary.MASC
'a lot of pride is unnecessary'

To conclude this section, pseudo-partitives in Romanian are single multi-headed projections. Agreement in variation depends on the semi-lexical or functional status of N_1. N_1 is an instantiation of the feature complex [+Functional, -Grammatical] (see van Riemsdijk 1998; Stavrou 2003) – it is a non grammatical category with functional features and behavior.

2.3.2. Evidence coming from selection

It seems that selection is powerful evidence in favor of considering partitives single projections containing one lexical and one functional head. In Dutch partitives, selection is between the predicate and either N_1 or N_2. In (41) the verb *turn over* may select either the object *tray* or the second noun – *pastries*, resulting in two interpretations, one in which the tray gets turned over and the other in which the pastries get turned over:

(41) Zij hebben een schaal (met) gebakjesomgestoten.
They have a tray (with) pastries turned-over.

If we consider the Romanian equivalents of (41), the first observation is that the two readings emerge in relation to two distinct prepositions: *de* 'of' vs. *cu* 'with'. In (42a) the reading is that in which many pastries have been turned over (the tray is the container), while in (42b) the tray gets turned over.

(42) a. Ei au răsturnat o tavă de prăjituri. AMBIGUOUS
They have overturned a tray of pastries
'they have overturned a tray of pastries'
b. Ei au răsturnat o tavă cu prăjituri. NON-AMBIGUOUS
They have overturned a tray with pastries.
'they have overturned a tray with pastries'

Of course, if the main verb is a verb imposing strong selectional restrictions on its object, such as *a mânca* 'eat', the reading in which only the tray is affected is odd. This will be taken as evidence that in (43a), the verb selects *prăjituri* 'pastries' as object, while in (43b) it selects *tavă* 'tray':

(43) a. Ei au mâncat o tavă de prajituri.
they have eaten a tray of pastries
b. ??Ei au mâncat o tavă cu prajituri.
They have eaten a tray with pastries

In the light of these considerations I will consider, therefore, that sentences like (42a) contain a semi-lexical noun which comes to be used as a 'classifier'.

It seems that N_1 can have either a quantificational (see 43a) or a referential interpretation (see 43b). In the former case, it indicates a certain amount or quantity while in the latter case it refers to an actual object, one that is present in the universe of discourse. As the Modern Grammar of Dutch (2003) maintains, the fact that N_1 can be a discourse referent can be made clear by means of pronominal reference. In the example in (44a) – taken from MGD, section 2.4. (2003) – N_1 satisfies the selection restriction of the verb *vasthouden* 'to hold', and it must refer to an actual object in the domain of discourse. The construction contains two referential expressions and pronouns can be used to refer back to either of these expressions. In (44b) the pronoun *het* refers back to the neuter noun *glas* and in (44c), the pronoun *ze* refers back to the feminine *melk*:

(44) a. Jan houdt een $glas_i$ $melk_j$ vast.
Jan holds a glass [of] milk prt.

b. Het$_i$ is mooi versierd.
It is beautifully decorated.
c. Ze$_j$ is zuur.
It is sour

When N_1 has a quantificational interpretation (45a), using the pronoun *het* to refer back to the quantificational expression gives a semantically anomalous result (45b). On the other hand, the pronoun *ze* corresponding to N_2 *melk* can be used to refer back to the quantificational expression (45c), which indicates that N_1 doesn't have a reference in this case but is used quantificationally.

(45) a. Jan drinkt een glas$_i$ melk$_j$.
Jan drinks a glass [of] milk
b. *Het$_i$ is mooi versierd.
It is beautifully decorated.
c. Ze$_j$ is zuur.
It is sour.

If we construct similar examples in Romanian, facts related to agreement with the copular AP and to pronominal anaphora point to the same interpretation. When the verb imposes strong selectional restrictions on N_1, like *a ține* 'to hold', N_1 has a referential interpretation and it refers to an actual object in the discourse domain (46a). The construction contains two referential expressions: *sticlă* 'bottle' and *lapte* 'milk', which can be referred to by means of the pronouns *ea* for the feminine *sticlă* (46b) and *el* for the masculine substance noun *lapte* (46c):

(46) a. Ion ține o sticlă$_i$ de lapte$_j$.
Ion holds a bottle of milk
b. (Ea) e spartă
(she$_i$) is broken.FEM
'it is broken'
c. (El) e acru
(he$_j$) is sour.MASC
'it is sour'.

When N_1 has a purely quantificational interpretation (47a) – in other words, when it functions as a classifier – we can only refer back to the substance noun *lapte* (47b), since the classifier does not refer to an actual object that is present in the universe of discourse:

(47) a. Ion a băut o sticlă$_i$ de lapte$_j$.
Ion drank a bottle of milk.
b. *(Ea) e spartă.
(she$_i$) is broken.FEM
'it is broken'.
c. El e acru
(he$_j$) is sour.MASC
'it is sour'

All these observations point to the fact that N_2 can (and more often than not, is) the semantic head of the construction. A verb like *a fuma* 'smoke' selects a complement which refers to some substance that can be smoked, i.e. tobacco, or to an object made out of this substance (48a). A complement like *cutie* 'box' does not satisfy the selection restriction of the verb (48b), but a pseudo-partitive expression like *cutie de trabucuri* 'box of cigars' is acceptable. This reinforces the view that N_2 can satisfy the selection restrictions of the verb and can be regarded as the semantic head of the construction:

(48) a. Ion a fumat un trabuc.
Ion has smoked a cigar
b. *Ion a fumat o cutie.
Ion has smoked a box.
c. Ion a fumat o cutie de trabucuri.
Ion has smoked a box of cigars.

To conclude this sub-section, it is often the case that N_2 is the semantic head of the pseudo-partitive construction, i.e. the verb selects N_2 rather than N_1 to satisfy its selectional restrictions. The immediate consequence is that N_1 can be effectively construed as a functional or semi-lexical item, i.e. a classifier, which designates amount or quantity but has no actual referent. Therefore, facts related to selection support our analysis of pseudo-partitives as single extended projections, with one semi-lexical head (the classifier) and one lexical head.

2.3.3. Evidence coming from interpretation

While it makes sense to claim that the underlying structure of *that idiot of a doctor* is *the doctor is a idiot*, which clearly points to a relation of predication, I claim that the same does not hold of structures like *a bottle of wine* or *twenty DE students*. Consider (49) and (50) with examples from English and Romanian, respectively:

(49) a. a crook of a minister = the minister is a crook
b. a number of examples = ??? the examples are a number
c. a bottle of wine = ??? the wine is a bottle

(50) a. un boboc de fată = fata e un boboc
a bud of girl = the girl is a bud
b. o pereche de exemple = ??? exemplele sunt o pereche
a pair of examples = ??? the examples are a pair
c. un pahar de lapte = ??? laptele e un pahar
a glass of milk = ??? the milk is a glass
d. treizeci de motociclete = ??? motocicletele sunt treizeci
thirty DE motorcycles = ??? motorcycles are thirty

In the examples a. of (49) and (50) N_1 is predicated of N_2. More specifically, the construction is used to express evaluative metaphoric comparison; N_2 is compared to the entity denoted by N_1, which is clear from the fact that the construction is sometimes paraphrased as 'a minister like a crook / the girl is like a bud'. In sharp contrast, the paraphrases for the examples b, c and d clearly show that the constructions are not based on a relation of predication. This

standpoint has two immediate consequences: a) the derivation of these constructions is not the result of predicate inversion and *de/of* is not a nominal copula; b) the relation is of a different nature, call it *classification*, which can best be captured by a syntactic configuration which contains a single extended projection, with *de/of* marking the transition from one semi-lexical (or functional) domain and one lexical domain.

2.3.4. Evidence coming from modification and sub-extraction phenomena

I already mentioned that fact that the classifier becomes semantically 'bleached', and is thus transparent to modification. In (51a), the modifier 'wonderful' obviously modifies the second noun in the construction. The same applies to (51b,c). Romanian examples are available in (52):

(51) a. a wonderful cup of tea
b. a stupid gang of schoolboys
c. a sexy bunch of girls

(52) a. o gaşcă idioată de huidume
a gang idiotic of bullies
'an idiotic gang of bullies'
b. o sticlă minunată de şampanie
a bottle wonderful of champagne
'a wonderful bottle of champagne'
c. un stol grăbit de şcolărițe
a bevy hurried of schoolgirls
'a hurried bevy of schoolgirls'

The adjectives modifying the first noun obviously refer semantically to the second noun. The fact the pseudo-partitive as a whole can be modified by attributive modifiers that rather belong to N_2 than N_1 suggests the fact that the semantic head of the construction is N_2. This falls in neatly with our analysis, which predicts that N_1 is a classifier and in this capacity, i.e. quantificational force, it shouldn't be sensitive to modification. In the same vein of thought, if we consider pseudo-partitives as single multi-headed projections, modification facts point to N_2 as the lexical head of the extended nominal projection (which can be modified by attributive modifiers) and to N_1 as the functional / semi-lexical head of the same projection, which is transparent to modification.

In addition to the obvious semantic relation between the modifier and the modifee, in Romanian the modifier agrees in number and gender with the first noun, a clear indication of headedness. I take these facts to indicate that the so-called pseudo-partitive constructions in Romanian contain a lexical head (modified by the adjective) and one functional noun, i.e. a classifier, which is transparent to modification.

2.3.5. A final note on N_1 in pseudo-partitives as semi-lexical heads – the syntactic configuration

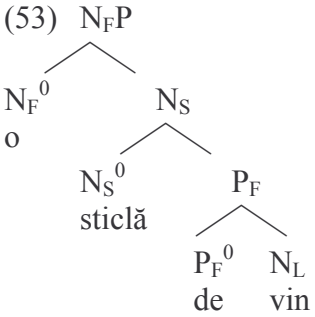
I will capitalize on suggestions made by van Riemsdijk (1998) and Borer (2005) and consider pseudo-partitive constructions in Romanian as involving a single extended projection. The

classifier phrase is headed by a semi-lexical or 'quasi-functional' item (Borer, 2005), such as *sticlă (de vin)* 'bottle of wine' or *ceaşcă (de ceai)* 'cup of tea'[3].

As for the status of the 'dangling' *of* (Corver, 1998), it may simply be regarded as a functional preposition (van Riemsdijk, 1998) or a marker of phrasal nominal boundary (Borer, 2005).

The syntactic structure I am going to assume (implicitly and explicitly) is the one proposed by van Riemsdijk (1998) for pseudo-partitives, which is governed by the law of categorial feature magnetism:

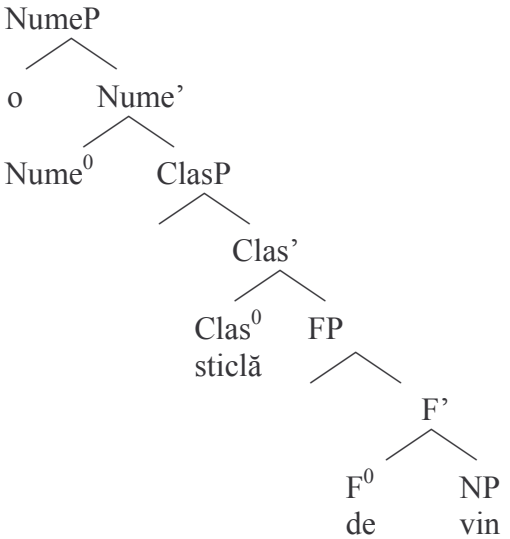
(53)



N_F= functional head
N_S = semi-lexical head
N_L = lexical head
P_F = functional preposition

I will transcribe the syntactic structure of a pseudo-partitive as given in (54) to capture the essence of my proposal, i.e. N_S is a classifier:

(54)



I have argued that the so-called pseudo-partitives in Romanian and English are better viewed as classifier phrases headed by a semi-lexical or quasi-functional noun. Therefore, our initial premise, i.e. that the mass noun taken from the lexicon is in need of partitioning, before it interacts with the count system, is supported by the data coming from pseudo-partitives.

The next section of my paper will tackle the issue of classifier projections as a matter of UG. If Borer (2005) takes complementary distribution as the hallmark of identity, therefore

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[3] Henk van Riemsdijk (personal communication) pointed out the fact that, in some registers of English, *cup of tea* becomes contracted – *cuppa*, as in *Let's have a cuppa*. This is also taken as evidence arguing contra predicate inversion and for considering pseudo-partitives as single (extended projections).

proposing that NumPs and ClasPs perform the same function – that of dividing the stuff denoted by the noun, I will refine the analysis and propose that, in 'plural languages', NumPs and ClasPs are not in complementary distribution. I will claim that ClasPs project cross-linguistically and parameterize languages as follows:

1. exclusively 'classifier' languages, i.e. Chinese, Japanese, Vietnamese, Thai, etc.
2. 'plural-classifier' languages, i.e. English, Romanian, Italian, etc.

The languages in the first group project a ClasP, which conflates the roles of the morphologic number and that of the classifier. A ClasP in such languages will be responsible for dividing the stuff denoted by the noun and making it syntactically visible for countability.

The languages in the second group project both a ClasP and a NumP. The head of the ClasP may be filled with lexical material – as in the case of pseudopartitive constructions – or, building on Kayne's (2003) proposal, with an abstract noun NUMBER.

3. A ClasP for everyone

This section is devoted to an in-depth analysis of classifiers as universal classificatory devices. In arguing for a universally legitimate Classifier Phrase, I will go along the main tenets of Doetjes (1997), Cheng and Sybesma (1999), Borer (2005). At the same time, however, I will depart from the strict parameterization of languages as either classifier or non-classifier languages (implicitly or explicitly assumed by the above-mentioned).

While still maintaining that the role of plural inflection in languages with plural morphology is the same as the role of classifier inflection in classifier languages, I will propose a new dimension of study to this analysis. Specifically, my claim is that classifiers project universally; when there is no classifier inflection, silent (semi-lexical) nouns come to the forefront (see Leu 2004, van Riemsdijk 2005, Kayne 2003).

3.1. Silent classifiers

In his analysis of *few* and *many* as adjectives modifying a silent noun NUMBER, Kayne (2005) notes that NUMBER can be conceived of as occurring with numerals, in classifier-like fashion:

(55) John has three NUMBER books.

Extending his analysis of *few* and *many* as adjectives of a silent noun NUMBER (59), nouns in 'plural-classifier' languages can be conceived of as projecting a NumP – which is responsible for divisibility – and a ClasP – which is responsible for identifying the portions divided by NumP, before they interact with numerals.

(56) John has few books = John has few NUMBER books.

(57) QP

three ClasP
trei
NUMBER NumP

-s NP
-uri wine/vin

The postulation of unpronounced NUMBER in (55) is supported by the fact that the adjective *few* can also modify the overt noun *number* (58a); in the same way, the overt *number* may sometimes appear in exclamative constructions (58b), which otherwise contain an empty classifier head (58c). These constructions will be analyzed in detail in the next subsection.

(58) a. John has too few a number of books / the fewest number of books.
b. Ce număr mare de maşini sunt aici!
What number big of cars are here
'what a great number of cars!'
c. Ce de maşini sunt aici!
What of cars are here
'what a great number of cars!

Therefore, it is conceivable and theoretically intuitive to allow a classifier projection above the number projection. What is still missing is some evidence as to the existence of a silent semi-lexical noun in its head. This is what the next section does. In analyzing some exclamatory constructions in Dutch and Romanian, the overall purpose is to show that they are based on a relation of modification of a silent noun NUMBER. Another interesting thing is that the functional preposition *de / of* will have a role to play in these constructions, too.

3.2. Silent nouns and exclamatives – evidence for NUMBER

This section will discuss exclamative constructions in Romanian. The analysis is meant to show that this type of construction contains a silent noun NUMBER. The presence of the silent noun is linked with the presence of the *de*-element, which has been analyzed in the previous sections as a functional preposition making the transition between the functional and the lexical domains of a partitive construction.

Consider the following examples:

(59) a. Ce case au unii!
What houses have some (people)
'some have such big/beautiful houses!'
b. Ce de case au unii!
What of houses have some (people)
'some have so many houses!'

(59a) can only be an exclamation about some salient property of houses, for example their being large or beautiful; on the other hand, (59b) exclaims about the relatively large number of the houses in question.

In this respect, Romanian differs from languages like English or Dutch, where what-exclamatives are consistently ambiguous between an interpretation where the number of elements is involved and an interpretation some other 'relatively excessive property' (van Riemsdijk (2005) is marveled at:

(60) a. Wat heeft die auto een deuken! (van Riemsdijk 2005)
What has that car a dents
'what dents that car has!'
b. What dents that car has!

(60) may be uttered to exclaim either about the relatively large number of car dents or about the type of dents, i.e. their large size or their deformation. In contrast, in the case of Romanian what-exclamatives what seems to make the difference is the element *de / of*.

It seems safe to assume that the *de*-exclamative construction in Romanian involves the silent noun NUMBER while the *de*-less construction may be viewed as containing the silent KIND / TYPE / SORT (see Leu 2005, van Riemsdijk 2005). Moreover, whenever the overt *number* is present, *de* is obligatory:

(61) a. Ce de băieți la petrecere! = Ce NUMĂR de băieți la petrecere !
What of boys at party = what NUMBER of boys at party
'there are so many boys at the party'
b. Ce băieți sunt la petrecere! = Ce TIP băieți sunt la petrecere!
What boys are at party! = What KIND boys are at party
'the boys at the party are really handsome, tall, etc'
c. Ce număr mare *(de) baieți la petrecere!
What number big *(of) boys at the party!
'what a great number of boys are at the party!'

The same can be noticed when mass nouns are involved. There are two patterns: one involving *de* and presumably, a silent noun, which can be paraphrased as AMOUNT (see Kayne 2003) and a *de*-less pattern, which exclaims about some relevant property of the noun (and not its amount):

(62) a. Ce de vin a băut! = Ce CANTITATE de vin a băut
What of wine hasdrunk = what AMOUNT of wine has drunk
'What an amount of wine did the guy drink!'
b. Ce vin au avut la petrecere! = ce TIP vin au avut lapetrecere!
What wine have had at party = what KIND wine have had at party
'What a good wine they had at the party!'

Another interesting pattern has to do with abstract nouns. Consider (63):

(63) a. Ce tristețe / bucurie e aici! = ce CANTITATE tristețe / bucurie e aici
What sadness / joy is here = what AMOUNT sadness / joy is here
'What sadness/joy!'
b.?? Ce de tristețe / bucurie e aici = ce NUMĂR tristețe / bucurie e aici
What of sadness / joy is here = what NUMBER sadness / joy is here

Since the *de*-element is taken to indicate the presence of silent NUMBER, (63b) is odd. The oddity comes from the fact that abstract nouns and NUMBER do not go together. The mass interpretation of an abstract noun like *sadness* is coerced by NUMBER into a count interpretation.

A piece of evidence for silent nouns acting as classifiers has thus been found. It is interesting to notice that the functional preposition *de*, which was shown to play an important role in the case of pseudo-partitive constructions, also surfaces in the case of silent classifiers. Pseudo-partitives have been shown to consist of a single extended projection with one quasi-functional element, i.e. the classifier and one lexical element, the *de*-element marking the transition between the two. In a parallel manner, seemingly 'discontinuous' constituents like *what of* in Romanian are shown to consist of one semi-lexical silent noun (see van Riemsdijk 1998, 2005, Kayne 2003) and a lexical noun, with the same *de*-element marking the transition.

4. Conclusion

To conclude my exposition, there are sufficient pieces of evidence to postulate a Classifier Phrase across languages. My proposal was that, in 'plural languages', i.e. languages with plural morphology, NumPs and ClasPs are not in complementary distribution, as implicit in Borer (2005). I have amassed evidence in favor of the claim that ClasP project cross-linguistically and parameterize languages as:

1. 'classifier' languages, i.e. Chinese, Japanese, Vietnamese, Thai, etc.
2. 'plural-classifier' languages, i.e. English, Romanian, Italian, etc.

The languages in the first group project a ClasP, which conflates the roles of the morphologic number and that of the classifier. A ClasP in such languages is responsible for dividing the stuff denoted by the noun and making it syntactically visible for countability (see Doetjes 1997; Sybesma 2006).

The languages in the second group project both a ClasP and a NumP. The head of the ClasP may be filled with semi-lexical material (see van Riemsdijk 1998, 2003) – as in the case of pseudopartitive constructions – or, building on Kayne's (2003) proposal, with an abstract noun NUMBER.

Mihaela Tănase-Dogaru
University of Bucharest
mihaela.dogaru@gmail.com

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A semantic constraint on *wh*-movement

Extended events and extraction from *in order* clauses

Robert Truswell

The existence of well-formed cases of *wh*-movement out of adjuncts constitutes a challenge to current locality theories. However, the fact that such extractions are not universally well-formed leaves an empirical hole in any theory which simply removes the adjunct condition without putting anything in its place. I show that the patterns of legitimate extraction out of adjuncts can be described in terms of an independently motivated theory of the internal structure of events. This means that our syntactic theory of locality needs to be supplemented by independent semantic well-formedness conditions on *wh*-movement.

1. *Introduction*

This paper attempts to sketch a program for dealing with classes of observed exceptions to an otherwise quite robust generalisation, which has come to be known as the *adjunct condition*. This condition has its roots in the seminal work of Ross (1967).[1] In its purest form, it can be stated as in (1).

(1) *Wh*-dependencies cannot be formed across adjunct boundaries.

As with all the other constraints which Ross discusses, and no doubt partially as a consequence of the formal tools available in 1967, the adjunct condition is entirely syntactic. By this, I mean that the condition is defined by sole reference to nodes in a phrase structure tree and relations among those nodes. In the work on locality theory stimulated by Ross' dissertation, this syntactocentrism has remained. Huang's (1982) Condition on Extraction Domain, for example, represents a genuine milestone in our understanding of locality effects, and it retains the syntactocentrism of Ross' approach, by defining extraction domains in terms of the syntactic relation of proper government. For our purposes in this paper, though, the CED moves beyond Ross'

[1] In actual fact, only tensed adjuncts automatically fall under Ross' definition of *island*, which makes crucial reference to S nodes occurring outside a chain of complementation relations. In the subsequent years, though, adjuncts in general have widely been assumed to be strong islands.

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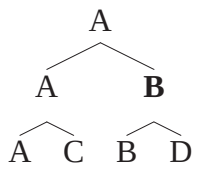
approach in two respects. Firstly, it extends Ross' prohibition against extraction out of tensed adjuncts to an explicit ban against extraction from *any* adjunct. Secondly, it unifies the subject and the adjunct conditions. As neither subjects nor adjuncts are properly governed, they are both strong islands for extraction.

In recent years, since Chomsky (1995) questioned the validity of government relations, several papers, such as Uriagereka (1999); Johnson (2002) and Zwart (2007), have attempted to derive CED effects from other considerations.[2] Although these three papers start from different sets of concerns, they end up with strikingly similar conclusions. These are summarised in (2).

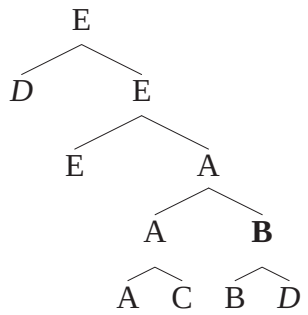
(2) A non-projecting phrase is a strong island if its sister is a phrase.

Pictorially, this means that in the tree in (3a) (where linear order should be taken to be irrelevant), the higher node labelled B is an island, and so a dependency formed across it, such as movement of D in (3b), is ungrammatical.

(3) a.



b. *



Of course, this is not the only conceivable syntactocentric position. For example, a position gaining some currency in HPSG (see, for example, Levine & Sag 2003), is that adjuncts, and possibly also subjects, are simply not islands, with the degradation of many cases of extraction from adjuncts coming from largely unspecified extragrammatical factors. Although I will eventually adopt something not a million miles from this position, such an approach in isolation could be seen as somewhat unsatisfying, given that in most cases, extraction from adjuncts is quite simply, and quite categorically, bad. Nothing can rescue cases like the following.[3]

(4) a. *What did you come here [because Mary wanted to talk to you about e]?
b. *What did John go home [after Mary said e]?
c. *What was little Jimmy playing in the sandpit [screaming about e]?

[2] Van de Koot (2004) gives a related, but subtly different approach. As this paper is no less syntactocentric, it remains prone to the sort of criticism to be developed below.

[3] I stick to extraction of complements from within adjuncts throughout this paper. Needless to say, extraction of subjects or adjuncts from within adjuncts is even worse.

According to most popular syntactic frameworks, the grammar works in black and white. Chomsky (1995), for example, only gives two possible outcomes of a syntactic derivation. It crashes, or it converges.[4] On the other hand, the extragrammatical factors appealed to by Levine & Sag may well be somewhat more gradient. The examples in (4) look pretty categorical, but are they representative? It turns out, in fact, that extraction from adjuncts is unquestionably bad in a great many cases, but that it is not bad across the board. This paper discusses two classes of adjuncts which allow subextraction in at least some cases, namely *bare present participial adjuncts*, as illustrated in (5) and discussed in more detail in Truswell (2007a); and *in order* clauses, as in (6).

(5) a. What did John drive Mary crazy [whistling e]?
b. What did John cut himself [carving e]?

(6) a. What are you working so hard [in order to achieve e]?
b. What did you come in [to talk to us about e today]?

This paper aims to show that these two groups of exceptions to the adjunct condition form a natural class. However, that class is described, not in the syntactic terms which have dominated discussion of extraction from adjuncts, but rather in semantic terms relating to the internal structure of events. This leads to the claim that there is a semantic condition on $\overline{\text{A}}$-constructions, related to event structure, in addition to the well-studied syntactic constraints.

The rest of the paper is structured as follows: Section 2 discusses the distribution of legitimate extractions from these two classes of adjuncts in more detail, and introduces the core semantic condition on *wh*-movement to be discussed in this paper. Section 3 then develops a novel theory of the internal structure of events, motivated by a series of experiments reported in Wolff (2003). Finally, section 4 relates this theory of event structure to the locality data given in section 2, and offers a brief comparison with syntactic alternatives.

2. *The problem*

The existence of grammatical apparent cases of extraction from adjuncts has been noted in the literature since at least the early days of Government and Binding theory.[5] Perhaps Cinque (1990:ch.3) provides the fullest discussion of such cases. The core of Cinque's very detailed analysis is that the gap within an adjunct island is never actually a trace of movement, but a null pronominal (*pro*) which comes to be $\overline{\text{A}}$-bound by a sufficiently local operator. It then transpires that the locality conditions on $\overline{\text{A}}$-dependencies across adjunct boundaries reduce to locality conditions on ($\overline{\text{A}}$-)binding. If, in certain cases, binding of *pro* contained within an adjunct by an operator outside that adjunct is possible, then an $\overline{\text{A}}$-dependency with many superficial charac-

[4]The third possibility discussed by Chomsky, convergence as gibberish, is not syntactically distinct from regular convergence, but rather distinct at the interfaces.

[5]The most famous such case is, of course, the *parasitic gap* phenomenon illustrated in (i), but I put these aside here on account of their quite distinct properties.

(i) What did John file t [without reading e]?

teristics of movement is possible across the adjunct boundary.

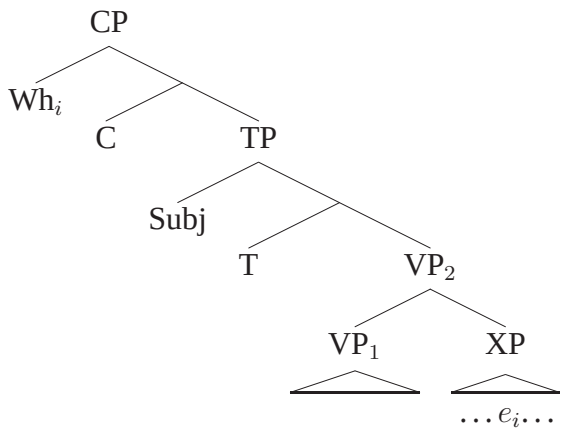
Cinque gives us a clear and plausible way to account for many facts concerning extraction out of adjuncts, which I cannot do justice to here. To give just one example of the empirical value of his approach, though, it derives the fact that only DPs are ever legitimately extracted from adjuncts, as noted by Chomsky (1982:72-3) in connection with the examples in (7). This follows automatically if the gaps within adjuncts are actually *pro*, and *pro* is a DP.

(7) a. The man that I went to England without speaking to e
b. *The man to whom I went to England without speaking e

However, one area where we gain no insight from Cinque's theory concerns the distribution of the types of adjuncts out of which we can form such dependencies in the first place. Some adjunct maximal projections apparently do not constitute barriers to binding, whereas others apparently are barriers. But, in either case, it could just as easily have been the other way round.

More problematically for an approach such as Cinque's, it appears that the acceptability of extraction from an adjunct is determined partially by the nature of the VP to which it is adjoined. This is quite unexpected on an approach based on barriers, or intervention on the path between the head and foot of the chain, as the VP to which the adjunct attaches is not part of that path. Schematically, in a structure such as (8), we often find that the nature of the material in VP_1, to which XP is adjoined, can affect the acceptability of the dependency between Wh_i and e_i, despite the fact that VP_1 is not actually on the path between the two members of the chain and so cannot plausibly count as a barrier to the formation of that dependency.

(8)



The following examples of extraction from bare present participial adjuncts illustrate this claim. (9) shows that the adjunct *complaining about the weather* can felicitously modify both of the matrix VPs in question. However, (10) shows that extraction is only possible in one of the two cases in question. On the assumption that the two sentences are syntactically identical apart from the content of the matrix VP, the distinction between (10a) and (10b) is a mystery on either a post-Cinque or a post-CED approach.

(9) a. John drove Mary crazy [complaining about the weather].
b. John does his work [complaining about the weather].

(10) a. What did John drive Mary crazy [complaining about e]?
b. *What does John do his work [complaining about e]?

The question I want to address here, then, is this: Why are some adjunct boundaries more *transparent* than others? That is, why can dependencies cross some adjunct boundaries, but not others?

The answer I will propose to that question deviates from the syntactocentric view which has persisted from Ross through to Uriagereka, Johnson, and Zwart. In a nutshell, I believe that nothing narrowly syntactic distinguishes a legitimate case of extraction of a DP from an adjunct by *wh*-movement, from a degraded example of the same: both are syntactically quite legitimate. Instead, they are distinguished in terms of a second set of structural constraints, concerning event semantics. The condition I propose is the following.

(11) **Events define locality domains for *wh*-movement**
A *wh*-chain is legitimate only if the denotation of the minimal constituent containing the head and foot of the chain asserts the existence of a single event.

In an earlier paper, Truswell (2007a), I showed that a condition along the lines of (11) could make sense of the pattern in (9)–(10) if we adopt a decompositional view of Vendler's (1957) aspectual classes, as in, for example, Dowty (1979) and Parsons (1990). Vendler claimed that verb phrases could be divided into four classes, the *accomplishments, achievements, activities* and *states*, on the basis of two intersecting families of diagnostic tests. For example, accomplishments and activities readily allow use of the progressive, as shown in (12a-b), whereas this is at least degraded for achievements and states, as in (12c-d).

(12) a. I am running a mile (drawing a circle, building a house,...).
b. I am running (writing, working,...).
c. *I am spotting the plane (appearing, blinking,...).
d. *I am knowing the answer (loving you, understanding antisymmetry,...).

On the other hand, accomplishments and achievements reject *wh*-questions of the form *for how long...*, as in (13a) and (13c), while these are quite acceptable with activities (13b) and states (13d).

(13) a. #For how long did he run a mile (draw a circle, build a house,...)?
b. For how long did he run (write, work,...)?
c. #For how long did you spot the plane (appear, blink,...)?
d. For how long did you know the answer (love me, understand antisymmetry,...)?

Dowty and Parsons give a way of deriving this pattern. If we assume, following Fodor (1970) among others, that a single verb phrase describes (or denotes a property of) a single event, then one interpretation of Dowty's and Parsons' approach is that such an event can be decomposed into a maximum of two salient subevents, which I will call a *process* (conceived of as durative and lacking a culmination) which immediately precedes and directly causes a pointlike *culmination*, where *direct causation* may be defined as follows.

(14) An event e_1 *directly causes* an event e_2 iff:

a. e_1 causes e_2;

b. There is no event e_3 at the same level of granularity[6] as e_1 or e_2 such that e_1 causes e_3 and e_3 causes e_2.

The different aspectual classes can be defined, to a first approximation, in terms of the presence or absence of those two subevents, as follows, where an arrow represents direct causation. Vendler's tests can then be explained if we assume that progressives can only be formed from VPs whose denotation includes a process component, and *for how long* questions can only be formed from VPs whose denotation *does not* include a culmination.

(15) a. **Accomplishment** (e.g. *build a house, draw a picture*): Process → culmination.

b. **Achievement** (e.g. *arrive, notice the commotion*): (Process →) culmination.[7]

c. **Activity** (e.g. *work, dance*): Process.

d. **State** (e.g. *know French, love Mary*): $\emptyset$.

In the terms of this approach, (10a) can be distinguished from (10b) in terms of aspectual class membership. In both cases, the adjunct event *complain about what* is an activity. In (10b), the matrix event *do his work* is also an activity. In (10a), on the other hand, the matrix event *drive Mary crazy* is an accomplishment. Moreover, it is an accomplishment in which the nature of the preparatory process is underspecified. I claim in Truswell (2007a) that an example like (10a) can meet condition (11), on the decompositional approach pioneered by Dowty and Parsons, if the process described in the adjunct VP is identified as the preparatory process in the accomplishment-denoting matrix VP. Accordingly, it is clear that, in (10a), the only possible interpretation is one in which Mary becomes crazy as a direct result of John's whistling.

As for the ungrammatical (10b), we see that in this case, both the matrix VP and the adjunct VP describe fully specified processes. Therefore, unlike the previous case, identification of these two events is not possible. This is for the simple reason that a complaining event is not an event of doing work: the descriptive content attached to the two event variables is not compatible, and so the identification cannot take place. Without such identification, condition (11) cannot be satisfied and extraction is impossible.

As one of the central elements in this explanation is the requirement that the matrix process subevent be underspecified, we predict that parallel cases of extraction from a bare present participial adjunct modifying an accomplishment with a fully specified preparatory process component should be ungrammatical. This prediction is borne out by comparing the two examples in (16).

(16) a. John wrote the cheque [complaining about what a waste of money it was].

b. *What did John write the cheque [complaining about e]?

Although *write the cheque* is an accomplishment VP, its preparatory process is clearly specified to consist of writing. The complaining event denoted by the adjunct VP therefore cannot be

[6] See in particular Bittner (1999) on this notion.

[7] See Truswell (2007a,b) for discussion of the presence of preparatory processes in achievements. I ignore the issue here.

identified as the preparatory process of the cheque-writing event, and (11) is violated. This derives the unacceptability of (16b). We see, then, that a decompositional event semantics gives us a handle on the otherwise perplexing pattern of extractions in (9)–(10) and (16).[8]

The main aim of this paper is to expand this account to cover the case of *in order* clauses, a class of subject-oriented purpose clauses delimited by Jones (1991).[9] As (17) shows, extraction of object NPs from these adjuncts is quite free, and unrestricted by the sort of aspectual considerations which regulate extraction from bare present participial adjuncts.

(17) a. What are you working so hard [in order to achieve e]?
b. Who did John travel to England [to make a sculpture of e]?
c. Whose attention is John jumping up and down [in order to attract e]?
d. What did you tap your nose [in order to signal to Mary e]?
e. What did you come in [to talk to us about e today]?

The question, as ever, is why it should be the case that extraction from *these* adjuncts is so much freer than extraction from other classes.[10] I will approach this question in two stages. Firstly, in section 3, I define a more substantial, recursive, structure for event composition, motivated on grounds independent of $\overline{\text{A}}$ locality. Then, in section 4, I return to the issue of locality. It will be shown that, although the more powerful event composition system sketched in section 3 does not lose any empirical adequacy with respect to data such as (9)–(10) above, it follows as a natural conclusion of this theory of event structure, in tandem with (11), that $\overline{\text{A}}$-dependencies across *in order* clause boundaries are essentially unrestricted, while $\overline{\text{A}}$-dependencies across bare present participial adjunct boundaries remain sensitive to aspectual class. Needless to say, nothing of the sort follows on any syntactocentric approach that I can conceive of.

3. *Extended events*

The purpose of this section is to define a more expansive class of event structures than those discussed above with respect to Vendler's aspectual classes, and give some reasons to assume

[8]This presentation could give the impression that extraction from bare present participial adjuncts is only possible when they modify accomplishment VPs. In fact, this is not the case. Extraction is also possible in some cases when they modify achievements, as in (i), and activities, as in (ii).

(i) a. What did John die [whistling e]?
b. What did John come back [thinking about e]?

(ii) a. What does John wander around [thinking about e]?
b. Which chair did John eat his breakfast [sitting on e]?

Different treatments of these are sketched in Truswell (2007a) and Truswell (2007b), but I wish to abstract away from these cases in this paper.

[9]As will be clear from the examples in (17), the actual words *in order* are not a defining characteristic of *in order* clauses. The word *to* in isolation heading an adjunct is frequently sufficient to indicate an *in order* clause. The defining characteristics of *in order* clauses are the subject-orientation and the 'purpose' semantics.

[10]I do not wish to give the impression that extraction from just these two classes of adjunct is possible. In fact, a wide range of adjunct types allow extraction, the most well-known perhaps being the participial adjuncts introduced by a preposition, as in (7a) and the more acceptable of the examples in footnote 15. Such examples have been noted by Chomsky (1982) and Cinque (1990), among others.

that these larger events are still, nonetheless, single events.

I take it for granted that, despite the presence of two subevents in the decompositions of accomplishments and achievements given in (15), it is still legitimate to consider any of the aspectual classes listed there as single events. That is, an accomplishment such as *build a house* is readily considered as a single event, even if it consists of two major subevents, a building process and the coming into existence of a house. Similarly, an achievement such as *arrive* is a single event despite perhaps being considered (with Pustejovsky 1991 and Higginbotham 2000, among others) as being composed of a preparatory process (roughly, a journey) leading to a culmination of being at a destination. Call such events, consisting maximally of a process and a culmination, although either may be absent, *core events*.

Of course, the existence of such part–whole relations among events is not a new idea. Bach (1986) was perhaps the first paper to propose it explicitly, extending Link's (1983) lattice-theoretical account of plural and mass reference in nominals to the domain of events. Bach's structure is general enough to allow quite free composition of smaller events (*subevents*) into larger events (*macroevents*). We have no reason *a priori* to expect the composition of smaller events into larger events to stop at the level of the core event, then. Instead, the question of whether we can further compose multiple core events into larger, *extended events* is best decided empirically.

To approach this question from an empirical point of view, though, we need some diagnostic criteria, or at least some heuristics, for deciding where the boundaries between events lie. To be sure, the stuff that happens all around us does not come neatly packaged into discrete chunks that we can call events. However, we have quite robust intuitions that some things are, and some things aren't, single events (although the grey area is admittedly quite large). Just as I claimed above that building a house is a single event despite its being decomposable into two subevents, it seems quite reasonable to state that reading a book for a while and then walking around in circles is *not* a single event, despite the presence, once again, of two salient subevents. How can we make those intuitions sharper, though?

In this section, I want to report some experimental evidence, presented in Wolff (2003), concerning the size of events. Wolff uses two tests to determine when a portion of stuff that happens is perceived as a single event. The first of these tests couldn't possibly be any simpler. Wolff asked the subjects participating in his experiments to report the number of events that they perceived in an animation. As a less direct measure of the same variable, Wolff also asked the subjects to choose between two alternative descriptions of the same animation, one containing a lexical causative and one containing a periphrastic causative.[11] The rationale underpinning this latter test stems from a hypothesis due to Fodor (1970), which can be summed up as in (18).

(18) **Fodor's generalisation:**
A single verb phrase can only describe a single event.

Now, if we consider an animation showing a woman acting in such a way that some smoke rising

[11] A *lexical* causative is one contained within a single VP, where the causal interpretation and the result state are both inherent to the lexical semantics of the verb. A *periphrastic* causative is a biclausal structure, where the subordinating verb, such as *make* or *cause*, expresses little more than a sort of general causation, and the embedded clause describes the result state that arises.

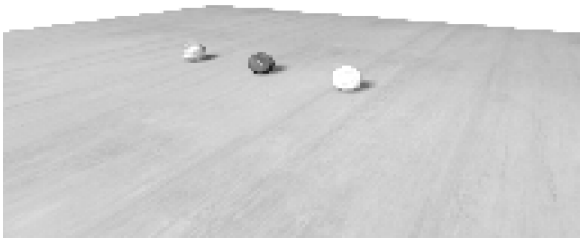
from a nearby ashtray disperses, then we may in principle conceive of this as either a single event, or two separate events, consisting of the woman's actions and the smoke dispersing, respectively. However, the number of events we perceive will influence the options available to us for describing that event, in the light of Fodor's generalisation. If we perceive the animation as depicting a single event, then we may either describe it using a lexical causative, as in (19a), or a periphrastic causative, as in (19b) or (19c). This is because Fodor's generalisation only holds as a one-way implication: just because a single event *can* be described by a single verb phrase, nothing in (18) prevents such an event from being described by multiple VPs.

(19) a. The woman dispersed the smoke.
b. The woman made the smoke disperse.
c. The woman caused the smoke to disperse.

If, on the other hand, we perceive the animation as depicting two separate events, then we cannot describe it using a lexical causative, as to do so would contradict Fodor's generalisation. Only periphrastic options such as (19b-c) are available to describe an animation which is taken to show multiple events, then. In this way, the descriptions of a given animation that subjects produce or accept can cast some light on their perception of events within that animation.

Wolff used these tests in several experiments, each consisting of a series of pairs of animations, differing in some minimal way. In the first experiment, the animations consisted of three marbles in a row, as in (20), from Wolff (2003:16). In the animations, the first marble, A, rolled into the second marble, B, which caused it to roll into the third marble, C, which, in turn, rolled away.

(20)



In the terms used in the discussion of (15) in section 2, then, there are two relations of direct causation holding in such an animation (between A and B, and between B and C), and one relation of indirect causation (between A and C). Given that the taxonomy of core events given in (15) made specific reference to direct causation, we would predict that subjects would report seeing only one event involving marbles A and B, but two events involving marbles A and C. Accordingly, either lexical or periphrastic causatives would be available to describe the interaction of marbles A and B, for example as in (21), but only a periphrastic causative would be available to describe the interaction of marbles A and C, as in (22).

(21) a. Marble A moved marble B.
b. Marble A caused marble B to move.

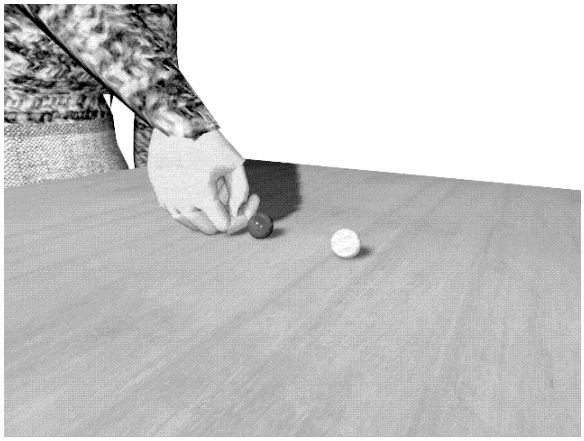
(22) a. *Marble A moved marble C.
b. Marble A caused marble C to move.

Indeed, this is what Wolff found. To a highly statistically significant extent, subjects reported an instance of direct causation as a single event, and an instance of indirect causation as two events. Moreover, there was a statistically significant preference for periphrastic causative forms in the description of the indirect causation case.

As it stands, this looks like strong evidence in favour of the position that the core events described in (15) constitute the upper limit for forming macroevents out of smaller subevents. No larger structure involving indirect causation was regularly considered as a single event. However, this finding can be contrasted with the results of Wolff's second experiment.

The setup for the second experiment was identical to that of the first, with the exception that the first marble in the sequence was replaced by a man's hand, as in (23), from Wolff (2003:16).

(23)



Whereas previously, subjects had seen only inanimate objects entering into causal relations, then, there was now an animate instigator for the series of causally related events. This had a striking effect on the perceived event structures of the examples. Specifically, whereas the interaction between marbles A and C in experiment 1 was generally reported to consist of two events, the interaction between the hand and marble C was reported to consist of a single event. Accordingly, both lexical and periphrastic causatives like the following were available to describe the animation.

(24) a. The man moved marble C.
b. The man made marble C move.

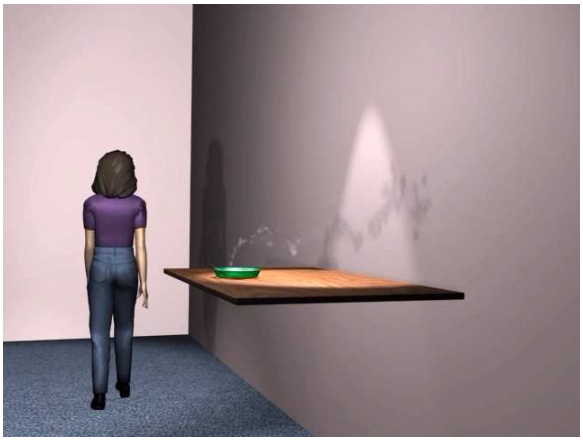
Given that the only relevant distinction between the animations in the two experiments concerns the animacy of the initiator of the first event, it is reasonable to conclude that the surprising distinction between (22) and (24) is related in some way to animacy. Wolff's third experiment (the last one which I will report here) sheds some light on the nature of this relation.

In the third experiment, two ingredients were kept from experiment 2. Subjects were shown animations consisting of three causally related events, the first of which was initiated by a human. However, in this experiment, the animations were paired in such a way that the human

clearly initiated the chain of causally related events intentionally in one member of the pair, but only accidentally in the other animation. For example, in one animation, a woman is seen wafting her hands, which creates a draught, which in turn causes smoke rising from a nearby ashtray to disperse. In a second animation, on the other hand, a woman walks down a corridor and passes an ashtray from which smoke is rising. The draught she creates by walking causes the smoke to disperse. Stills from these two animations, from Wolff (2003:22), are given in (25).

(25) a.

b.



Although there are arguably three subevents in each case (the woman's actions, the draught, and the dispersal of the smoke), only in the former case can the woman reasonably be said to have deliberately acted in such a way as to make the smoke disperse. Strikingly, the now-familiar pattern was repeated here too. To a highly significant extent, subjects reported perceiving the intentional animations as depicting a single event, and the unintentional animations as depicting two events. Moreover, although both animations were describable with a periphrastic causative such as (26b), only the intentional animation was regularly described by a lexical causative like (26a).

(26) a. The woman dispersed the smoke.
b. The woman caused the smoke to disperse.

If the only things which counted as single events were the core event structures described in (15), this result would constitute something of a challenge to Fodor's generalisation (18). According to that generalisation, a single VP, such as *disperse the smoke* in (26a), can only describe a single event. Moreover, the event structures listed in (15) consist maximally of a process and a culmination. However, the animation described by (26a) consists of *two* processes and a culmination. The hand-wafting causes a draught to blow, which, in turn, causes the dispersal of the smoke. Clearly, we cannot simultaneously keep Fodor's generalisation, the foregoing analysis of the animation described above, and the notion that (15) lists the only available types of macroevent formation from subevents, without contradicting ourselves.

As a way out of this, I propose to significantly expand the set of available types of event formation, based on the hypothesis that the difference between the perceptions of the two smoke-dispersal animations described above rests on the notion of intentionality.[12] When the woman was intentionally acting in such a way as to bring about the final event in the causal chain, subjects perceived a single event. When this was not something she intended, subjects perceived two events. In order to formally capture this, I propose a second level of event structure, defined in terms of groupings of the core events described in (15). The definition I propose is the following:[13]

(27) An extended event consists of a sequence $e_1, \ldots, e_n$ of core events, such that:
   a. e_1 occurred and is agentive;
   b. The agent of e_1 intends e_n to occur;
   c. For every e_k, $1 \leq \mathrm{k} < \mathrm{n}$, either e_k causes e_{k+1} or the agent of e_1 believes that the occurrence e_k will enable him to bring e_{k+1}.

Notably, this definition brings an element of recursion into the characterisation of the class of possible subevent structures. This is in parallel to the notions of *forward-* and *backward-chaining* used by Steedman (2002) to characterise our means of plan formation by either working forward towards a goal state from our present state of affairs, or working backward from a goal state in the hope of constructing a plan connecting the present state and the goal state. A well-formed plan, put into action, would meet exactly the conditions described in (27). In a very real sense, then, plans can always be construed as single (extended) events. Space constraints prevent me from defending this position here, but several pieces of linguistic evidence pointing to the validity of this claim are presented in Truswell (2007b).

It should be clear how this definition of extended events allows us to draw the line between the two smoke-dispersal animations above, while maintaining Fodor's generalisation. In the single-event animation (25a), the woman *intended* her actions to bring about the dispersal of the

[12] This presentation differs somewhat from that in Wolff (2003), most notably in not referring to force dynamics, in the sense of Talmy (1988), as Wolff does. However, as far as I can tell, both explanations are equally capable of capturing the data that Wolff presents.

[13] A reviewer raises the issue of the validity of considering such a chain of events as a single event, given that it is possible for the initial subevent in such a chain (the agent's action) to occur without the intended result also occurring. As far as I can tell, this is unproblematic if we adopt a modal accessibility relation among worlds, parallel to the relations yielding sets of belief-worlds and desire-worlds in Heim (1992), for example. Although a dissociation of the initial and final subevents is possible in the real world, the two both necessarily occur in an accessible world corresponding to the agent's plan.

smoke, whereas this was not a plan of hers in the two-event case, (25b). Schematically, we may represent the distinction as follows, where circles represent core events, and solid horizontal lines between circles represent plan-forming relations. Crucially, there are no such relations in (28b), which is the reason for the absence of the single-event interpretation.[14]

(28) a.

b.

At this point, we have developed a recursive model of macroevent formation which accords well with intuitions concerning the delimitations of events, as attested both directly and through Fodor's generalisation. The model has two stages. Firstly, we define a set of *core events*, whose internal structures consist maximally of a process which directly causes a culmination. Secondly, these core events are chained into *extended events* corresponding to an agent's plans. In the following section, this model will be combined with condition (11) to give an account of the cases of legitimate extraction from adjuncts described in section 2.

4. *Reaching the parts that syntax cannot reach*

Section 2 introduced two major challenges to a syntactocentric theory of locality conditions on extraction from adjuncts. The first concerns the patterns of extraction from bare present participial adjuncts, the acceptability of which is conditioned by the aspectual class of the VP to which the adjunct is attached. The second concerns the general acceptability of extraction of nominal complements from within *in order* clauses. Sharpening the second question a little, we are interested in why it is precisely the class of *in order* clauses that allow such free extraction. I will claim below that the theory of event structure developed in section 3, together with condition (11), automatically predicts such a pattern. Before that, however, I want to see what syntactic alternatives have to say.

In fact, no current purely syntactic theory of locality gets close even to describing the relatively limited set of data given here.[15] Syntactic locality theories can be broadly divided into four

[14]Of course, there are still relations of direct causation between adjacent events, which I have represented by a dotted line in (28b). This means that the intermediate process and the final culmination can jointly form a core event, according to the description in (15). This is in conformity with Fodor's generalisation, as a lexical causative description such as *The draught dispersed the smoke* is quite appropriate in such a case.

[15]This is not to claim that the data are not well-known, but simply that they have long been seen as a thorn in the side of locality theories. Chomsky (1982), for example, lists examples such as the following, commenting that they 'range in acceptability from fairly high. . . to virtual gibberish' (Chomsky 1982:72). No satisfying account of this gradience is forthcoming there, however.

(i) a. Here is the influential professor that John went to college in order to impress e.

classes, the status of one of which is less clear from a minimalist perspective. Firstly, post-CED theories (Uriagereka 1999; Johnson 2002) work on the assumption that movement is absolutely impossible from certain domains. Secondly, minimality-type theories (Rizzi 1990; Chomsky 1995; Starke 2001) claim that a given movement step is illicit if it crosses a closer element of 'the same type'. On the minimalist reinterpretation of this approach, this reduces to the claim that a feature on a probe can only enter into an agreement relation with that feature on a goal if there is no closer element bearing the same feature. Thirdly, phase-based theories (Chomsky 2000, 2004; Fox & Pesetsky 2005) claim that movement out of certain domains is impossible unless the moved element is close enough to the edge of that domain. Finally, the older, and currently somewhat disfavoured, barriers-type theories (Chomsky 1986; Cinque 1990) suggest that a movement step crossing a given node is illicit unless that node enters into certain relatons (e.g. proper government) with other nodes.[16]

It should be clear that a post-CED theory is no use to us here. All of the references cited above make extraction from an adjunct impossible, in which case the existence of examples such as (10a) or (17), repeated below, is seriously problematic.

(10) a. What did John drive Mary crazy [complaining about e]?

(17) a. What are you working so hard [in order to achieve e]?
b. Who did John travel to England [to make a sculpture of e]?
c. Whose attention is John jumping up and down [in order to attract e]?
d. What did you tap your nose [in order to signal to Mary e]?
e. What did you come in [to talk to us about e today]?

An alternative post-CED theory would be one in which the criteria for domains allowing extraction are modified in such a way that extraction from an adjunct is uniformly possible. However, in that case, the ungrammaticality of examples such as those in (4) goes unexplained.

(4) a. *What did you come here [because Mary wanted to talk to you about e]?
b. *What did John go home [after Mary said e]?
c. *What was little Jimmy playing in the sandpit [screaming about e]?

What a post-CED theory lacks is a way of stating that extraction from a given domain is sometimes permitted and sometimes impossible, but that seems to be the best description of the facts here. The post-CED approach will not give us a handle on these facts, then.

The minimality-type, phase-based, and barriers-type approaches *can*, at least in principle, capture the fact that extraction from an adjunct is only sometimes legitimate. On a minimality approach, the natural way to capture such a pattern is to associate an $\overline{\text{A}}$ feature of the relevant type with the head of all and only adjuncts which do not allow extraction. Perhaps, for a phase-based approach, we could assume that adjuncts are always phases, but that only certain adjuncts have an available edge position, and so only those adjuncts will allow subextraction. Meanwhile,

b. The article that I went to England without reading e.
c. The book that I went to college because I liked e.
d. The man that I went to England without speaking to e. (Chomsky 1982:72)

[16]Of course, the boundaries between these modes of explanation are not sharp, and many hybrid theories exist. This is a good first approximation to the state of the art, though.

on a barriers-type approach, the opportunities are legion.[17] Without going into details, we may expect height of attachment to affect the possibility of extraction, given that adjunction of a *wh*-phrase to VP, but not IP, is possible in Chomsky (1986). It is also possible to stipulate that some, but not all, adjunct maximal projections allow adjunction, thereby voiding their barrierhood.

However, the minimality-type, phase-based, and barriers-type approaches suffer from a quite complementary problem, already flagged up in section 2. All three of these approaches relate locality effects to properties of the nodes crossed by a given movement step. However, the paradigm in (10) shows that contrasts in grammaticality of extraction from adjuncts cannot always be reduced to properties of the nodes on the path from base position to surface position.

(10) a. What did John drive Mary crazy [complaining about e]?
b. *What does John do his work [complaining about e]?

Faced with this problem, we may wonder whether an analysis in the spirit of the original CED, whereby the distribution of a syntactic relation determines extraction possibilities, could account for this paradigm. In principle, a CED-type analysis is better equipped to deal with apparent locality effects due to properties of the adjunct's sister, as it may be possible to claim that some extra relation (call it the *pseudoargument* relation) holds between an adjunct and (nodes within) its sister in a case like (10a), in addition to any such relations that hold in (10b). However, I suspect that, fully developed, it would amount to little more than a syntacticisation of the semantic story developed here: the distribution of the putatively syntactic pseudoargument relation would in fact be determined on the purely semantic grounds discussed above, leaving this approach with no motivation beyond a desire to keep locality theory in the syntax. In such a situation, I would argue that the burden of proof lies with the more complex syntactocentric theory. However, I have been unable to find any evidence for the syntactic reality of such a pseudoargument relation.

Other approaches also suggest themselves. For example, we can, of course, deny the assumption that the adjunct-external syntax of these two examples is the same. This would allow us to attribute the difference in acceptability between the two examples in (10) to, for example, a syntactic height effect. However, while not impossible, this route once again lacks independent motivation: according to most standard constituency tests, it seems that the two adjuncts in (10) are attached at the same height. Moreover, it should be noted that extraction from relatively high adjuncts is not universally impossible, as many people accept stranding of temporal prepositions, as in (29), which are generally taken to attach in the IP domain. It seems, then, that height alone cannot provide us with all the answers here.

(29) Which film did John fall asleep [during e]?

A further possibility, suggested by an anonymous reviewer, is that we may posit a covert *while* in (10b), which is absent in (10a). We could then link the different extraction patterns to adjunct-*internal* syntactic factors, most naturally the syntactic size of the adjunct. If (10b), containing covert *while*, is a CP, whereas those adjuncts which allow extraction are TPs or smaller, then standard modes of explanation would become available to us. However, this approach, too,

[17] See Jones (1987) for a critical survey.

raises many questions. Firstly, we need to explain why, for example, a covert *while* has this effect, but not an equally plausible covert *by* in (10a). Secondly, it would then be unclear why cases of extraction from similar constructions with an overt preposition, as in (7a), are frequently acceptable.

Of course, it is quite possible to stipulate our way through all these difficulties on a syntactic approach. It would appear, though, the end result will be a highly disjunctive theory, with separate conditions applying to different classes of adjunct. What is much harder is to come up with a unified syntactocentric theory with genuine explanatory potential, as more elegant syntactocentric approaches invariably run into serious empirical problems. Now, consider how the event-based approach accounts for this pattern.

The core of the event-based approach lies in condition (11), repeated below.

(11) **Events define locality domains for *wh*-movement**
A *wh*-chain is legitimate only if the denotation of the minimal constituent containing the head and foot of the chain asserts the existence of a single event.

Fleshing out the notion of *single event*, sections 2 and 3 proposed a two-stage characterisation of events. Firstly, *core events* consist at most of a single process which directly causes a single culmination. Secondly, *extended events* consist of a series of core events corresponding to an agent's plan for reaching the goal, represented as the final core event in the series.

Moreover, we saw in section 2 that the characterisation of core events alone was sufficient to derive the pattern in (10). (10a) is grammatical as a result of the adjunct event's coming to be identified as the preparatory process leading to the culmination specified in the matrix VP. However, no such identification is available in the cases of (10b) and (16), and as a consequence, (11) cannot be satisfied in those cases.

The extension to extraction from *in order* clauses should now be clear. *In order* clauses describe an agent's plans, and consequently, the matrix and adjunct events together form an extended event. This is sufficient to permit extraction from the adjunct, whatever the aspectual class of the event-denoting constituents in question.[18] Whereas extraction from bare present participial adjuncts, which can only form core events with their sisters, is accordingly contingent on various factors concerning the rather limited internal structural possibilities of core events, extraction from *in order* clauses can take advantage of the fact that the extended event formation

[18]Of course, certain combinations of events in *in order* constructions will be infelicitous, regardless of *wh*-movement, because the combination of the two events in question do not correspond to our real-world knowledge of what constitutes a reasonable plan. Crucially, though, even the declarative versions of such sentences, as in (ia), are infelicitous. Extracting out of the adjunct, as in (ib), doesn't make things any worse.

(i) a. #John is smiling in order to fry an egg.
b. #Which egg is John smiling in order to fry?

I am aware of one exception to the claim that extraction of DPs from *in order* clauses is unproblematic. This is based on uses of these clauses, discussed in Culicover & Jackendoff (2001), in areas such as literary criticism to describe an author's intention at a given point in the text. Such examples do not require agentivity, or even animacy, on the part of the subject, and the adjunct describes the *author's* plan, not the subject's. In such cases, extraction from the *in order* clause is impossible, as shown in (ii).

(ii) a. The ship sinks [in order to further the plot].
b. *What does the ship sink [in order to achieve e]?

At present, I have no satisfactory explanation for this fact.

process can chain together any class of core events, which guarantees that the matrix and adjunct events will jointly form an extended event in this case. Unlike bare present participial adjuncts, then, satisfaction of (11) by, and consequently extraction from, *in order* clauses is predicted to be automatically possible.

There remains one question, which is why bare present participial adjuncts and *in order* clauses should align themselves with core events and extended events in this way. I claim that this is due to the overt forms that the two classes of adjuncts take. Bare present participial adjuncts are distinguished by not having any overt marker of the precise semantic relation between the matrix and adjunct events. In contrast, *in order* clauses are distinguished by the presence of an initial *in order to* (or just *to*), which clearly signals that the matrix and adjunct events are related as the initial event and the goal of a plan.

The representation of *in order* clauses as extended events is unsurprising, in that case, but why should bare present participial adjunct constructions, without any overt marking of the relation between matrix and adjunct events, not be interpretable as extended events? I believe that this is because of a basic fact about plans: they sometimes fail. In other words, there is no guarantee from the use of an *in order* clause that the goal event occurred just because the initial event did, but the two events in a bare present participial adjunct construction are not separable in this way. So while (30a) is a quite acceptable utterance, (30b) is contradictory.

(30) a. John came to England in order to meet the Queen, but he never got to meet her.
b. #John drove Mary crazy complaining about the weather, but he never {complained about the weather / drove Mary crazy}.

In this case, the restriction of bare present participial adjuncts to core events makes sense if we adopt the following natural hypothesis.[19]

(31) Modality must be overtly signalled.

(30) shows that there is a modal element to the relation signalled by *in order* which is absent from the relation among events in a bare present participial adjunct construction. If the matrix event in a bare present participial adjunct construction occurred, then so did the adjunct event, but this does not hold for the *in order* case. This is as expected if (31) holds.

Now, let's consider the relations among subevents that hold in core events, and in extended events. We have seen that subevents of extended events are related by the forward- and backward-chaining relations that govern plan formation. We have also seen from (30a) that such relations are modal in nature. However, the only relation that holds among events in core events is direct

[19] A reviewer asks whether we may expect that modality will facilitate extraction in general. Although little rests on the answer for the issues narrowly at hand here, it seems in fact that, in at least one case, there is a connection between modality and extraction. This is the factive island phenomenon discussed by Erteschik-Shir (1973), and illustrated below.

(i) a. Who did John say [that Mary kissed e]?
b. *Who did John regret [that Mary kissed e]?

Although space precludes a discussion here, an extension of the event-structural condition is proposed in Truswell (2007b:§3.3) which makes crucial use of the relativisation of the kissing event to John's belief worlds in (ia), but not in (ib), in the same way that the extended events hypothesised to lie behind extraction out of *in order* clauses are relativised to John's planning worlds, however they may ultimately be formalised.

causation. This is not modal in nature. A basic definition of causation (see, for example, Lewis 1973 for a more subtle approach along these lines) is as follows.

(32) An event e_1 *causes* an event e_2 iff:
  a. e_1 and e_2 both occur;
  b. If e_1 hadn't occurred, then, all else being equal, e_2 wouldn't have occurred either.

This is exactly the sort of inseparability that we observed with respect to the two subevents of a bare present participial adjunct construction in (30b). If it is legitimate to adopt (31), then, it follows that the subevents in a bare present participial adjunct construction cannot jointly form an extended event, but they *can* form a core event.[20]

Summing up, this section has shown that any orthodox syntactic locality theory encounters serious problems in accounting for even the few pieces of data presented here. However, the event-based approach to locality, supplemented by one natural assumption, (31), about overt signalling of modal elements, breezes through the data.

5. *Conclusion*

The empirical impetus for this paper comes from a few clear exceptions to the otherwise well-motivated generalisation that adjuncts are strong islands. The interest of these exceptions is that, rather than necessitating some small amount of tinkering with the theory, they have led to a radically different view of the ill-formedness of many extractions from adjuncts. Section 4 showed that the cases where extraction is possible form natural classes on an independently motivated view of the internal structure of events, but not on any current view of phrase structure.

Where does this leave the overall architecture of a theory of locality? Certainly, adjuncts are not (always) strong islands — the counterexamples scattered throughout this paper are sufficient to dispel that claim. However, we also cannot expect to remove all of locality theory from syntax. This is clearly shown by the effects noted by Cinque and discussed in section 2, the upshot of which is that even when they allow subextraction, adjuncts still show many typical properties of *weak* islands. So, for example, we saw in (7), repeated below, that extraction of anything other than a DP from an adjunct is impossible, as is typical of weak islands.

(7) a. The man that I went to England without speaking to e
  b. *The man to whom I went to England without speaking e (Chomsky 1982:72-3)

Such sensitivity to syntactic category would be hard to reproduce in a purely semantic theory. It seems, then, that classic locality effects are partly a matter of syntax, and partly a matter of

[20]This does not mean, of course, that they *have to* form a core event. In a case like (i), the relation between the matrix and adjunct events is in no way causal. Instead, it is more accurately characterised as conjunction, with additional appropriate restrictions on spatiotemporal location of the two events.

(i) John works building igloos.

However, in such a case, the two events do not jointly form a single macroevent. Accordingly, (11) is not satisfied and extraction is impossible.

(ii) *What does John work building?

semantics. As ever, there are two obvious ways to accommodate such a result within the theory. Either we can give up on the standard Y-model, in favour of a parallel architecture in which the logical priority of syntax is reduced or abolished (see, for example, Jackendoff 2002), or we can conceive of the semantic component as a filter, operating on an overgenerating syntactic component by rejecting those sentences which do not comply with condition (11). Choosing between two such alternatives is far beyond the scope of this paper, however.

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Robert Truswell
University College London
r.truswell@ucl.ac.uk
http://www.phon.ucl.ac.uk/home/robert/

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Clusters and the onset

Alexandre L. Vaxman

It has been argued in the literature that branching onsets should be dispensed with by introducing complex segments. These were claimed to be obstruents with liquids as their secondary articulation, segments available *as is* in the phonemic inventory of a given language ('Complex Segment Hypothesis'). It is shown that this hypothesis is desirable for phonological theory. Some aspects of CSH are discussed on Russian material by adducing arguments from verbal morphology and from experimental phonetics. Finally, a phonetic study of a speech corpus (British English) renders support to the Complex Segment Hypothesis.

1. Introduction

This paper is devoted to the issue of complex segments in the onset. The central claim considered is that of the so-called 'Complex Segment Hypothesis' first submitted by Hirst (1986). Radically different versions of such hypothesis developed, according to the phonological model assumed: an Underspecification approach (Hirst 1986, 1995), an Aperture Theory approach (Steriade 1993, 1994), a CVCV approach. The latter, represented by Lowenstamm (2003) forms the focus of the present discussion. It is referred throughout this paper as 'CSH'.

According to CSH, onset obstruent-liquid clusters *may* be interpreted as underlying segments forming single units, in other words as complex segments. Not all (onset) obstruent-liquid sequences, however, are complex segments. As Lowenstamm (2003) argues for this point with his analysis of Chaha data (*cf. also section 2*), two competing interpretations are available within CVCV. One candidate representation maps an obstruent X exhibiting a secondary articulation (viz. a palatal approximation or a liquid), onto a *single* C position. The other candidate representation maps X onto a C position while mapping the secondary articulation on the following C position, the two positions being separated by an empty V position. On the segmental level, in the former case, we are dealing with a *single* segment $X^{j/Liquid}$; in the latter case, we are dealing with a {X j/L} complex.

CSH appears to be a straightforward solution to the issue of the complex cluster representation in highly constrained CVCV phonology. That was a less crucial theoretical matter for other theories. For example, standard Government Phonology would syllabify the 'CCL' clusters as heterosyllabic sequences in which the first consonant is in the Coda whereas the following consonant-liquid sequence forms a branching onset. By contrast, such

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interpretation is unavailable in CVCV because of the ban placed by this theory on branching constituents (both Onset and Rhyme) and on Codas. CSH provides then a possible solution.

In this very vein, the aims of this paper are to show that CSH is theoretically desirable because it gives us a simple way of capturing complex consonant patterns and predicting some important, testable phonetic processes.

As noted, the status of phonetic clusters is phonologically ambiguous. The decision about the phonemic status of a cluster may then be a product of concrete methods of phonological analysis. Those exploited in Lowenstamm (2003) are based on the study of templates and reduplicative morphology in relation with various phonological phenomena such as palatalization, vocalic centralization and deaspiration, and of the non-sensitivity of metrical systems to onset structure. These phenomena have been studied on data from Chaha, Ilokano, Greek and Czech.

A related question arises naturally: can CSH be supported by arguments based on data from other languages? Also, could CSH be independently verified via methods of different nature? To illustrate one such method, phonetic treatment of English clusters is proposed addressing the question of effective phonetic duration of consonant clusters in the onsets in British English speech. Evidence bearing on the CSH will come from data concerning susceptibility of clusters to compression. Equally, I will show that CSH is desirable for phonological theory: I will discuss some of its aspects on Russian material adducing arguments from Russian phonotactics and verbal morphology. Regarding these arguments, I will make use of Single-stem theory, a particular framework for modeling Russian morphology. An interesting account of the so-called *l-epentheticum* in Russian will follow from this morphological framework and other considerations.

The structure of the paper is as follows. Section 2 sets forth two of Lowenstamm's (2003) arguments in favor of CSH in order to give the reader some background. Section 3 shows, arguing from Russian data, that CSH is desirable. It will be assessed in the following two sections how well CSH copes with Russian clusters given verbal morphology of this language. Section 5 is an approach to complex segments in English onsets; an experiment on compression of clusters in English is presented, with some of the implications of this experiment for CSH discussed. The conclusion of the paper sums up the results.

2. Some arguments in defense of the Complex Segment Hypothesis[1]

In this section, I briefly present some arguments for CSH drawing heavily on Lowenstamm (2003:2-4). The reader should note that this passage relies on previous results obtained by the same author (Lowenstamm 1996, 1999, 2001).

Compare two perfective verbs in Chaha, a Southern Ethio-semitic language:

(1) a. 3 MASC. SG. fiċänäq-ä 'squash'
b. 3 FEM. SG. q^{w}ıräċ-ä 'take a handful and close the hand'

On the surface, the two verb roots are different in their make-up: the verb in (a) contains four consonants whereas the one in (b) contains three consonants. However, Lowenstamm (1996) shows that the allegedly triliteral roots are mere quadriradicals, if they contain the central

[1] The reader is referred to Lowenstamm (2001, 2003) for detailed explanation and a wealth of details (cf. also the review in Vaxman 2006)

vowel ɪ. (Additionally, some biliteral roots have been proved to be triliteral in Lowenstamm (2001) so that it is easy to see that surface realizations may be one segment shorter than respective underlying forms).

Granted this point, the root in (b) counts as quadriliteral on a par with the root in (a). It is then legitimate to construe of [ċ] as phonetic realization of /ṭ j/ sequence where /j/ is a segment attached to the next C position in the CVCV configuration. On the contrary, what we have in (a) is not a sequence, but a single segment attached to one C position and consisting of /ṭ/ as primary articulation and /j/ as secondary articulation. To put it differently, in (a) we have a cluster while in (b) just one segment.

Part of demonstration runs as follows. If we examine the 1 SG. and 2 MASC. SG. Perfectives of the same two verbs and compare them to (1), we see an [ä] intervening between the final consonant of the root and the *consonant-initial* affix. Lowenstamm's claim is that this vowel results from a metathesis: in this language, a root-final yod and its preceding vowels are reordered:

(2)	a. UR and realization			b. *Conventional* output notation
	UR		Output	
1 SG	/fɪṭ^{j}änäq-x^{w}/	>	[fɪṭ^{j}änäqx^{w}]	fɪċänäq-x^{w}
2 MASC. SG.	/fɪṭ^{j}änäq-xä/	>	[fɪṭ^{j}änäqxä]	fɪċänäq-xä
1 SG.	/q^{w}ɪräṭäj-x^{w}/	>	[q^{w}ɪräṭjäx^{w}]	q^{w}ɪräċä-x^{w}
2 MASC. SG	/q^{w}ɪräṭäj-xä/	>	[q^{w}ɪräṭjäxä]	q^{w}ɪräċä-xä

Chaha morphology lets the root-final consonant appear in its bare form. Thus, *vowel-initial* suffixes assuming the function of agreement markers trigger root-final yod deletion yielding forms with 'bare' [ṭ]:

(3)	a. 3 MASC. PL.	/q^{w}ɪräṭäj-o/	>	[q^{w}ɪräṭäwo][2]
	b. 3 FEM. PL.	/q^{w}ɪräṭäj-ma/	>	[q^{w}ɪräṭäma]

The [ä] directly follows the last consonant of the root in the output, which brings in partial confirmation of its root-final occurrence when a consonant-initial affix is added. In a word, agreement operations with vowel-initial suffixes opens access to the URs that conventional notation has been obfuscating.

Additional corroboration of CSH comes from Greek reduplicative morphology. Perfect Formation, one of derivational operations involving reduplication in Greek, requires the following ingredients: (i) the phonetic interpretation of a light CV affix in which (ii)V is /e/ and (iii) C is a copy of the root-initial consonant.

Thus, /luo/, after reduplication, yields /le-luka/. However, /grap$_{h}$o/, after reduplication yields /ge-grap$_{h}$euka/, that is the liquid is pruned in order to fit the format of the copy. The process observed has been termed 'decomplexification' in Lowenstamm (2003:10) and defined as deletion of secondary articulation. Now, note that decomplexification is not a

[2] A careful reader will notice a [w] occurring in 3 MASC PL. form. According to Lowenstamm, [w] is inserted after deletion of [j]. Two remarks are due: first, glide insertion is a wide-spread linguistic phenomenon, hence insertion in itself is not problematic phenomenologically speaking. However, there may arise a theoretical question: don't we get a case of intrinsic ordering between deletion of yod and [w] insertion?

universal phenomenon. For example, decomplexification does not operate in Ilokano. In other words, Ilokano does not prune the yod and the liquids.

A uniform account of reduplication in both Greek and Ilokano can be captured straightforwardly through the means of parameterization. Lowenstamm introduces 'a parameter of reduplicative systems' for decomplexification: *"Reduplicate complex segments YES/NO"* (Lowenstamm 2003:10). Then, simply, decomplexification parameter is set to NO for Greek and to YES for Ilokano.

Additionally, in Greek, the pruning of multiple secondary articulations reduplication applies to the copy of the root-initial consonants. Thus, in reduplication, both aspiration and the liquid (be it /$^{l/}$ or /$^{r/}$) are pruned. This fact serves as evidence to the basic claim that liquids are mere secondary articulations. And we conclude with Lowenstamm (2003) that Greek (and Ilokano) *mutæ cum liquidā* do not form branching onsets

I omit the remainder of ample evidence for CSH detailed in Lowenstamm (2003); the reader is referred to the above-mentioned publications by this author.

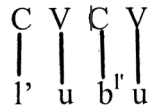
3. The appeal of complex segments

The wide-spread idea of the Russian segment inventory holds that most of consonant phonemes form a certain number of 'palatalized/unpalatalized' pairs: /b/:/b'/, /p/:/p'/, /v/:/v'/, /f/:/f'/, /m/:/m'/ etc. Under the complex segment hypothesis, the plain /b/, previously paired with /b'/, must now be expanded to include the complex /b$^{l'}$/ and this may also be true of all other pairs of consonants. Therefore, a part of the phonemic inventory of Russian should consist of a number of consonants organized in series of three items. (The series can further be extended to include /b^{r}/ and /b$^{r'}$/ and this might be valid for all Russian labials.)

The aim of this section is to show, drawing on Contemporary Russian data, that this approach to consonantal clusters is desirable for phonological theory.

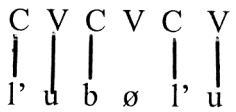
Consider now the form [l'ubl'u] ('love', 1 SG. Pres; Conjugation II). Adopting Lowenstamm's proposal, the appropriate representation for this form would be:

(4)



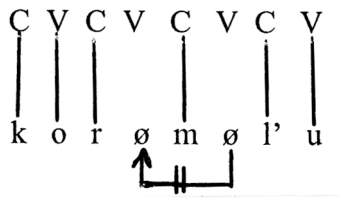
Instead of the traditional representation with an intervening empty nucleus:

(5)



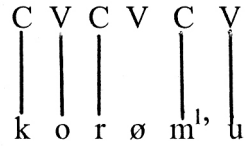
(4) offers the advantage that we can now easily express the patterning of consonants in three-member clusters in CVCV using the Proper Government (henceforth, PG). As an illustration of this, consider the form [korml'u] ('feed' 1 SG. PRES; Conjugation II). This form could be represented as in (6) assuming the standard framework:

(6)



Obviously, this representation violates the Empty Category Principle (ECP) (following Kaye *et al*. 1985 and Charette 1991). On the other hand, ECP is not violated if we accept CSH, /m$^{l'}$/ being then hosted by a single (non-branching) C position without an empty nucleus intervening between *m* and *l'*. As a consequence, we are left with only one empty V position properly governed by the following filled V position:

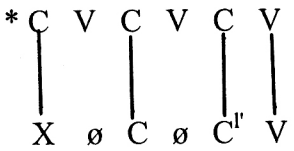
(7)



It follows that CSH allows us to fit a surface sequence of three consonants under two C-nodes. This is important for representing clusters, commonly encountered in Slavic, the complexity of which is otherwise problematic for the CVCV representational format.

There is another reason that makes CSH desirable: CSH predicts the representations (4) (7), precluding at the same time all other ones. In particular, CSH, coupled with the usual principles of CVCV, leads to the prediction that (8) is ill-formed.

(8)



where X is any consonant

This prediction is directly borne out by the data: there are no surface clusters in Russian that would end in [l'] following *three or more* consonantal segments of any kind. In other words, there are …*CCCl'*-type sequences.

In a nutshell, Russian data provide empirical support for CSH. This hypothesis lays the grounds for the modeling of a simple representation for complex clusters without relaxing the CVCV assumptions.

4. A case for the Single-stem theory

4.1. Presentation of the morphological framework

Below, I offer a case study within Single-stem theory showing that not every sequence theoretically qualifying for the complex segment status can effectively be analyzed using the Complex Segment Hypothesis.

The Single-stem theory (Jakobson 1948) is a theory of Russian conjugation that derives all forms of a verb using a single verb stem, as opposed to traditional grammatical theories in which conjugation is based on two different stems: the Present-tense stem and the Infinitive stem.

In order to test CSH on Russian material, I examine a case of alternation in the verbal inflection. The verbs with root-final labials in the Infinitive will be considered. These verbs are treated in a special way within 'two-stem' accounts of Russian morphonology (cf. Čurganova 1973, Reformatskij 1975). These accounts brazenly posit multiple lexical forms for the same word. Such attitude being problematic for a generative model, a different approach is pursued in the present paper.

The reasoning of the two sections below is as follows: (a) a suffix /i/ is added to the stem in the present tense as compared to the Infinitive once the stem-final (so called 'thematic') vowel deletes in the latter; (b) this /i/ is phonetically realized as [l'] in the 1 SG. while realized as [i] in the rest of the forms; hence (c) the obtained sequence *labial+l'* cannot be interpreted as a simplex segment due to phonological and morphological reasons.

4.2. Present Formation

Consider table 1 in which the present-tense forms for the verb [l'ubl'u] 'I love' are listed. (Present-tense endings fuse PERSON and NUMBER categories.) Observe that the thematic suffix /i/ added to the root to form the verbal stem, deletes in 1 SG.

	SG.	**PL.**
1 PERS.	l'ub-l'-u (l'ub'-l'-u)	l'ub'-i-m
2 PERS.	l'ub'-i-š	l'ub'-i-t'e
3 PERS.	l'ub'-i-t	l'ub'-at

Table 1. A Present Formation paradigm

(7) Infinitive: l'ub-i-t' 'love'
Stem: l'ubi
Root: l'ub

As can be seen from table 1, the suffix /l'/ occurring in 1 SG. is palatalized while the preceding labial *may* remain plain (palatalization of the labial being optional, *see below*), and the root-final consonants in all other persons are also palatalized. Another point is that /l'/ of the 1 SG. alternates with ø of 3 PL.

It is possible to account for these observations by postulating an /i/ (tentatively interpreted as marking the fact that the verb is conjugated) added to the right of the stem after the deletion of a homonymous thematic vowel /i/. The deletion of /i/ was traditionally expressed within the Single-stem theory by a 'truncation rule' (cf., in particular, Jakobson 1948 and Coats & Lightner 1975). In fact, /i/ deletes to resolve an ill-formed hiatus. A hiatus is always precluded from forming on the right periphery of the word, that is after the right boundary of the root), as observed in Garde (1970).

For the sake of clarity, the phonological process at hand is represented informally in table 2.

stem	ending	present form.	result
l'ubi-	u	l'ubi+u	l'ubu
kormi-	u	kormi+u	kormu
lovi-	u	lovi+u	lovu

Table 2. Hiatus resolution: thematic suffix + ending

Gloss:
l'ubit' 'love' (Inf)
kormit' 'feed' (Inf)
lovit' 'catch' (Inf)

The conjugative suffix /i/ is then affixed to the right of the root. This results in a new hiatus between the added vocalic suffix and the ending that also begins with a vowel. Compare two derivations for the paradigm in table 2:

(9) 1 SG.l'ub]$_{stem}$ + i + u → l'ubju
3 PL. l'ub]$_{stem}$ + i + at → l'ub'at

Palatalization of /b/ and absence of a surface vowel in 3 PL. is due to hiatus resolution. /i/ and /a/ are both vocalic. Given that in Russian two vowels cannot co-occur in a sequence on the right margin of a stem, /i/ simply deletes. (Observe that in this respect Russian behaves typically: most languages delete some V_1 in a V_1V_2 sequence, not the second.) These processes are informally represented in (10) and (11) in a rule-based format:

(10) /b/-> b'/_____ $V_{[+front]}$

(11) /i/ -> ø / _____ V

In 1 SG, on the contrary, /i/ does not delete, yielding instead /j/: /i/ and /u/ sharing the Place feature [+high] are subject to the OCP-Place. This principle disfavors neighboring segments with at least one place feature being the same. The OCP-place triggers glidification and yields /j/ so that /l'ubju/ is derived.

Summarizing, the differential treatment of /i/ before /u/ and /a/ is determined by the distinction between, on one hand, the phonotactic ban on a morphonologically defined type of hiatus (i+a) and, on the other hand, the OCP-Place (i+u).

Russian provides extensive corroboration for the hypothesis that a yod occurs and exerts an action in the derivation of [l'ubl'u] (1 SG.). Indeed, the regular state-of-affairs for the Russian

verbs in the Present is the palatalization of the stem-final consonant of a verb implying the action of /j/ to the right of a given consonant:

(12)

a. **Infinitive**	b. **1 SG. PR.**	c. **Gloss**	d. **compare**	e. **Gloss**
xot-e-t’	xoč-u	want	o-xot-a	‘longing’
gorod-i-t’	gorož-u	put a fence	za-gorod-k-a	‘hurdle’
zl-i-t’	zl’-u	anger	zl-oj	‘angry’
vis-e-t’	vi-šu	hang	po-vis	‘hung on’

(12a) shows Infinitives with stem-final segments that are underlyingly non-palatalized. Cognates in (12d) are unpalatalized on the surface, so they evidence that stems in (10a) effectively end in a non-palatalized consonant. By contrast, (12b) shows the result of palatalization.[3] One can easily account for this phenomenon considering then that l’ub’at (3ps. PL.) in table 1 is also a case of palatalization. /j/ palatalizes /b/ in (10) just like it does throughout the 1 SG. PR. forms in (12b) as compared to (12a). (Obviously, back vowels do not palatalize the preceding consonant.) By way of contrast, this does not apply to /b/ in 1 SG l’ubl’u where /b/ is not palatalized obligatorily.

According to Daniel Hirst (pers. comm., 2006), the differential treatment of /j/ may be explained by the phonetic fact that what we have here are precisely sequences consisting of a labial plus a lingual and it is easier to use the tongue to articulate a lingual after a labial than after another lingual. No doubt, this elegant explanation has its appeal. Nevertheless, one might ask why the phonetic output is precisely [l’]. This is the question considered in the remainder of the section 4.

4.3. Fortition?

Above, I have discussed the rationale behind the differential treatment of the marker /i/ and on how yod obtains. Now, the issue boils down to capturing the motivation for the phonetic surface realization of the yod.

The correct explanation for this process had been viewed by some researchers as part of fortition phenomenology. That is why, in this subsection, I willl begin by re-appraising the work of Kristó & Scheer (2005) which takes such point of view. In the following subsection, I shall submit my own interpretation of the facts.

In their talk on the fate of the yod in Slavic, Kristó & Scheer (2005) take the fortition in the postconsonantal position (on which cf. Segeral & Scheer 1999), that is in non-initial onsets, to be the reason behind j -> l’ alternation:

[3] Stem-final velars are not subject to this process in 1 SG. due to their distiribution: in Russian, the palatalized allophones of the velars do not combine with non-front vowels such as /u/ of the 1 SG. present ending (except few loanwords, cf. [ek’u] ‘ an écu’; cf. Paradis 2006). Palatalization in the given Infinitives occurs on the surface. In (10a) we give the forms in the UR, determined by contrasting (10b) with (10c). Palatalization is caused here by the front vowels (cf. Rubach 2002 and references therein).

PSl. *y > l'/ Clab ___

Yod stenghtens to a palatal liquid after (unpalatalizable) labials, elsewhere (= after non-labials) it produces regular palatalization.

Initial Labial + Yod:
PSl *bjudo/bjudъ . dish > OCS bl.ud/bl.udъ, Po bluda, Ru bl.udo
PSl *pjujơ . I spit > OCS plujõ, Sn plújem, Po pluje, Cz pliju, Bu pl'uja.
(Kristó & Scheer 2005)

Note that the authors' claim that labials are unpalatalizable in Slavic does not match phonetics of Russian labials. In this respect, Russian is in sharp contrast with Latin, a language in which labials could not be palatalized (see below). There are abundant examples of secondary articulation in Russian labials, such as:

(13)	b'is	'an encore'	b'es	'demon'
	m'il	'nice' (Attrib.)	m'el	'chalk'
	p'il	'was drinking'	p'el	'was singing'
	sv'iter	'a sweater'	v'et'er	'wind'
	f'int	'a sly trick'	f'en'a	'cronyism'

Further evidence comes from Padgett (2001). This author characterizes the /b'/ vs. /b/ contrast as a 'palatalized' vs. 'velarized' contrast. His argument is based on an experimental study comparing [b] and [b'], [d] and [d'] in speakers of (Moscow) Russian vs. corresponding phones in Donegal (Northern Irish). The experiment focused on the contrast between palatalization and velarization. In particular, Padgett has taken formant measures of the /i/ following relevant labials and dentals, measures that served as acoustic cues to the 'palatalized'/'velarized' contrast.[4] Then, an analysis of variance (ANOVA) measures has been performed on these measures. The results are given in table 3.

Subject	**Russian 1**	**Russian 2**	**Russian 3**	**Irish 1**	**Irish 2**	**Irish 3**
b vs. b'	826 Hz	1189 Hz	1009 Hz	1061 Hz	1842 Hz	1395 Hz
d vs. d'	238 Hz	390 Hz	532 Hz	263 Hz	257 Hz	136 Hz
Result	F(1.32) =161 p<0.001	F(1.32) =529 p<0.001	F(1.32) =249 p<0.001	F(1.16) =218 P< 0.001	F(1.32) =249 p<0.001	F(1.24) =694 P<0.001

Table 3. Results of ANOVA for F2' means of [b]-type vs. [d]-type sounds across 3 Russian and 3 Irish speakers

It is clear from table 3 that for every subject, the difference between the F2' means was much larger following the bilabial consonant, an interaction (velarized/palatalized versus consonant type) that is highly significant. This conclusion provides empirical support for the claim that Russian labials can be palatalized. Phonetically, they are even more palatalizable than dentals knowing that some phonetic properties are not categorical.

[4] F2' at the end-point of a consonant is the major acoustic cue to velarization/palatalization. It is computed with the formula: F2'=F2+0.5(F3-F2)((F2-F1)(F3-F1)).

Since labials are palatalizable in Russian, it is not true, synchronically speaking, that /j/ strengthens into [l'] because it cannot palatalize the preceding labial. The labials, as it has just been seen, palatalize very well. Thus, all types of labial consonants preceding /l'/ in the onset were historically palatalized in Russian, as in [b'l'udo] ('dish'), [p'l'uju] ('I spit') and [lov'l'u] ('I catch'). This pronunciation was prescribed as Standard Russian pronunciation in phonetic textbooks until quite recently (Avanesov 1972 is a good example). It is nowadays a signal that Russian speakers whose speech exhibits palatalized labials in this type of clusters belong to the oldest living generation of Muscovites. This fact implies that Kristo & Scheer's proposal might not be valid synchronically and is probably at least incomplete historically.

In fact, the motivation underpinning their claim may have been the existence of a widely known historical pattern of sound change in which the labials are unpalatalizable, the yod remains and Coda Mirror-induced fortition effectively takes place. Such is, *inter alia*, the formation of French [saš]. It resulted from Latin [sabja-], with the yod obstruentized and [b] ultimately deleted in the coda by lenition (or, for many, lenition targeting an unlicenced C position):

(14)

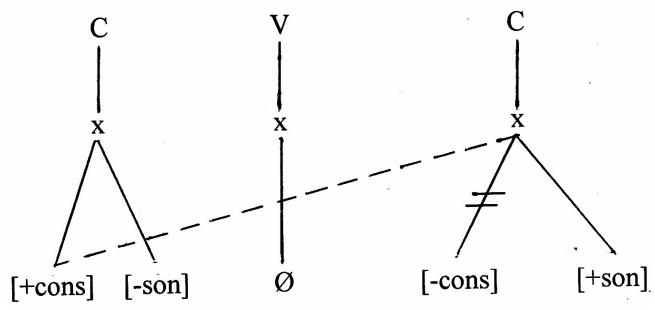
Such sound change observed in many Romance languages (Kaisse 1992, Rankin 1981) typically leads to an obstruent, not to a liquid. Note that in this historical pattern, the coda consonant, which is effectively unpalatalizable as far as Latin is concerned, is lenited to zero. By contrast, the labial in the relevant Russian clusters is never lenited. This fact indicates that the labial is in the onset, not in the coda, and that, in this case, the processes in action are not the same for Russian and for Latin.

Lastly, the authors argue that /j/ strengthens in [l'] because of its syllabic affiliation to the onset, in a way we would then have a mere instance of a positionally-conditioned fortition. It is important to see however, that fortition may not be the operative factor here: explaining our data by fortition is inadequate to account for the phonetic identity of the output, i.e. of the [l']. Nothing in fortition-based approaches explains us why we get precisely a palatalized lateral alveolar liquid.

4.4. A feature-geometrical account

My own solution to these problems is couched in feature-geometrical terms: [l'] results from a rightward spread of the [+consonantal] feature of /b/ onto the palatal glide following the empty nucleus, the [-consonantal] feature of the glide being delinked:

(15)



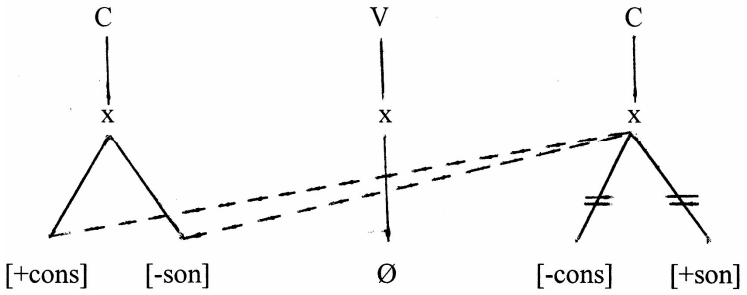
All other features in [j] are maintained, in particular the feature [+sonorant] and the feature [+continuant] of the second consonant. The non-delinking of these two features explains why what we get at the output is not a rhotic.

Feature geometry may provide a uniform account for this type of alternation and the Romance sound change mentioned above. The advantage of this approach is that the obstruentization pattern, like the pattern in (14), can be accounted for using the means of feature-linking/delinking. This is shown in (16). We thus get a unified account for both types of alternations.

(Resort to geometry is dictated by the consideration that in the element theory proper to principle-based frameworks apparently it would have been difficult to offer a complete solution. To operate on the glide with elements, C-to-C relations need to be established, which would explain how the position of /j/ is affected structurally.)

We can therefore conclude that the sequence [bl'] in [l'ubl'u] cannot be interpreted as a complex segment. In the Present forms, [l'] results from /j/ following a labial, as opposed to the Infinitive. The input for [l'ubl'u] being actually /l'ub+i+u/ derived from the root /l'ub/, [bl'] corresponds to an underlying labial-vowel sequence. Thus, a surface cluster that seems to be a realization of a complex segment may well match a genuine cluster in the underlying representation in Russian.

(16)



5. A phonetic case for the Complex Segment Hypothesis

5.1. Compression

Some important phonetic phenomena also point to the validity of the CSH. One of these is compression. Roughly speaking, compression is a shortening in the duration of segments occurring in a given phonetic domain.

Assuming that part of phonological operations should be controlled at the phonetic level, CSH may be tested phonetically. It would in this case predict that compression of consonant clusters would be observed in the onsets, a statement subject to experimental verification.

Hirst & Bouzon (2005), an experimental study of compression as a function of the number of segments in prosodic units, revealed an effect of compression on the levels of the Narrow Rhythmic Unit (NRU), a prosodic unit proposed in Jassem (1952), of the F(oot) and of the Intonational Unit (IU). They found that compression of consonants is successively increasing in the prosodic units from the IU to the F and then to the NRU. Remarkably, no compression was found on the syllable level. These results complement those of J. Allen *et al.* (1987).

In this section, I will present a study of compression *inside* the syllable domain, namely compression in the onset. As a first approximation, our experimental hypothesis is that the more segments occur in an onset, the shorter the duration of each segment in this position.

5.2. Materials

The experiment was carried out on the speech database Aix-MARSEC (Auran *et al.* 2004). The Aix-MARSEC database originally comes from a collection of BBC recordings in British English dating back to the 1980s. It contains approximately five hours and thirty minutes of speech produced by 53 speakers, 17 men and 36 women, in eleven speech styles, from news to poetical recitation. An important feature of the Aix-MARSEC database is that all speech samples are audience-oriented, i.e. produced with the intention of communicating with an audience (by contrast with the laboratory speech corpora, in which speech is not produced with a communicative intention).

Besides recordings, the database contains a broad phonetic transcription in SAMPA aligned with the signal and prosodic category labels, and other material.

5.3. Methods

The Aix-MARSEC database contains 37 speech characteristics organized in columns. The speech characteristics we are interested in are onsets, *phonetically identified* segments, the number of segments in an onset, and the z-scores of these segments.

The z-scores are the normalized durations of segments calculated using the formula:

(15) $$z\text{-}scores(i,p) = \frac{d(p_i) - M(d(p_k))}{SD(d(p_i))}$$

where i is the instance of the segment p, d is the duration of a segment p, M is the mean of durations of the segment p for all of its instances i, $k=1,2,\ldots,n$, n is the number of instances of p, and SD is standard deviation.

5.4. Results

Three sample groups with onsets were considered: one-, two- and three-member onsets. The number of members is designated by *npc* (npc = 1, 2, 3 respectively). The *npc* factor ('npc' refers to 'number (of members) per constituent') has three levels: 1, 2 and 3 that correspond to the number of phonemes in a syllable constituent. Mean z-scores (mean *zp*) were calculated for these three samples as shown in table 4.

npc	1	2	3
mean zp	-0.136297	-0.2742007	-0.193786

Table 4.The mean z-scores ('zp') of consonants in onsets as a function of the number of consonants ('npc') in the onsets

The results given in table 4 show that the mean normalized durations are different and vary with the 'npc' factor, which suggests the following compression hypothesis:

(16) *The 'npc' factor has a significant effect on the mean values of the variable 'zp' in British English speech.*

Note that this statement makes a general prediction for (British) English

An ANOVA was carried out with the statistical software R (Windows NT). The results were very significant: $F(2, 70463) = 100.85$, $p < 2.2\ e\ (-16)$.

5.5. Discussion

In the above experiment, $F = 100.85$ and p is extremely low. This result suggests with a very high probability that the null hypothesis that the means are equal must be rejected. The *npc* factor has an extremely significant effect on the means of the *zp* variable. In other words, this test lends compelling support to the hypothesis that at least one of these three means is different from the others. The duration of consonants in the onset position is shorter for onsets with two or three consonants than for onsets with one consonant.

The relevant phonological interpretation might well be that, in CVCV, the same space is allotted to clusters as to single segments, i.e. segmental sequences of consonants attach to only one C position. If present experimental results prove robust in further experiments, then these findings may be viewed as a phonetic corroboration of the complex segment hypothesis. However, further phonological formalization is needed in order to incorporate the phonetic observations above.

6. Conclusion

The morphological, phonological and phonetic investigation of the plausibility of the Complex Segment Hypothesis leads us to interesting conclusions relative to both phonology and phonetics.

Firstly, it was observed that the *labial+l'* sequences serve as a group to the left of which no consonant may licitly occur. This empirical observation bears out the predictions of the Complex Segment Hypothesis. In other word, this hypothesis is theoretically desirable and matches well with CVCV requirements on representations. On a practical level, however, at least some CL sequences have been shown not to be complex segments.

Secondly, there is clear phonetic evidence for compression in the onset in British English speech (*contra* Allen et al. 1987). I have shown that there is a shortening depending on the number of consonants in the onset. As for phonological value of the phonetic account, compression effect may be taken as an indication that clusters are attached to single non-

branching C positions. Surface consonant sequences occurring in onsets might well then be interpreted as complex segments in the underlying representation. It follows from this interpretation (if it is correct) that *mutæ cum liquidā* are items of the phonemic inventory of English.

Finally, a word of caution is due. Phonetic results presented in this paper might prove non-robust. Non-robustness depends in this case on several factors. These factors are mainly phonetic variation in the database, e.g. inter-speaker variation; sensitivity to sound context; phonotactic restrictions on *sCC* sequences. Further experiments are currently in preparation to control these factors closely.

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Alexandre L. Vaxman
Laboratoire Parole et Langage (LPL)
Equipe Prosodie et Représentation Formelle du Langage
UMR 6057 CNRS, Université de Provence
alexandre.vaxman@uconn.edu
alvaxman@yahoo.com

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The Negation of Action Sentences

Are there Negative Events?

Stéphanie Weiser

Events have three properties: they have causes and effects, they need a time and space zone and they can happen. In his work, Davidson (1967, 1969) argues that events are necessary to provide a logical form for action sentences. We can then ask what happens when action sentences are negated: do they still refer to events? Native speakers often have the feeling that, when an action sentence is negated, it means that it refers to something that did not happened. Is it possible that an action sentence could describe something that is not happening? Or is it possible that a negative sentence could represent an action sentence and could therefore refer to an event?

1. *Introduction*

Various entities, such as events, states and facts, exist in language as they do in the world. An ontology of such entities needs to be established in order to be used in NLP applications, such as machine translation, natural language understanding or generation, as well as in more theoretical semantic work. Since Davidson (1967, 1969), it is accepted that events are necessary to provide a logical form for action sentences. We can ask what happens when action sentences are negated: do they still refer to events? Native speakers often have the feeling that, when an action sentence is negated, it means that nothing happened. Is it possible that an action sentence could describe something that did not happen? Or is it possible that a negative sentence could represent an action sentence and could therefore refer to an event? The first section of this paper will present a few definitions of abstract entities and a presentation of Davidson's and Parsons' (1990) respective work on events. The second section will concentrate on negation: what happens when an action sentence is negative, does it have a standard logical form? What happens when this logical form does not represent the actual sentence? The last, and most important, section presents a classification of the various cases where the logical form of negative action sentences is not as one might expect.

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2. Abstract Entities

2.1. Useful Definitions

According to Parsons' ontology, there are three main types of entity: events, states and facts. On one hand we have events and states, which are eventualities (along with processes) and on the other hand we have facts, which are propositional. Events have three properties: they have a spatio-temporal localisation, they have causes and effects, and they can happen, or culminate. States also last for a certain period of time but do not have a culmination point. Lastly, facts are propositional and have the property of always being true.

2.2. Davidson's representation of action sentences

Davidson's work has been very influential in the field of philosophy of language. He suggested that the logical form of a sentence needs to include enough information to be consistent. From Davidson's point of view, every action verb has an argument position reserved for an event. This event is necessary to build the logical form, in which it needs to be existentially quantified.

(1) Brutus stabbed Caesar

Ignoring verb tense, this sentence would have the following logical form:

(2) ∃e stab (Brutus, Caesar, e)

For the first time, the original sentence does not appear in the logical form.

2.3. Parsons' logical form

The logical form suggested by Parsons is a lot more detailed than Davidson's. It is a paraphrase: there is an event about which we can say as many things as we want.

(3) Brutus stabbed Caesar

(4) For some event e, e is a stabbing, and the agent of e is Brutus, and the object of e is Caesar, and e culminated at some time in the past.

In Parsons' theory, verbs are similar to nouns: each common noun refers to a kind of object (and not to a particular object) and each verb refers to a kind of action or state. Parsons' logical form has an advantage: it makes predictions possible. For example, from Parsons' logical form, it is possible to predict *Mary runs* from *Mary runs slowly.* Parsons' and Davidson's founding works have been very influential and they have formed the base for all further work on event representation. Davidson's representation has been adopted here because it was more convenient for this work but we should not forget that Parsons' view could be considered more complete and, therefore, his ontology has been used.

3. Negation of action sentences

3.1. Expected Logical Form

According to Davidson's representation, the logical form of a standard action sentence begins with ∃e, we might expect the logical form of a negated action sentence to start with ¬∃e.

(5) Paul laughed

Ignoring verb tense, a sentence like this one would have a logical form like:

(6) ∃e laugh(Paul, e)

For negative sentences, it would work as follow:

(7) Paul did not laugh

(8) ¬∃e laugh(Paul, e)

This logical form works with more complicated examples as well, like:

(9) John won the chess game

(10) He did not win the chess game.

But it is incompatible with a number of properties of negated sentences.

3.2. Objection to this Logical Form

Following the expected logical form, negative sentences never refer to events. But after studying negated sentences, it was found that they can have the same properties as positive action sentences. This is why we can not accept the expected logical form every time. The three properties which typify events can also be found in some negated action sentences. These negated action sentences can have causes and effects.

(11) John fell out of the tree because [he did not go to school]

In this sentence, *he did not go to school* can be understood as the cause of the first part *John fell out of the tree*. We could object to this argument by poitning out that even if *because* is a linguistic mark of causality, it does not necessarily imply a causal relation in the world. But here, we can assume that *if John had gone to school, he would not have been in a tree.* Negative sentences can also describe something that happens:

(12) John did not come to school, it happened yesterday.

Finally, they may express a location in time and space:

(13) Yesterday, John did not go to school.

We have thus seen that a single negative action sentence *John did not go to school*, may possess the three properties of events that we exposed earlier. This provides a basis on which to reject the standard logical form of negative sentences, in which events do not exist.

4. Classification

Departing from the work on events and/or negation by De Swart and Molendijk (1999), Przepiórkowski (1999), Amsili & Le Draoulec (1998) or Cooper, an attempt has been made to identify which negated action sentences could not be given the expected logical form. After studying these sentences, they have been classified into four classes, which are presented here. Many of the examples used come from Przepiórkowski (1999) but they are not necessarily his own.

4.1. Factual Discourse Referent

It is a general assumption that the pronoun *it* may be used to refer to an event. This assumption is validated by the fact that *it* can be placed in an event container (a predicative context subcategorising an event in argument position):

(14) [John did not stop at the gas station], it happened yesterday.

We could then assume that *John did not stop at the gas station* involves an event. But is it still clear in the following example?

(15) [John did not stop at the gas station], it surprised Mary.

It is not certain that the verb *surprise* requires an event subject.

(16) The color of the car surprised Mary.

In this sentence, it is obvious that *the color of the car* does not correspond to an event but it may be factual, propositional. We can make the same observation for other sentences:

(17) John did not kiss Mary, which made her angry.

John did not kiss Mary may not refer to an event since it can not be placed in an event container:

(18) *John did not kiss Mary, it happened yesterday.

The situation is the same in sentences with durative complements:

(19) After John did not arrive on the 10 o'clock train, Eva left the train station.

These sentences do not refer to events, but to facts, to situations which can be perceived.

4.2. Positive Equivalent Sentences

It is commonly assumed that when a perception verb is followed by an infinitive, it refers to an event. This would then be the case in Higginbotham's (1983) famous example :

(20) I saw John not stop at the red light.

But these sentences are rare and often unnatural:

(21) ?I saw Mary not knit.

It may be suggested that this kind of negative sentence is natural when there is an equivalent positive sentence. Instead of *I saw John not stop at the red light*, we could easily say *I saw John cross the road*. It is more difficult to find a matching positive sentence for *not knit*. *Not close* would correspond to *leave open*, *not give* to *keep*, and so on. We observe that the negative sentences which have a positive equivalent can be placed in an event container:

(22) What happened is that John did not stop at the red light.

It is more difficult for the sentences that do not have this equivalent:

(23) *What happened is that Mary did not knit.

Negative sentences with a positive equivalent may also have causes and effects, which is not the case for the other sentences:

(24) John had an accident because he did not stop at the red light.

It is hard to find a sentence in which *Mary did not knit* would have a cause or consequence. It may therefore be concluded that when a negative sentence has a positive equivalent sentence, the latter refers to a standard - positive - event. The problem is that the speaker's intuition is necessary to identify these sentences, which makes them hard to process automatically.

4.3. Temporal Quantification

(25) Often, John has not paid his taxes.

Sentences like this one seem to refer to an event and reveal the breaking of a habit: *usually, John does pay his taxes, we expect him to do so*. But it is hard to establish the logical form corresponding.

(26) ¬ often (∃e pay (John, taxes, e))

(27) often (∃e¬pay (John, taxes, e))

In the first logical form proposed here, the negation has a wide scope: *there are not a lot of occasions where John pays his taxes*. But in this logical form there seems to be an event of *John paying his taxes*. In the second logical form, it is the adverb that has a wide scope but we can

understand it as *often, there is an event such as John is not paying his taxes*. We need to account for the relations between temporal adverbs and negation. To understand that the sentence refers to the breaking of a habit, we often need the context:

(28) Mary did not turn off the stove.

In this example (Partee), it does not mean that *she never did it*. It could mean that *she did not the last time she left the kitchen*: *there is no event of Mary turning off the stove for a certain period of time*. We can make similar observations with cardinal adverbs:

(29) Twice, he did not laugh

Does *twice* mean that there are two events or two periods of time? I noticed that there is no good logical form for this kind of sentence. The need seems apparent for a theory accounting for the interaction between time, aspect and negation. De Swart (1996) tried to establish such a theory but it is very complicated and will not be explored here.

4.4. Negative Substantive

(30) The non-explosion - the invalidation

These words (from Higginbotham 1983) are negative substantives and may be the closest thing to negative events. They do not involve a phrasal negation, but a noun that is negated. This noun could refer to an event, since it can be placed in an event container:

(31) The non-explosion of the gases happened yesterday in public.

This sentence could seem unnatural but it is not so hard to find a context in which it is not:

(32) The chemists try to mix two gases but they explode every time. Yesterday the non-explosion of the gases happened after all.

This morphological negation is restrained: it is *the non-explosion* and not *the no-explosion*, *invalidation* and not *devalidation* and so on. The discourse referent of this kind of sentence is thus an event. There is no problem with regards to logical form since the negation is included in the noun, the logical form can start with $\exists$e. The only thing to keep in mind is that not all the verbs have equivalent negative substantives, so this can not be generalized.

4.5. Summary

The cases in which the logical form of a negative action sentence is not the expected form ($\neg\exists$e) have been classified into four classes. Firstly, a negative action sentence can provide a factual discourse referent instead of an event. For the sentence *John did not arrive, it surprised Mary*, to be consistent, the first proposition *John did not arrive* needs to be true. If we can say of a sentence that it is true, then it means that it refers to a fact. Here, the pronoun *it* refers to a fact

and not to an event. This fact is expressed by the negative sentence. Secondly, some negative sentences can be understood thanks to their positive equivalent action sentence: we refer to a standard, positive event but we express it with a negative sentence. When we say *Paul did not stop at the red light*, we picture *him driving across the intersection*, and this is clearly an event. Thirdly, when there is a quantification over time, it is hard to establish a correct logical form. We need a new theory accounting for the interactions between time, aspect and negation. This theory could handle sentences like *Often, he has not paid his taxes.* Last, when the negation is morphological and concerning the noun, the discourse referent which is made available is an event but the sentence is not negative. There is no problem with the standard logical form $\exists$e.

5. *Conclusion*

In order to improve on this work, one of the first steps would be to try to establish a complete theory of the interaction between tense, aspect and negation. It would be interesting to study more carefully the notion of event containers and what happens when there is a negation in such a container. This work could be useful in NLP applications such as text generation and machine translation. It could be enlarged to other entities and maybe integrated in DRT. It is naturally assumed that negation is posterior to affirmation. But a psycho-linguistic study showed that negative sentences do not take more time to be produced than positive ones. It could therefore be suggested that negation is not an operator but that it is at the same level as positive productions. Another lead to follow is the effect of neg-raising, which has been mentioned by Horn. In some sentences, the negation may not be informative but purely pragmatic, which explains why it may be moved by a neg-raising phenomenon. A similar idea, that of the positive equivalent sentence, has been evoked here, but it may be applied to temporal quantification as well: *Mary usually turns off the stove, but not this time...* It can therefore be concluded that the logical form of negated sentences is $\neg\exists$e except in some cases, which are very disparate.

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Stéphanie Weiser University Paris X Nanterre - Laboratoire MoDyCo *sweiser@u-paris10.fr*

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