

## Replicative Processes in Grammar

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# Preface:

## What are replicative processes?

Johannes Hein, Andrew Murphy, Ludger Paschen & Joanna Zaleska\*

### 1. Introduction

The present volume investigates replicative processes in language. Intuitively, we can conceive of replication as a kind of copying, with varying degrees of abstractness of the information that is reproduced. For the purposes of this volume, we identify three different kinds of replicative processes. First, there are replicative processes that affect entire ‘linguistic objects’ in the relevant domain, that is, (lexical or functional) categories in syntax, segments in phonology and morphemes in morphology. Second, replicative processes can affect more abstract objects, namely features, be they morphosyntactic or phonological. Finally, there is replication of even more abstract material such as relations, requirements or functions. As shown in figure 1, these processes fall on a scale of abstractness with regard to the material affected.

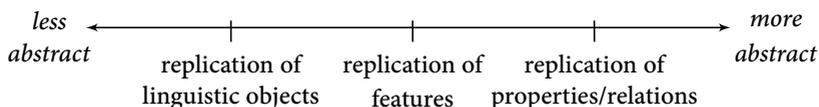


Figure 1: Degrees of replication in natural language

Concrete examples of each of these replication types will be discussed in what follows. However, while the present volume discusses numerous examples

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of replicative processes in the languages of the world, replication is also a ubiquitous phenomenon in many other natural systems, apart from language.

## 2. Replication in non-linguistic natural systems

In addition to linguistics, replication plays an important role in a number of other scientific fields, including biology, chemistry, computer science, (nano)engineering, mathematics, and sociology/anthropology. What is mainly of interest there is what is termed *self-replication*, the property of a system to use some process to create a copy of itself or part of itself. The most prominent example of this is the replication of the deoxyribonucleic acid (DNA) in the cell's nucleus during mitosis. DNA is made up of two complementary strands each consisting of a phosphate backbone chain with a sequence of four different types of bases pointing inwards. The bases are matched with those of the other strand where adenine pairs with thymine and guanine pairs with cytosine. Replication is achieved by splitting the two strands and synthesizing the missing complementary bases for each one of them thereby creating two complete copies of the original DNA. Thus, each strand encodes information about and serves as a template for replicating its respective complementary strand (figure 2).

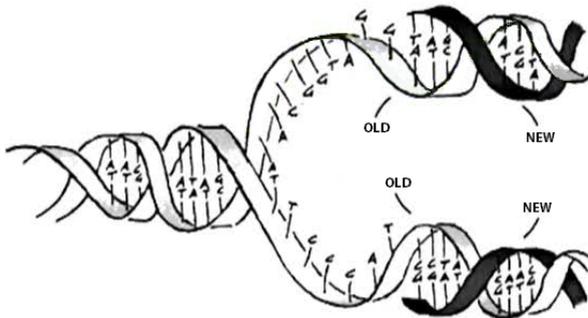


Figure 2: Replication of DNA<sup>1</sup>

Some less well-known examples include self-replicating molecular systems (chemistry), quines, i.e. self-replicating computer programs (computer science), or setisets (mathematics).

<sup>1</sup>Modified: [https://s3.amazonaws.com/ck12bg.ck12.org/curriculum/107576/thumb\\_540\\_50.jpg](https://s3.amazonaws.com/ck12bg.ck12.org/curriculum/107576/thumb_540_50.jpg)

A self-replicating molecular system is a chemical reaction that catalyses itself (auto catalysis). For example, condensation of the aldehyde **1** and the amine **2** yields the Schiff base **3** which by means of electro-magnetic interaction arranges still available molecules of **1** and **2** such that their positioning facilitates the formation of a bond between them (figure 3).

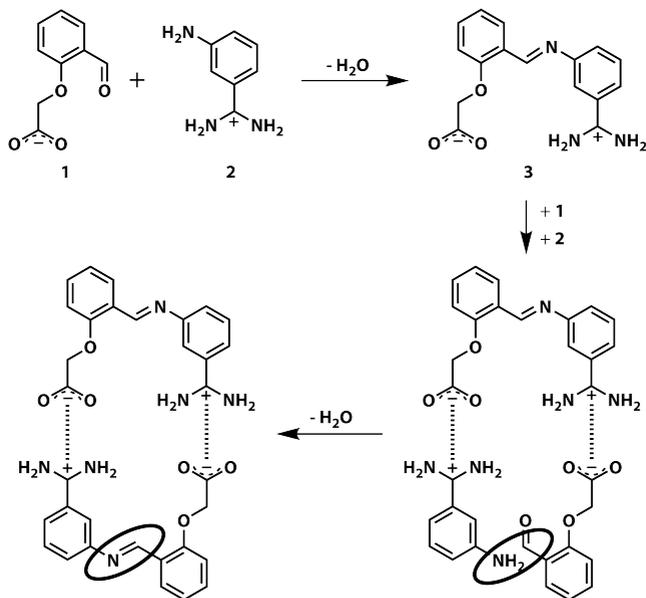


Figure 3: A self-replicating molecular system

A self-replicating computer program, known as a 'quine', is one whose only function is to output its own code upon execution. An example of such a program, formulated in Python, is given in (1).

- (1) *Python 2 code for a quine*<sup>2</sup>  
`a="a=%c%s%c;print a%(34,a,34)";print a%(34,a,34)`

The print command in (1) tells python to display the value of the previously defined variable called a, replacing the so-called *format codes* (which always begin with the % operator) with the values provided in brackets. Here, the value of a is a string which contains a mixture of ordinary text and three format

<sup>2</sup>From [https://de.wikipedia.org/wiki/Quine\\_\(Computerprogramm\)](https://de.wikipedia.org/wiki/Quine_(Computerprogramm)), accessed 15.03.2016

codes, %c, %s and another %c,<sup>3</sup> which have to be replaced with 34, a and 34, respectively. The %c code can be replaced by a single character corresponding to the ASCII code provided. Here, this results in %c being replaced with the double quotation mark " (ASCII code 34). The %s code converts the value it has been assigned (a in (1)) into a string. Here, this will result in a=%c%s%c; print a%%(34, a, 34) being displayed (with no replacements, since the format codes are now treated as ordinary strings). With this explanation in place, the readers should be able to check by themselves that executing print a%(34, a, 34) results in the entire string given in (1) being displayed.

In mathematics, self-replication can be found in geometry in so-called self-tiling tile sets, or 'setisets' for short. These are sets of  $n$  shapes that can be put together in  $n$  different ways to form larger copies of themselves. An example of a perfect setiset of order four, one in which each of the four shapes is different from the others, is given in (2).

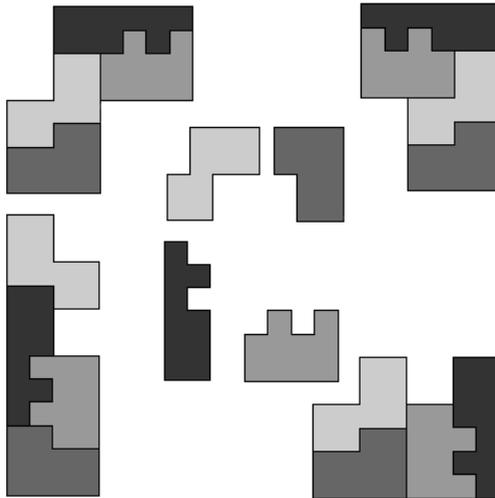


Figure 4: A perfect self-tiling tile set of order 4<sup>4</sup>

<sup>3</sup>The repeated percent sign simply indicates that the symbol is not to be treated as an operator, but rather as the % character; this is equivalent to writing \% in L<sup>A</sup>T<sub>E</sub>X to print the percent character.

<sup>4</sup>Modified from [http://www.leesallows.com/files/stts%20order-4\(16\).png](http://www.leesallows.com/files/stts%20order-4(16).png) under the Creative Commons license.

What sets these examples apart from linguistic replication is that they do not involve replication of particularly abstract material. As figure 1 shows, replicative processes in language affect linguistic elements of varying degrees of abstractness. In the following sections, we discuss examples of each.

### 3. Replication of linguistic objects

#### 3.1. Phonology

Overt replication in phonology comprises a number of mostly local processes in which segments are copied or split to satisfy some higher structural constraint. An example of copying can be found in Selayarese, an Austronesian language spoken on the island of Selayar in Indonesia, where certain segments, such as [r], [l] or [s], are not allowed in the syllable coda. To salvage these consonants, Selayarese resorts to echo epenthesis. As shown in (2), the inserted vowel is an identical copy of the last vowel of the stem.

- (2) *Echo epenthesis in Selayarese (Mithun & Basri 1986: 238)*
- |             |          |                     |          |
|-------------|----------|---------------------|----------|
| [ˈlambere]  | ‘long’   | cf. [lamˈber-aŋ]    | ‘longer’ |
| [ˈluara]    | ‘wide’   | cf. [luˈar-aŋ]      | ‘wider’  |
| [aʔˈbotoro] | ‘gamble’ | cf. [paʔˈboˈtor-aŋ] | ‘casino’ |

Another phonological process that could arguably be analysed as segmental copying is gemination. The process can be illustrated with the so-called *raddoppiamento fonosintattico*, a well-known sandhi phenomenon found in Central and Southern Italy, whereby word-initial consonants are lengthened after words that end in a stressed open syllable (as well as after a limited set of functional words), as shown in (3). It must be said, however, that the result of *raddoppiamento fonosintattico* is a long, rather than rearticulated, consonant, and that the process is usually viewed as an addition of a weight unit, rather than as copying.

- (3) *Raddoppiamento sintattico in Italian (Loporcaro 1997)*
- |              |                  |                  |
|--------------|------------------|------------------|
| farò bene    | [farɔbˈbene]     | ‘I will do well’ |
| cf. bene     | [ˈbene]          | ‘well’           |
| città triste | [tʃittatˈtriste] | ‘sad city’       |
| cf. triste   | [ˈtriste]        | ‘sad’            |
| però mangia  | [perɔmˈmandʒa]   | ‘but eat’        |
| cf. mangia   | [ˈmandʒa]        | ‘eat’            |

A different phonological phenomenon that could be seen as replication is the creation of glide-vowel sequences to resolve vowel hiatus. In Faroese, a sequence of two vowels is only allowed when both vowels are non-high. When this is not the case, the sequence is repaired by epenthesis of a glide homorganic with one of the high vowels, as illustrated in (4). One way to analyse this is to say that the high vowel splits into two featurally identical segments. The ‘copy’ of the segment that occupies the onset position is realized as a glide homorganic with the adjacent high vowel.

- (4) *Glide insertion next to high vowels in Faroese (Staroverov 2014)*
- |          |          |                 |                |             |
|----------|----------|-----------------|----------------|-------------|
| /si:-ʊr/ | [si:jʊr] | ‘custom’ (nom.) | cf. [si:lɛsʊr] | ‘immoral’   |
| /su:-ʊr/ | [su:wʊr] | ‘south’ (nom.)  | cf. [su:rɪ]    | ‘southerly’ |
| /kle:i/  | [kle:ji] | ‘pleasure’      | cf. [kle:a]    | ‘please’    |

### 3.2. Morphology

The most obvious case of replication of linguistic objects in morphology is reduplication. Reduplication denotes a process whereby a phonological copy of material already present in a base form expresses some morphosyntactic property of that form. Thus, in Indonesian, plurality is expressed by copying the whole base of a noun (5).

- (5) *Full reduplication in Indonesian plurals (Sneddon 1996: 17f.)*
- |           |                |                     |                 |
|-----------|----------------|---------------------|-----------------|
| rumah     | ‘house’        | rumah-rumah         | ‘houses’        |
| singkatan | ‘abbreviation’ | singkatan-singkatan | ‘abbreviations’ |
| perubahan | ‘change’       | perubahan-perubahan | ‘changes’       |

Reduplication can be full, as in the above example, or partial. In the latter case, only a part of the base form is repeated. In Hebrew, for example, diminution of adjectives is expressed by copying only the last three segments of the base (6).

- (6) *Partial reduplication in Hebrew diminution (Levkovych 2007)*
- |        |          |            |             |
|--------|----------|------------|-------------|
| tsahov | ‘yellow’ | tsahav-hav | ‘yellowish’ |
| matok  | ‘sweet’  | metak-tak  | ‘sweetish’  |
| katan  | ‘small’  | katan-tan  | ‘tiny’      |

Furthermore, reduplication may affect different parts of speech such as nouns (5) and adjectives (6), but also verbs (7).

- (7) *Partial reduplication in Yaqui habitual (Harley & Amarillas 2003: 9)*
- |        |            |             |                         |
|--------|------------|-------------|-------------------------|
| chakte | 'to drip'  | chak-chakte | 'to drip (habitually)'  |
| kitte  | 'to knead' | kit-kitte   | 'to knead (habitually)' |
| atbwa  | 'to laugh' | at-atbwa    | 'to laugh (habitually)' |

It occurs in inflectional and derivational morphology and may denote a range of meanings including intensity, plurality, distributivity, attenuation, tense, aspect, case, and indefiniteness (cf. Rubino 2013).

Although reduplication usually replicates overt material of the base there may be discrepancies between base and reduplicant. An example is provided by Kikuyu diminution where a high tone in the base is not replicated (8).

- (8) *Toneless reduplication in Kikuyu diminution (Peng 1993: 18)*
- |      |            |           |                     |
|------|------------|-----------|---------------------|
| irá  | 'to scorn' | ira-irá   | 'to scorn a little' |
| ciná | 'to burn'  | cina-ciná | 'to burn a little'  |
| korá | 'to grow'  | kora-korá | 'to grow a little'  |

Interestingly, there may also be differences between base and reduplicant with respect to phonological processes. Thus, a process that usually applies in the base may fail to do so in the reduplicant, a case of underapplication. A process that does not apply in the base (or only applies in a restricted fashion) may nonetheless apply in the reduplicant, a case of overapplication. An illustration of the latter is provided by so-called backcopying of Nasal Spread in Malay (McCarthy & Prince 1995, Raimy 2000). In Malay, nasality iteratively spreads rightwards onto vowels from nasal segments (ʔ, h, w, y being transparent, oral consonants being opaque). In reduplicated forms, however, reduplicated vowels become nasalised even though they are not preceded by a nasal segment (marked in bold in (9)).

- (9) *Backcopying of Nasal Spread in Malay reduplicated forms*
- |        |                      |                          |
|--------|----------------------|--------------------------|
| /hamə/ | [hām̩- <b>hām̩</b> ] | 'germ/germs'             |
| /waŋi/ | [wāŋi- <b>wāŋi</b> ] | 'fragrant/(intensified)' |
| /aŋan/ | [āŋān- <b>āŋān</b> ] | 'reverie/ambition'       |
| /aŋen/ | [āŋēn- <b>āŋēn</b> ] | 'wind/unconfirmed news'  |

In those reduplicants, Nasal Spread has apparently applied in a different fashion, namely from right to left. Example (9) is therefore a case of overapplication in reduplication.

### 3.3. Syntax

Some of the most striking cases of replication in syntax take the form of ‘copying’ or ‘doubling’ constructions. One pertinent example that is discussed in this volume is predicate doubling such as (10).

- (10) *Predicate fronting* (Vicente 2009: 159, Landau 2006: 32)
- a. *Salir*, Juan ha *salido* con Maria  
 go.out.INF Juan has gone.out with Maria  
 ‘As for going out, Juan has gone out with Maria.’ (Spanish)
  - b. *Lirkod*, Gil lo *yirkod* baxayim  
 to.dance Gil not will.dance in.the.life  
 ‘As for dancing, Gil will never dance.’ (Hebrew)

In such examples, the verb appears in a fronted position with a lower copy also pronounced. Another example of this kind of replication is so-called ‘wh-copying’ (11). In these constructions, a wh-phrase appears in multiple positions in the clause.

- (11) *Wh-copying* (McDaniel 1986: 182, Fanselow & Mahajan 2000: 220)
- a. *Kas* misline *kas* o Demiri dikhlá?  
 who you.think who the Demiri saw  
 ‘Who do you think Demiri saw?’ (Romani)
  - b. *Wie* glaubst du, *wie* sie das gemacht hat?  
 how believe you, how she that done has  
 ‘How do you think she did that?’ (German)

There are also examples of doubling inside the DP, for example determiner doubling in Swiss German (12) and the so-called ‘construct state’ in Hebrew (13). In both cases, the determiner or definiteness marking is realized twice.

- (12) *Determiner doubling in Swiss German* (Barbiers 2008: 5)
- a. *ä ganz ä liebi* Frau  
 a really a lovely woman  
 ‘a really lovely woman’
  - b. *de vil de schöner* Garten  
 the much the nicer garden  
 ‘the much nicer garden’

- (13) 'Construct state' in Hebrew (Ritter 1988: 916, Danon 2008: 875)
- a. beyt *ha-mora ha-yafa*  
house the-teacher the-pretty  
'the pretty teacher's house'
  - b. *ha-tmunot ha-xadašot*  
the-pictures the-new  
'the new pictures'

These are some of the clearest cases of doubling, in which the form of the replicated material is consistent. There are, of course, other well-known cases of doubling, for example clitic left/right dislocation or resumption, however these arguably involve replication at the level of features. As with phonology and morphology, the distinction between replication of objects and features is not always clear-cut, since many analyses derive the former from the latter.

#### 4. Replication of linguistic features

##### 4.1. Phonology

Possibly the most obvious and convincing cases of featural replication in phonology are assimilation and harmony processes. An example of segmental assimilation comes again from Selayarese, where a stem-final nasal assimilates to a following consonant in reduplicated forms, as shown in (14). The nasal retains its manner of articulation but its place features become identical to those of the following segment. This can be analysed as spreading but also as copying of these features.

- (14) *Nasal place assimilation in Selayarese* (Mithun & Basri 1986: 245)
- |          |           |                |                |
|----------|-----------|----------------|----------------|
| [bambaŋ] | 'hot'     | [bambambambaŋ] | 'sort of hot'  |
| [dodoŋ]  | 'sick'    | [dodondodoŋ]   | 'sort of sick' |
| [jaŋaŋ]  | 'chicken' | [jaŋaŋjaŋaŋ]   | 'bird'         |

A similar analysis can be applied to cases of vowel harmony, where vowels in a certain domain are required to be identical in terms of some property, such as tongue position or lip rounding. One example can be found in Akan, a Kwa language of the Niger-Congo family, where the prefix vowels take on the [ $\pm$ ATR] ('Advanced Tongue Root') value from the initial vowel of the stem, as shown in (15).

(15) *[ATR] harmony in Akan (Dolphyne 1988: 15, Sampson Korsah p.c.)*

+ATR		-ATR	
[m̀ì-dí]	‘I eat’	[m̀ì-dì]	‘I am called’
[wú-dí]	‘you eat’	[wú-dì]	‘you are called’
[ò-dí]	‘s/he eats’	[(w)ò-dì]	‘s/he is called’
[jè-dí]	‘we eat’	[jè-dì]	‘we are called’

Finally, it could be argued that a process whereby one segment is split into two, both of which bear some properties of the original, is also a type of incomplete replication. Splitting, although less frequent than the phenomena discussed above, is nevertheless attested in a number of languages. One example is found in Slovene, where the palatal nasal /ɲ/ decomposes into the sequence [ɲj] before vowels, as shown in (16). Each of the resulting segments maintains some features of the original: [ɲ] retains the nasality of /ɲ/, whereas [j] retains its palatality.

(16) *Decomposition in Slovene (Rubach 2008: 171, Adrian Stegovec p.c.)*

[kɔɲ]	‘horse’ (masc.nom.sg.)	[kɔɲja]	‘horse’ (gen.sg.)
[sviɲ]	‘pig’ (fem.gen.pl.)	[sviɲja]	‘pig’ (nom.sg.)
[ɔgɔɲ]	‘fire’ (masc.nom.sg.)	[ɔgɔɲja]	‘fire’ (gen.sg.)

## 4.2. Morphology

Featural replication in morphology comprises what has been termed extended or multiple exponence (Matthews 1974) where a morphological feature is expressed by two or more separate exponents. A classic example is the double plural marking in Breton diminutives where two different markers *-ed* and *-ou* express the same single plural feature.

(17) *Breton plural marking (Matthews 1972, Stump 1989, Ortman 1999)*

labous ‘bird’	SG	PL
	labous	labous- <i>ed</i>
DIM	labous-ig	labous- <i>ed-ig-ou</i>

Caballero & Harris (2012) provide a decent typological overview of the phenomenon. The markers that show up in extended exponence may have distinct forms as in (17) (showing that this cannot be simple copying of a linguistic

object) or the same form as is the case, for instance, in extreme extended (‘exuberant’) exponence in Batsbi class markers (18).

- (18) *Batsbi exuberant exponence (Harris 2009)*  
*y-ox-y-o-y-anö*  
 CM-rip-CM-PRES-CM-EVID  
 ‘Evidently she ripped it (e.g. a dress).’

Furthermore, there is some variation with regard to the degree of redundancy of the additional exponent(s). In Breton and Batsbi, the markers express exactly the same features (i.e. plural in Breton and gender-number in Batsbi). Each of them is thus fully superfluous because the other marker sufficiently encodes the feature (Caballero & Harris 2012). Conversely, in Meskwaki (19), only the person prefix is redundant since the suffix encodes number additionally. Multiple exponence is thus only partly superfluous here.

- (19) *Meskwaki (Fox) person agreement (Dahlstrom 2000)*  
*ke-nowi:-pwa*  
 2-go.out-2.PL  
 ‘You (pl.) go out.’

An example of overlapping multiple exponence, where none of the markers involved can be left out without losing any information, is provided by the language Daga (20).

- (20) *Daga subject-number-person agreement (Murane 1974)*  
*kanda-nigas-ivin*  
 awaken-INTSV.1SG.SUBJ-PRES.CONT.1SG.SUBJ  
 ‘I am awakening.’

Independently of whether multiple exponence is analysed in a realizational or incremental framework (Stump 2001), one and the same morphosyntactic feature receives expression by more than one exponent on the surface and is therefore replicated in some manner.

#### 4.3. Syntax

The clearest cases of replication of syntactic features involve agreement and concord phenomena, in which some features of a nominal expression are

reflected on an agreeing element. In an overwhelming number of languages, the verb shows agreement for some  $\phi$ -features (person, number) with the subject (21), and sometimes also the object (22).

(21)  *$\phi$ -agreement with subject in Icelandic (Sigurðsson 1996: 6)*

a. Við lás-*um* bókina  
 we read-1PL the.book  
 ‘We read the books.’

b. Þið lás-*uð* bókina  
 you read-2PL the.book  
 ‘You read the book.’

(22)  *$\phi$ -agreement with subject and object (Preminger 2014: 19, Rude 1986: 126)*

a. rat x-*e'*-aw-ax-aj rje'  
 you COM-3PL.ABS-2SG.ERG-hear-ACT them  
 ‘You heard them.’ (Kaqchikel)

b. Háama-nm *pée'*-wi-ye wewúkiye-ne  
 man-ERG 3SUBJ/3OBJ-shoot-ASP elk-OBJ  
 ‘The man shot the elk.’ (Nez Perce)

Of course, the features that can be replicated are by no means restricted to  $\phi$ -features. Agreement can also target either gender (23) or noun class features (24) (in the latter case, both subject and object).

(23) *Gender agreement in Hindi (Bhatt & Walkow 2013: 954)*

Ve lar̥kiyā akhbaar paṛh-*tii* *thī*  
 those girl.F.PL newspaper.M read-HAB.F be.PST.F.PL  
 ‘Those girls used to read (a/the) newspaper.’

(24) *Noun class agreement in Chichewa (Mchombo 2004: 19)*

Mi-káango *i*-ku-zí-sák-a zi-gawénga  
 4-lions 4SUBJ-PRES-8OBJ-hunt-FV 8-terrorists  
 ‘The lions are hunting the terrorists.’

Furthermore, the class of agreeing elements extends beyond verbs. Many languages show  $\phi$ -agreement on the complementizer (e.g. Bavarian German, see Bayer 1984).

DP-internal agreement is often referred to as *concord*, rather than agreement. In example (25), both the definite determiner and the adjective (as well as the noun) show gender and number marking.

(25) *Nominal concord in Italian* (Corbett 2006: 9)

- a. i            nuov-i    quadr-i  
     DEF.M.PL new-M.PL picture(M)-PL  
     ‘the new pictures’
- b. la            nuov-a    tel-a  
     DEF.F.SG new-F.SG painting(F)-SG  
     ‘the new paintings’

Concord also exists outside the DP and with polarity features. One widely discussed example is *negative concord*, in which a polarity item in the scope of negation (e.g. *anything*) also shows replication of negative features (26).

(26) *Negative concord in Serbo-Croatian* (Progovac 1994: 40)

- Milan ne    vidi \*(n)-i-šta  
 Milan NEG sees    NEG-any-what  
 ‘Milan cannot see anything’

A less obvious case of replication of linguistic features involves resumption. In resumption, it is not the entire element that is replicated (as in wh-copying), but instead, a pronoun matching the  $\phi$ -features of the displaced element is realized in its base position.

(27) *Resumption in Akan and Irish* (Saah 1988: 19, McCloskey 2002: 189)

- a. Hena na wo-hu-u    no    wɔ    fie    hɔ?  
     who.M FOC 2SG-see-PST RP.3SG LOC house there  
     ‘Who did you see (him) in the house?’
- b. an ghirseach a-r            ghoid na síogaí í  
     the girl.F            COMP-PAST stole    the fairies RP.3SG.F  
     ‘The girl that the fairies stole (her)’

## 5. Replication of properties/relations

It is also possible for replication to target more abstract linguistic material than even features. There are a number of ‘sharing constructions’ in language, in which it seems that an item is associated or present in more than one position (e.g. ‘Across-The-Board’ (ATB) movement, free relatives, parasitic gaps and a number of ellipsis phenomena such as gapping and ‘Right Node Raising’). In ATB movement (28), for example, the wh-phrase *which book* seems to

simultaneously satisfy the subcategorization requirements of the verbs in both conjuncts. On the surface, it appears that the ability of the DP to act as an argument is replicated in these constructions.

- (28) *Across-the-Board movement* (Ross 1967, Williams 1978, de Vries to appear)  
Which book does Peter like \_\_\_ and Susan hate \_\_\_ ?

Furthermore, there are instances in which particular configurational requirements are replicated across a structure. One clear example of these are parallelism constraints. One prominent example comes from scope restrictions with VP ellipsis in English. In (29a), it is perfectly possible to have a wide scope reading of the universal quantifier *every teacher*, in which there are several boys and every teacher is admired by one. Interestingly, this reading is absent from (29b), which only has the narrow scope reading in which there is just one boy who admires every teacher.

- (29) *Scope restrictions on VP ellipsis* (Fox 2000: 30)

- a. A boy admires every teacher.  $(\exists > \forall) (\forall > \exists)$   
b. A boy admires every teacher. Mary does too.  $(\exists > \forall) (*\forall > \exists)$

Thus, it seems that the elided quantifier in (29b) blocks a wide scope interpretation. There are various ways one could account for this formally, but the basic intuition is that there is a ‘parallelism’ requirement on wide scope interpretations, that is, the scopal position of a quantifier must match between an ellipsis site and its antecedent. Since the universal quantifier cannot take wide scope in the ellipsis clause in (29b) (there is not another quantifier for it to scope over), this interpretation is exceptionally blocked in the antecedent clause. Interestingly, this restriction disappears once a quantifier is introduced into the second clause (Hirschbühler 1982, Fox 2000).

- (30) a. A boy admires every teacher. A girl does too.  $(\exists > \forall) (\forall > \exists)$   
b. A Canadian flag stood in front of every embassy, and an American flag did too.  $(\exists > \forall) (\forall > \exists)$

Thus, it appears that ellipsis constructions have a requirement that abstract linguistic properties such as scope relations are replicated across larger portions of structure, i.e. between the ellipsis site and the antecedent. Ellipsis has been

known to obey many more of these kinds of restrictions that constitute further examples of abstract replication (see e.g. Merchant 2001).

Furthermore, coordinate structures have been reported to also impose parallelism restrictions on their conjuncts. One pertinent example concerns ATB movement such as (28). In an ATB movement construction, there is a general requirement that the case assigned to the moved item in each conjunct must match (e.g. Borsley 1983, Dyła 1984, Citko 2005). In particular, Franks (1993, 1995) proposes an additional constraint on ATB movement that bans movement from ‘non-parallel’ positions (also see Kasai 2004). This is what rules out the example in (31), in which case matching is satisfied, but extraction is from non-parallel positions (subject vs. object).

(31) *Parallelism requirement on ATB (Franks 1995: 64)*

\*dziewczyna, której [Janek dał swoją marynarkę —<sub>DAT</sub>] a  
 girl who.DAT Janek gave his jacket and  
 mimo tego [—<sub>DAT</sub> było zimno]  
 despite this was cold  
 ‘the girl who Janek gave his jacket to but was still cold’

Furthermore, Citko (2006) shows that ATB extraction requires proper contrast between non-extracted elements in both conjuncts. The notion of contrast is also known to play an important role in ellipsis constructions such as (pseudo-)gapping (see e.g. Johnson 2014).

There are also a number of examples of replication in discourse. It is well-known that speakers in naturally occurring conversations systematically reproduce parts from previous turns. Replication in discourse is not restricted to a specific linguistic domain, and size and abstractness of the recycled material can vary considerably as well, ranging from subtle sub-segmental details (Schweitzer & Lewandowski 2014) to suprasegmental features (Szczepek Reed 2007) and from repetitions of lexical items (Button 1990) to copying of larger syntactic chunks (Du Bois 2014). In recent work, *accommodation* has been discussed extensively as an ubiquitous process by which speakers adapt their own way of speaking to that of their interlocutors (Siebenhaar 2006, 2012, Beňuš et al. 2011).

Furthermore, even before they are fully capable of reproducing segmental material, small children are known to imitate prosodic patterns early on when interacting with carers, as illustrated in figure 5. Wells (2010: 254) claims that in

line 21 of figure 5, the child is replicating the prosodic contour of the mother's previous utterance (line 20).

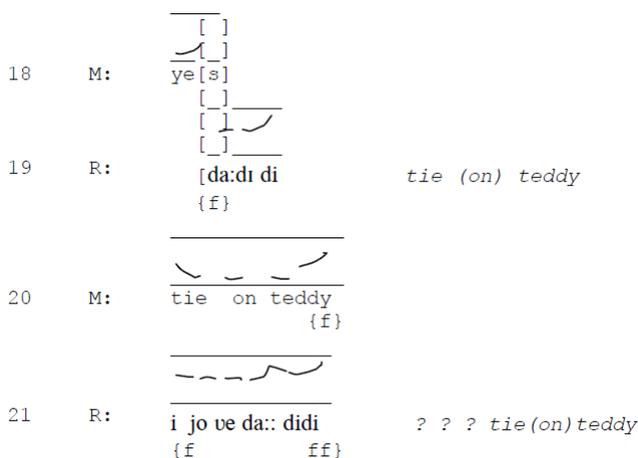


Figure 5: Tonal repetition in carer-child interaction (Wells 2010: 253)

In addition, various kinds of replication have been identified as crucial components in a number of interactional strategies (e.g. the case of other-repair as discussed in Schegloff 1987 and Wu 2009).

## 6. Contributions to this volume

The contributions to this volume address specific cases of replication in natural language that cover all points of the spectrum in figure 1. The papers address issues of replication of linguistic objects, features and properties respectively, and have been ordered accordingly.

The paper by **Zimmermann** offers an analysis of two copying processes in Kiranti languages triggered by certain affixes. In one of these, the final segment of an affix that precedes the triggering morpheme is copied. In the other one, it is the rhyme material (the nucleus and, if present, the coda) from the preceding affix that is copied. It is shown that the two processes receive a unified account under the assumption that the triggering affixes are underlyingly defective in the sense that they contain empty prosodic structure and if copying is viewed as segmental fission.

**Korsah** presents new data from Gã showing that negative polarity items (NPIs) corresponding to *any*-NPs in English are formed by reduplication of indefinites. However, he shows that the distribution for these elements in Gã is more restricted than their English counterparts. Two analyses are entertained and evaluated: one in which reduplication involves the valuation of a polarity feature on the indefinite, and another involving NEG-raising.

New data concerning verb doubling in Limbum are presented and discussed by **Becker and Nformi**. In particular, they discuss the close affinity between information structure and replication. They first provide convincing arguments that Limbum has two distinct focus positions in the clause and then go on to show how the various patterns of verb doubling in Limbum can be understood with reference to these positions.

**Hein** discusses verb doubling constructions in Asante Twi. With new data, he argues that this language shows the hitherto unattested pattern of asymmetric verb doubling, that is, Asante Twi is a language which doubles the verb for verb fronting but employs a *do*-support-like strategy for VP fronting. Furthermore, Hein shows how the varying order of operations at PF can derive the entire typology of verb doubling across languages.

In a response to Hein's contribution, **Müller** discusses copying phenomena in syntax from the point of view of phonological copying. Beginning with the observation that copying phenomena have radically different treatments in phonology/morphology and in syntax, Müller argues for a Copy operation in syntax similar to the one employed for reduplication in morphology. This is illustrated on the basis of patterns found with VP and predicate fronting, in particular the new Asante Twi data presented by Hein.

In a similar vein, **Murphy** challenges the widely held belief that wh-copying in languages such as German provides evidence for successive-cyclic movement. It is shown that wh-copying in German does not behave like comparable long-distance extraction structures in many crucial respects, therefore casting doubt on the traditional analysis of these constructions as involving the Spell-Out of an intermediate copy of a chain.

In their paper, **Barnickel & Hein** present an analysis of a kind of R-pronoun replication attested in several German dialects. It is argued that this doubling cannot be tied to extraction/movement since it also occurs *in situ*. Building on previous work on R-pronouns, they propose that replication comes about as a consequence of the interaction of various constraints in Optimality Theory.

**Doliana** discusses novel data from Italian, where agentive nouns can be formed by reduplication of the base form of a verb. After reviewing some phonological and syntactic restrictions of the construction, he puts forward a tentative account which treats them as a special kind of regular VN-compound, namely one that takes a non-lexical item as its internal argument.

The paper by **Trommer** deals with [ATR] and height harmony in Mayak. Trommer shows how these harmony processes interact with each other and with general markedness constraints, and argues that the fact that some of the affixes in Mayak seem to be consistent triggers of harmony while others are not can be accounted for by assuming they operate on different morphological strata.

**Himmelreich** discusses cross-linguistic differences in case matching effects with parasitic gaps and free relatives. It is argued that the strikingly asymmetric behaviour of this construction in German and Polish can be derived from differences in the order and directionality of Agree operations. In general, Himmelreich assumes that Agree can apply in either direction (upward or downward) and that the availability of case matches derives from the type of Agree involved in the language or construction in question.

A similar empirical domain is addressed by **Hein & Murphy**, who discuss case matching restrictions in so-called ‘Across-the-Board’ constructions. In particular, they aim to derive the fact that case mismatches are tolerated if the form of the cases happens to match (i.e. is syncretic). They demonstrate that current analyses of ATB cannot insightfully capture this fact and, instead, show how it follows from a new mechanism of ATB movement involving intersection of feature sets.

**Gjersøe** discusses a different kind of ‘sharing construction’, namely pseudo-coordination in Norwegian. Unlike the previous two approaches, Gjersøe invokes multidominance as the explanation for sharing. Rejecting an approach involving subordination, it is argued that pseudo-coordination in Norwegian involves coordination of *v*Ps, where the subject (and optionally adjuncts) are shared across the conjuncts via multidominance.

**Guzmán Naranjo & Paschen** develop a formal analysis of replicative interactional strategies in conversation. Drawing from the observation that speakers make systematic use of two very distinct kinds of *repetitions* in *closing sequences*, the authors argue that both can be analysed as reflexes of simple (*co-*)*indexation*, a general building block widely used in both declarative and derivational theories of grammar.

Salzmann proposes an analysis of ‘displaced morphology’ in German, that is, exponents that are realized in a position other than what is assumed to be their base position. In his analysis, Salzmann makes use of the Local Dislocation operation in Distributed Morphology thereby avoiding problems of purely syntactic accounts. This can be viewed as an instance of replication across modules of grammar and provides a compelling argument for postsyntactic morphology.

The contribution by Doliana & Sundaresan identifies a new type of control under modality that they dub ‘proxy control’. In general, control can also be viewed as a replicative process since it seems that the subject or object controller is simultaneously fulfilling some requirements in (at least) two positions in the clause. The authors’ analysis involves a non-exhaustive obligatory control relation between two sets of individuals. As well as contributing novel data and observations, it also provides a potential argument against movement theories of control.

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# Copy affixes in Kiranti

Eva Zimmermann\*

## Abstract

I argue that affix copying in Kiranti languages is the result of defective prosodic structure in the representation of specific morphemes. Since the copying process in Kiranti is neither true phonological copying to avoid marked structure nor reduplication to realize certain morpho-syntactic features, its formal account is particularly interesting for the question of how to model (phonological) copying and (morphological) doubling in phonology and/or morphology (Kawahara 2007, Inkelas 2008, Saba Kirchner 2010).

## 1. Introduction

For some cases of copying or doubling of phonological material, rather straightforward motivations can be identified. In Washo (1), for example, a prosodically defined portion of base segments is copied to realize certain morpho-syntactic features. In Hocank (2), on the other hand, a segment is doubled to avoid a phonologically marked structure.

(1)	<i>Washo (Winter 1970, Yu 2008)</i>		(2)	<i>Hocank (Miner 1993)</i>		
	Base	Plural		Underlying	Surface	
	sukuʔ	‘dog’	sukukuʔ	ʃ-wapox	‘you stab’	ʃawapox
	bokoŋ	‘snore’	bokokoŋ	ʃ-ruxuk	‘you earn’	ʃuruxuk

\*I am grateful to the audience of the workshop ‘Replicative processes in grammar’ (Leipzig, 1./2.10.2015) for helpful comments and discussion, especially to Jason Haugen and Alan Yu. This paper is a substantially revised version of Zimmermann (2012); although the data and generalizations are basically the same, the analysis differs in some crucial details. For example, the empirical generalizations concerning the copying of entire morphemes were absent in that previous version. This research was supported by a DFG grant to the project ‘Featural Affixes: The Morphology of Phonological Features’ (TR 521/6–1).

This paper investigates copying processes in Kiranti languages that are apparently less straightforward with respect to their motivation. In (3), a first illustrating example from Athpare is given. The phonological content of certain agreement suffixes appears multiple times on the surface. I argue in this paper, that this copying process can be characterized neither as sole realization of certain morpho-syntactic features as in (1) nor as repair to avoid otherwise phonologically marked structure as in (2).

- (3) *Copying in Athpare* (Ebert 1997)
- a. lems-u-ŋ-tsi-e [lemsuŋtsiŋe]  
'I beat them.' (past)
  - b. lems-i-t-ŋa [lemsitiŋa]  
'She will beat us (excl).'
  - c. lems-u-m-tsi-t-ŋa [lemsumtsimtsimma]  
'We (excl.) will beat them.'

Copying in Kiranti is morpheme-specific in that it is triggered by certain affixes. In the typology of copying/reduplication processes, the Kiranti copying pattern hence has an interesting intermediate status. Since copying always occurs in the presence of certain affixes, it is apparently similar to instances of (morphological) fixed segmentism reduplication, where realization of a fixed segmental portion is always accompanied by copying/reduplicating base segments (Alderete et al. 1999).

There are several additional restrictions on affix copying in Kiranti that make it interesting for a theoretical discussion: for one, copying is strictly local since only segments adjacent to the triggering morpheme can ever be copied. In addition, there are restrictions on copying that refer to the morphological affiliation of segments. *First*, only affix material and never stem segments can be copied and, *second*, there is a dispreference for copying only parts of morphemes and a strong preference for copying entire morphemes.

In this paper, an OT-account for Kiranti copying is proposed that is based on the assumption that copying is the general phonological repair operation of segment fission. This phonological repair is triggered either by phonotactic markedness constraints or by empty prosodic structure (Saba Kirchner 2007, 2010). An argument is made for a CONTIGUITY constraint referring to the morphological affiliation of elements. The constraint predicts the preference for copying entire morphemes, which has two different effects in Kiranti copying

patterns: either copying of more than the expected minimum of segments becomes optimal even if this results in a phonologically marked structure, or copying is blocked if fission of all segments that form a morpheme would result in a segment string that is too large. A second related restriction is that one of the copy-triggering morphemes in Kiranti contains a segment that has a fixed syllabification requirement and may not be resyllabified into another syllable position, even if this would avoid additional markedness problems. It is argued that such a restriction straightforwardly falls out in a theory where segment fission can be triggered by morphemes that contain empty prosodic structure. The restrictions that require copying of entire morphemes on the one hand but fixed syllable position of certain affix material on the other result in a somehow paradoxical situation in Kiranti, where so many segments undergo fission that additional segment fusion becomes optimal to avoid phonotactic markedness violations. This Duke of York-like effect is shown to follow straightforwardly in the present OT-account.

The paper is structured as follows: The empirical generalizations about Kiranti copying are presented in section 2. The theoretical account assuming that copying is fission is presented in section 3. In both sections, nasal copying (2.1 and 3.2) is discussed before syllable copying (2.2 and 3.3).

In section 4, the consequences of Kiranti copying for the alternative more standard BR-correspondence-theoretic OT account are discussed. It is shown that especially the preference to copy entire morphemes and the fixed syllabification of one of the copy-triggering morphemes are not easily predicted under the standard assumption of correspondence relations between only base-reduplicant and input-output. Finally, the fact that both copy patterns can cooccur and feed each other reveals the complex morpheme-specific machinery necessary under a BR-correspondence account. I conclude in section 5.

## 2. Data: Copying in Kiranti

There are around 30 Kiranti languages (Tibeto-Burman), spoken in the Eastern hills of the Himalayas, mainly in Nepal (van Driem 2001, Opgenort 2005). This paper discusses two different copying processes: nasal copying (section 2.1) is attested in a number of different Eastern Kiranti languages in basically the same form, whereas syllable copying (section 2.2) is unique to the Eastern Kiranti language Athpare. Since both these processes can be found in the suffix

string of the verbal agreement paradigm, some background information about agreement in Kiranti is given before we turn to the actual copying processes.<sup>1</sup>

Verbs in Kiranti agree for person and number. The affixes might also be specified for what one might term ‘case’, i.e. the status of marking features of the subject of a transitive verb (=A), the object of a transitive verb (=P), or the single argument of an intransitive verb (=S). The relevant person and number categories are given in (4) together with their decomposition into binary features that will be used to describe the ‘meaning’ or marker specification for all affixes in the following. As can be seen, first person is divided into inclusive and exclusive and there is a three-way number distinction between singular, plural, and dual.<sup>2</sup>

(4) *Morpho-syntactic categories and their decomposition in binary features*

Category	Binary features	Category	Binary features
1s	+1,-2,-3,+sg,-pl	2s	-1,+2,-3,+sg,-pl
1pe	+1,-2,-3,-sg,+pl	2d	-1,+2,-3,-sg,-pl
1pi	+1,+2,-3,-sg,+pl	2p	-1,+2,-3,-sg,+pl
1de	+1,-2,-3,-sg,-pl	3s	-1,-2,+3,+sg,-pl
1di	+1,+2,-3,-sg,-pl	3d	-1,-2,+3,-sg,-pl
		3p	-1,-2,+3,-sg,+pl

Some of the suffixes that are (in this form or as a cognate) crucial in the following discussion are given in (5).<sup>3</sup>

<sup>1</sup>Complete paradigms for all languages under discussion together with additional morphological and phonological background information can be found in the wiki of the research project ‘Hierarchy Effects in Kiranti and Broader Algie’ under [http://proalki.uni-leipzig.de/wiki/Main\\_Page](http://proalki.uni-leipzig.de/wiki/Main_Page). This resource is especially well-suited for morphological analysis and has a ‘colourizer’ tool that can visualize all occurrences of a marker or a certain morphological feature in a paradigm.

<sup>2</sup>A=agent, P=patient, s=singular, d=dual, p=plural, Ns=non-singular (i.e. dual or plural), e=(1.person)exclusive, i=(first person)inclusive, Pst=past, NPst=non-past, Pos=positive, intr=intransitive. Note that ‘A’ and ‘P’ are taken to be abstract labels for ‘subjecthood’ and ‘objecthood’ (remaining unspecific about alignment and the case system of the language).

<sup>3</sup>The segmentation into affixes and their respective meanings in (5) is the result of my own analysis and differs slightly from the one given in Doornenbal (2009) or Gvozdanović (2004). The affix list is given in the standard Distributed Morphology (Halle & Marantz 1993) notation where context features (=morpho-syntactic features that must be present for the marker to be inserted but are not realized by the marker) are given after a slash. Note also that affixes are not fully specified; this is expected under a theoretical account where more specific markers block less specific ones (e.g. Halle & Marantz 1993, Harley & Noyer 1999). The distribution of /-tsi/ in Bantawa (and many related languages) is such that two hypotheses for its specification are

(5) *Some relevant affixes: Bantawa*

-u	↔	[+3,P]	-m	↔	[-3,+pl,A]
-ka	↔	[+1,-2]	-tsi	↔	[-sg]
-ŋ	↔	[+1,+sg]			

The order of agreement suffixes is basically fixed and follows the hierarchy P(atient) >> A(gent) >> N(umber) >> P(er)s(on). There are interesting deviations from this hierarchy-governed order. One is the ‘reordering’ of the non-singular marker /-tsi/ in dual-3 contexts, where it surfaces before the P(atient) marker /-u/. As is argued in Zimmermann (2015), this follows from the demand to mark the agent prominently. With this morphological background, we can now turn to the two copying processes in the agreement suffix strings.

## 2.1. Nasal copying

The nasal copying process is illustrated in the following mainly with data from Bantawa, a Central Kiranti language spoken in the Bhojpur district in Eastern Nepal (all data in the following are from Doornenbal 2009). In (6), some forms of the transitive verb ‘to take’ are given. If not specified otherwise, all Bantawa forms in the following are from the non-past positive paradigm. On the left side of the table, the abstract underlying representations for the affixes are listed and on the right side, the phonetic surface forms. It can easily be seen that in the non-singular object forms, some affixes or parts of some affixes appear twice on the surface (marked in boldface). There are some more alternations between underlying and surface forms that are irrelevant for the following discussion. These include stem allomorphy and a predictable alternation for the affix /-tsi/ that surfaces as [tsi] before /-ŋ/ and /-m/ and as [tsi] elsewhere. The combination /tsi + u/ is predictably realized as [tsu] to avoid adjacent vowels.

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plausible: it is either a general non-singular marker (cf. (5)) that is generally absent in non-third person plural forms or there are two homophonous markers /-tsi/, one being a dual marker and the second a non-singular marker restricted to the context of third person patients. In this paper, one underspecified /-tsi/ is assumed. This choice, however, is not crucial for anything that follows.

(6) *Bantawa: Nasal copying*

A\P	3s		3Ns	
1s	k <sup>h</sup> at-u-ŋ	[k <sup>h</sup> at:uŋ]	k <sup>h</sup> at-u-ŋ-tsi	[k <sup>h</sup> at:uŋtsiŋ]
1pe	k <sup>h</sup> at-u-m-ka	[k <sup>h</sup> at:umka]	k <sup>h</sup> at-u-m-tsi-ka	[k <sup>h</sup> at:umtsimka]
1pi	k <sup>h</sup> at-u-m	[k <sup>h</sup> at:um]	k <sup>h</sup> at-u-m-tsi	[k <sup>h</sup> at:umtsim]
2p	ti-k <sup>h</sup> at-u-m	[tik <sup>h</sup> at:um]	ti-k <sup>h</sup> at-u-m-tsi	[tik <sup>h</sup> at:umtsim]

As was already mentioned above, this type of copying occurs in various related Kiranti languages in a nearly identical form. Example (7) lists some 1s-3Ns forms from the relevant languages that show this copying pattern.

(7) *More nasal copying in Kiranti (surface forms)*

	Language	1s-3Ns		
a.	Bantawa	k <sup>h</sup> at:uŋtsiŋ	‘I will take them.’	(Doornenbal 2009)
b.	Belhare	lureŋts <sup>h</sup> iŋ	‘I told them.’	(Bickel 1998, 2003)
c.	Limbu	huʔruŋsiŋ	‘I taught them.’	(van Driem 1987)
d.	Puma	k <sup>h</sup> aŋŋuŋtsaŋ	‘I will see them.’	(Bickel et al. 2010)
e.	Yakkha	piŋtsiŋa	‘I gave them.’	(Schackow 2014)
f.	Yamphu	k <sup>h</sup> aksuŋtɕiŋ	‘I saw them.’	(Rutgers 1998)

A first possible hypothesis to explain the data in (6) and (7) is that this is not copying at all but the surfacing of (parts of) morphemes. Some possible alternative segmentations and/or morpheme specifications that explain the surface effect we observed in (6) are given in (8). In contrast to the marker list in (5) that assumes a non-third person plural agent marker /-m/ and a first person marker /-ŋ/, two different morphemes are assumed for these two contexts, depending on whether a third person non-singular argument is present or not. In all these alternative analyses, the marker specifications are hence suspiciously similar and the second marker is only distinguished from the first by the assumption of additional context features. Under (8a) two homophonous markers /-ŋ/ and /-m/ with different morpho-syntactic feature specifications are assumed. This analysis would complicate the assumptions about affix order in Bantawa. Given the hierarchy P >> A >> N >> Ps that can be observed elsewhere in the paradigm, both marker pairs /-ŋ<sub>1</sub>/ & /-ŋ<sub>2</sub>/ and /-m<sub>1</sub>/ & /-m<sub>2</sub>/ are expected to be adjacent to each other. The possible segmentation in (8b) assumes the complex markers /-ŋtsiŋ/ and /-m<sub>1</sub>tsim/.

Under this segmentation, the absence of /-tsi/ as a marker for object number is mysterious and needs an independent explanation. The segmentation in (8c) assumes a discontinuous circumfixal morpheme that is typologically unusual since the two parts of the suffix do not surface on different sides of the stem but on different sides of another suffix. Finally, all these alternative segmentations share the economy problem that morphemes with rather similar form and function are assumed.

(8) *Alternative marker specifications/segmentations*

- |    |                 |   |                     |                    |   |                       |
|----|-----------------|---|---------------------|--------------------|---|-----------------------|
| a. | -ŋ <sub>1</sub> | ↔ | [+1,+sg]            | -m <sub>1</sub>    | ↔ | [-3,+pl,A]            |
|    | -ŋ <sub>2</sub> | ↔ | [+1,+sg] / __+3,-sg | -m <sub>2</sub>    | ↔ | [-3,+pl,A] / __+3,-sg |
| b. | -ŋ              | ↔ | [+1,+sg] / __+3,+sg | -m                 | ↔ | [-3,+pl,A] / __+3,+sg |
|    | -ŋtsiŋ          | ↔ | [+1,+sg] / __+3,-sg | -m <sub>tsim</sub> | ↔ | [-3,+pl,A] / __+3,-sg |
| c. | -ŋ              | ↔ | [+1,+sg] / __+3,+sg | -m                 | ↔ | [-3,+pl,A] / __+3,+sg |
|    | -ŋ...ŋ          | ↔ | [+1,+sg] / __+3,-sg | -m...m             | ↔ | [-3,+pl,A] / __+3,-sg |

A second possible hypothesis is that this is true phonological copying that is solely triggered by the demand to avoid a marked structure, absolutely parallel to the Hocank example in (2). A reasonable explanation seems to be that the copied nasal avoids an otherwise open final syllable. This is not implausible from the perspective of general markedness and there are arguments in the optimality-theoretic literature for a constraint FINAL-C demanding that prosodic words must end in a consonant (McCarthy 1993, Ito & Mester 2009).

The obvious problem with this assumption is that there is also non-final copying as in (9a). The avoidance of an open syllable word-medially cannot be plausibly analysed as markedness avoidance since it goes against the universal principle that codas are marked. Moreover, it is not the case that all final open syllables are avoided. As can be seen in (9b), there is no copying of a nasal to avoid the open final affix syllable /ka/.

(9) *Bantawa: Absence of copying after /-ka/*

- |    |                              |                              |                                |           |
|----|------------------------------|------------------------------|--------------------------------|-----------|
| a. | k <sup>h</sup> at-u-m-tsi-ka | [k <sup>h</sup> at:umtsimka] | *[k <sup>h</sup> at:umtsimkam] | (1pe-3Ns) |
| b. | k <sup>h</sup> at-u-m-ka     | [k <sup>h</sup> at:umka]     | *[k <sup>h</sup> at:umkam]     | (1pe-3s)  |
|    | ni-k <sup>h</sup> at-in-ka   | [nik <sup>h</sup> at:inka]   | *[k <sup>h</sup> at:inkan]     | (3-1pe)   |

We can hence conclude that the multiple surface occurrences of nasals in Bantawa are indeed the result of a copying operation and that this copying operation is not truly phonologically triggered. In what follows, several

additional empirical generalizations about the copying pattern are fleshed out before we turn to the theoretical account.

First, the copying is bound to the presence of the number marker /-tsi/. This is another generalization that we can already conclude from the absence of copying in the data in (9). No copying ever takes place in similar contexts in the absence of /-tsi/ where, for example, only the person marker /-ka/ follows the plural marker /-m/.

Another generalization is that not just any (nasal) segment that precedes /-tsi/ is copied. Example (10) shows some forms where /-tsi/ is directly adjacent to a stem and no copying ever occurs. Crucially, copying is absent even when the stem ends in a nasal consonant, which is shown with some examples from the intransitive verb /kon/ 'to walk' (10b). We can hence conclude that nasal copying is restricted to affix segments.

(10) *Bantawa: No copying of stem segments*

a.	k <sup>h</sup> at-tsi-u	[k <sup>h</sup> attsu]	*[k <sup>h</sup> attsut]	(1di-3s)
	k <sup>h</sup> at-tsi-u-ka	[k <sup>h</sup> attsuʔa]	*[k <sup>h</sup> attsutka]	(1de-3s)
b.	kon-tsi	[kontsi]	*[kontsin]	(1di/3d.intr)
	ti-kon-tsi	[tikontsi]	*[tikontsin]	(2d.intr)

Another generalization is that the copied affix segment is always directly adjacent to /-tsi/. The data in (11) to (13) show that no nasal affix consonant that is separated from /-tsi/ by another affix vowel is ever copied. The fact that Yamphu (12) and Limbu (13) show in principle the same type of nasal copying after /-ɕji/ and /-si/ was shown in (7).

(11) *Bantawa: No non-adjacent copying*

k <sup>h</sup> at-na-tsi	[k <sup>h</sup> atnatsi]	'I will take you two.'
	*[k <sup>h</sup> atnatsin]	

(12) *Yamphu: No non-adjacent copying (Pst, Pos; Rutgers 1998)*

k <sup>h</sup> aks-a-u-ŋ-ma-ɕji	[k <sup>h</sup> aksuŋmaɕji]	'We (excl.) saw them.'
	*[k <sup>h</sup> aksuŋmaɕjim]	

(13) *Limbu: No non-adjacent copying (Pst, Neg; van Driem 1987)*

mɛ-n-huʔr-mʔna-si	[mɛnhuʔmʔnasi]	'We (excl.) didn't teach them.'
	*[mɛnhuʔmʔnasin]	

In all the examples so far, a nasal consonant was copied. It is in fact impossible to prove that there is an additional ban against copying non-nasal consonants.

If we assume the restrictions shown so far that only affix segments directly adjacent to /-tʃi/ are ever copied, there is no context where we ever expect copying of a non-nasal affix consonant. The only other additional generalization is that the /-tʃi/ never triggers copying of its own consonant [tʃ]. As can be seen in (14), no copying applies if there is no affix-consonant adjacent to /-tʃi/.

(14) *Bantawa: No copying of a non-nasal*

		Copy stem	Copy 'itself'	
k <sup>h</sup> at-tʃi-u-ka	[k <sup>h</sup> attʃuʔa]	*[k <sup>h</sup> attʃutʔa]	*[k <sup>h</sup> attʃitsʔa]	(1de-3s)
k <sup>h</sup> at-tʃi-u	[k <sup>h</sup> attʃu]	*[k <sup>h</sup> attʃut]	*[k <sup>h</sup> attʃitsʃu]	(1di-3s)

A final interesting criterion is the question of whether only entire affixes or also parts of affixes can be copied. As can be seen in (15) and (16), copying can affect a single nasal consonant from a larger suffix string in Bantawa and Limbu: only the final consonant from /-ŋaŋ/ and /-oŋ/ is copied. This argument of course crucially hinges on the morpheme segmentation that is assumed. An alternative segmentation where the suffixes /-ŋaŋ/ and /-oŋ/ are segmented into smaller parts is given next to the tables. Under this analysis, the copying again only affects a single monoconsonantal affix. However, the segmentation is suboptimal since it involves multiple exponence (e.g. /ti-k<sup>h</sup>at-ŋa<sub>+1,+sg,SP</sub>-ŋ<sub>+1,+sg</sub>-tʃi-sg/)

(15) *Bantawa: Partial affix-copying*

A\P	1s		
2d	ti-k <sup>h</sup> at-ŋaŋ-tʃi	[tik <sup>h</sup> atŋaŋtʃiŋ]	<i>Alternative:</i> -ŋa ↔ [+1,+sg,SP] -ŋ ↔ [+1,+sg]
3d	i-k <sup>h</sup> at-ŋaŋ-tʃi	[ik <sup>h</sup> atŋaŋtʃiŋ]	

(16) *Puma: Partial affix-copying (Pst, Pos; Bickel et al. 2010)*

A\P	1s		
2d	t <sub>Λ</sub> -tsind-oŋ-tʃi	[t <sub>Λ</sub> tsind <sub>oŋ</sub> tʃaŋ]	<i>Alternative:</i> -o ↔ [+1,+sg,SP] -ŋ ↔ [+1,+sg]
3d	p <sub>Λ</sub> -tsind-oŋ-tʃi	[p <sub>Λ</sub> tsind <sub>oŋ</sub> tʃaŋ]	

In Yakkha and Yamphu, on the other hand, copying of only parts of suffixes is apparently excluded. As can be seen in (17b), no copying of a nasal directly preceding /-tʃi/ can be observed in Yamphu when this nasal is part of a longer



PaAf criterion for languages where there simply never is a longer suffix string containing a nasal that directly precedes the triggering /-tʃi/. A generalization whether parts of affixes are copied is hence impossible to make.

(19) *Nasal copying in Kiranti: Empirical summary*

	MoSp	AffS	NasS	AdjS	PaAf
Bantawa	☺	☺	☺	☺	☺
Puma	☺	☺	☺	☺	☺
Limbu	☺	☺	☺	☺	☺
Athpare	☺	☺	☺	☺	–
Chamling	☺	☺	☺	☺	–
Belhare	☺	☺	☺	☺	–
Chintang	☺	☺	☺	☺	–
Yakkha	☺	☺	☺	☺	☺
Yamphu	☺	☺	☺	☺	☺

2.2. Syllable copying in Athpare

Yet another copying process can be found in Athpare, a language of the Southeastern Kiranti area (all data in the following is taken from Ebert 1997). It can easily be observed if one compares the non-past and past paradigms that are both marked with a tense suffix: /-e/ can be found throughout all past forms and /-t/ can be found in the corresponding non-past forms.<sup>5</sup> In the non-past forms in (20a), we see that an additional syllable follows the /-t/ that is absent in the corresponding past forms (20b). This additional syllable consists of copied rhyme material of the affix segments preceding the /-t/: either only an affix vowel or a preceding affix vowel and its coda.<sup>6</sup>

<sup>5</sup>Both markers are independently interesting with respect to affix ordering: the /-e/ follows all agreement suffixes, whereas the /-t/ precedes person agreement but must never be adjacent to the stem. This latter restriction explains contrasts like / $\Sigma$ -i<sub>SP-3+pl</sub>-t-ŋa<sub>+1-2</sub>/ (2/3-1pe) and / $\Sigma$ -ŋa<sub>+1-2</sub>-t/ (2s/3s-1s).

<sup>6</sup>Note that Athpare also shows additional phonological alternations: whenever /-tʃi/ precedes /-u/, the first vowel of the vowel cluster is deleted resulting in [tsu]. Adjacent nasal consonants undergo place assimilation that can be observed in, for example, 1pe-3 contexts where underlying /ŋ/ is realized as [m] if it is preceded by an /m/.

(20) *Syllable copying triggered by /-t/*

a. <i>Non-past</i>		b. <i>Past</i>	
-u-ŋ-t	[uŋ.tuŋ]	-u-ŋ-e	[u.ŋe] (1s-3s)
-u-m-t	[um.tum]	-u-m-e	[u.me] (1pi-3s)
-u-m-t-ŋa	[um.tum:a]	-u-m-ŋa-e	[um:e] (1pe-3s)
-i-t	[i.ti]	-i-e	[i.e] (1pi.intr)
-i-t-ŋa	[i.ti.ŋa]	-i-ŋa-e	[i.ŋe] (1pe.intr)

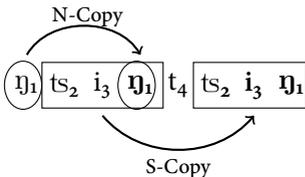
If we turn to contexts where the /-t/ is preceded by a /-tsi/, this picture gets more complicated (21a). Apparently, what surfaces is not the /-t/ suffix but two copies of [tsi] or [tsu] in case the /-tsi/ was followed by the third person object marker /-u/. Yet another unexpected surface alternation can be observed whenever a nasal is the onset of the affix syllable directly preceding the /-t/. As can be seen in (21b), only a [ʔ] is realized in the onset of the ‘copied’ syllable in those contexts.

The last three forms in (21a) are particularly interesting since they show the co-occurrence of syllable and nasal copying. The /-tsi/ triggers copying of a preceding nasal and if /-tsi/ is directly followed by /-t/, the whole syllable including the already copied nasal is copied. This interaction of the two copying processes is illustrated in (21).

(21) *Syllable copying triggered by /-t/*

a.	-tsi-t	[tsi.tsi]	(1di.intr)
	-tsi-t-ŋa	[tsi.tsi.ŋa]	(1de.intr)
	-tsi-u-t-ŋa	[tsu.tsu.ŋa]	(1de-3)
	-u-ŋ-tsi-t	[uŋ.tsiŋ.tsiŋ]	(1s-3Ns)
	-u-m-tsi-t	[um.tsim.tsim]	(1pi-3Ns)
	-u-m-tsi-t-ŋa	[um.tsim.tsim:a]	(1pe-3Ns)
b.	-ŋa-t	[ŋa.ʔa]	(1s.intr)
	-na-t	[na.ʔa]	(1-2s)
	-na-t-tsi	[na.ʔa.tsi]	(1-2d)
	-na-t-ni	[na.ʔa.ni]	(1-2p)

(22) *Interaction: Nasal and syllable copying*



A first important generalization about the copying in (21) is that it is not the minimal amount of affix segments that are necessary to constitute a well-formed syllable that is copied. The form \*[tsi.ti], where only the affix vowel from the /-tsi/ is copied, is perfectly fine with respect to all syllable structure restrictions of the language and mirrors the vowel-copying instances we saw in (20). However, [tsitsi] surfaces instead. We can hence conclude that it is necessary to copy the whole affix string /-tsi/ and that copying of only a single segment of an affix is excluded. Given this generalization, the data in (22a) could reasonably be explained by saying that the expected stop-affricate sequence in [tsittsi] is avoided and the segments are merged into a single affricate given that the stop and the initial stop-component of the affricate are identical.<sup>7</sup> However, Athpare allows sequences of [Vt.tsV] as is illustrated with forms like [alemstjettsi] ‘they both are beating us all’ (Ebert 1997: 186) or some of the forms in (10). The absence of [t] in these contexts is consequently not expected from the general phonology of the language.

A second crucial generalization is hence that the /-t/ cannot be syllabified as coda, excluding \*[tsit.tsi]. If the /-t/ must remain in onset position and the entire affix string /-tsi/ must be copied, the non-realization of /-t/ is straightforwardly expected since Athpare does not allow complex onsets \*[tsi.ttsi]. To avoid the complex onset, the two segments [t] and [ts] are simplified into [ts]. The contexts in (21b) are completely parallel. If we take the assumption that only entire affixes can be copied for granted, we expect the sequence \*[nat.na] for an underlying sequence /-na-t/. This sequence is phonologically unproblematic in Athpare as can be seen in, for example, the full form /k<sup>h</sup>atnaʔa/ ‘I will go’ where the stem-final /t/ is indeed syllabified as coda preceding a nasal onset.<sup>8</sup> However, if the [t] must be syllabified in onset position, the complex onsets \*[tna] and \*[tja] are expected. These are impossible in Athpare and neutralized to [ʔa]. As is argued in more detail below (section 3.3), all these repair processes are taken to be segment fusion.

<sup>7</sup>The segment notated with <c> in Ebert (1997) is taken to be the affricate [ts] in the following. Although Ebert (1997) lists <c> as an alveo-palatal stop in the phoneme inventory (Ebert 1997: 13), the sound is given as [ts] in all the instances where a phonetic transcription is given in the grammar. This is also consistent with the descriptions of the affricate [ts] in the closely related Greater Yakkhan languages Belhare (Bickel 2003) and Yakkha (Schackow 2014).

<sup>8</sup>Voiceless stops in coda position are unreleased in Athpare and hence difficult to distinguish from the glottal stop, e.g. in [k<sup>h</sup>ap<sup>h</sup>ma] ~ [k<sup>h</sup>aʔma] ‘go’ (Ebert 1997: 14).

The two generalizations about entire morpheme copying and complex onset avoidance are briefly summarized in (23) as a three-step derivational process.

(23) *Full morpheme copying after /-t/*

Underlying	-tsi-t	-na-t	-ŋa-t
1. Full morpheme copying after /-t/:	tsittsi	natna	ŋatŋa
2. Syllabification with /-t/ as onset:	tʰi.tʰsi	na.tna	ŋa.tŋa
3. Fusion to avoid complex onset:	tʰi.tʰsi	na.ʔa	ŋa.ʔa

As with the nasal copying, let us first explore the hypothesis that this might be a phonological repair operation triggered solely by phonotactic markedness. Indeed, there are some examples where the creation of this additional syllable avoids complex word-final consonant clusters (24a) or where the copying creates an open syllable and avoids a coda consonant (24b).

(24) *Copying to avoid marked structure?*

	Surface form	Without copying
a.	[lemsuŋtuŋ]    'I will beat him'	*[lemsuŋt]
	[lemsuŋtsiŋtsiŋ]    'I will beat them'	*[lemsuŋtsiŋt]
b.	[lemnaʔa]    'I/we will beat you'	*[lemnat]
	[alemʰtsitsiŋa]    'You will beat us two'	*[alemʰtsiŋa]

Crucially, however, syllable copying is not a general repair strategy available to repair all otherwise closed syllables. There are forms like [a.lem.sum.tum] 'We (incl.) beat him' that are not repaired via copying to \*[a.lem.su.mu.tum] or \*[a.le.me.su.mu.tu.mu]. Both these hypothetical forms optimize the syllable structure through additional copying operations and avoid all closed syllables. Together with the other crucial observation that syllable copying only applies in the non-past paradigm in the context of the /-t/, we can once again conclude that this is indeed a morpheme-specific process.

In the examples in (20) and (21), only the suffix string was given, without any preceding stem. This simplification was possible since syllable copying only ever affects affix material, absolutely parallel to nasal copying. As can be seen in (25), the final stem consonant is never copied, even if it is syllabified as onset of the affix syllable that is copied.<sup>9</sup>

<sup>9</sup>This is even more interesting if we recall the ordering properties of /-t/ (cf. footnote 5) – whenever /-t/ is expected to appear directly after the stem, reordering applies and /-t/ surfaces

(25) *No copying of stem material*

a-lems-u-t	[alemsutu]	*[alemsutsu]	‘You (sg) will beat him.’
a-khat-i-t	[khaditi]	*[khaditti]	‘You (pl) will go.’

## 2.3. Summary: Copying in Kiranti

The two copying processes can be summarized as follows: *first*, affix (nasal) consonants that directly precede /-tsi/ and its cognates are copied into a position after /-tsi/ in various Eastern Kiranti languages, and *second*, an additional syllable is created after the non-past marker /-t/ consisting of copied affix material preceding the /-t/ in Athpare. In both copying processes, we saw a preference for copying entire morphemes. First, there was evidence that nasal copying in Yakkha and Yamphu is blocked if the nasal is only part of an affix. And, second, syllable copying in Athpare always targets whole morphemes. Crucially, this latter restriction may even result in situations where the affix /-t/ cannot be realized faithfully itself since copying of the entire morpheme results in an otherwise marked phonological structure. A second factor which results in non-faithful realization of the /-t/ is the impossibility to syllabify it as the coda of the preceding syllable.

## 3. Analysis: Copying as phonological repair

## 3.1. Theoretical background: Copying as fission

One theoretical ‘landscape’ of copying assumes two crucially different mechanisms for morphological reduplication as in Washo (1) and phonological copying as in Hocank (2) (for example, Kawahara 2007, Inkelas 2008). Phonological copying is either modeled as autosegmental spreading (e.g. Kawahara 2007) or string-internal correspondence (e.g. Inkelas 2008) whereas morphological reduplication is the result of an abstract RED-morpheme triggering BR-correspondence (e.g. Kawahara 2007) or morphological doubling (e.g. Inkelas 2008).

Another view is to assume that both morphological reduplication and phonological copying are the result of the same copying mechanism (=Theory of Minimal Reduplication, Saba Kirchner 2007, 2010). Copying is taken to be

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unexpectedly after a person marker. From the perspective of copying, this reordering hence ensures that copying is possible.

a general phonological repair process comparable to epenthesis or deletion. What distinguishes morphological reduplication from phonological copying is then simply the reason why this repair process applies: either to fill an otherwise empty prosodic node with segmental structure (=morphological reduplication) or to avoid a phonotactic markedness violation (=phonological copying). Morphological reduplication is hence triggered by the presence of morphemes that contain empty prosodic structure in their representation, an assumption that straightforwardly implements the fact that reduplicants have a fixed prosodic size.

The main arguments for such a unified theory for copying/reduplication are, *first*, its theoretical economy and elegance through abandoning any mechanisms specific to a certain morphological context or process and, *second*, the fact that there are examples in the languages of the world where copying alternates with other types of non-concatenative exponence. For example in Kwak'wala (Saba Kirchner 2007, 2010, Bermúdez-Otero 2012) or Afar (Bye & Svenonius 2012) copying of segments alternates predictably with epenthesis. The Theory of Minimal Reduplication straightforwardly predicts such a state of affairs since the empty prosodic structure is not bound to any specific repair such as copying; it simply must be filled with material and every language chooses between the universally available phonological strategies for providing additional material in a specific phonological context.

One way to formally implement the copying mechanism is fission (Struijke 2000, Gafos 2003, Nelson 2003): one input segment is split up into two output correspondents under violation of INT (26). Tableaux (27) and (28) briefly sketch how the theoretical account for Washo and Hocank could look like in such a theory. In Hocank, a high-ranked markedness constraint \*[CC penalizes complex onsets and INT is simply the lowest-ranked faithfulness constraint, predicting that fission of a vowel is the optimal strategy to resolve this markedness problem. In Washo, on the other hand, the plural morpheme is taken to consist of only an empty syllable node. MAXF (=MAXFLOAT, Wolf 2007) ensures that this floating node cannot be deleted and standard prosodic markedness constraints against syllable nodes that do not dominate any (segmental) material ensure that the syllable must be filled with segments. Low-ranked INT again predicts that fission is the optimal strategy to repair this otherwise marked structure.

(26) INT (=INTEGRITY; McCarthy & Prince 1995)

Assign a violation mark for every input segment with multiple output correspondents

(27) *Phonological reduplication*

$\int_1 + w_2 a_3 p_4 o_5 x_6$	*[CC]	DEP	INT
a. $\int_1 w_2 a_3 p_4 o_5 x_6$	*!		
b. $\int_1 \emptyset w_2 a_3 p_4 o_5 x_6$		*!	
c. $\int_1 a_3 w_2 a_3 p_4 o_5 x_6$			*

(28) *Morphological reduplication*

$\sigma_a + \sigma_b \quad \sigma_c$ $\triangle_{b_1 o_2} \quad \triangle_{k_3 o_4 \int_5}$	MAXF	DEP	INT
a. $\sigma_b \quad \sigma_c$ $\triangle_{b_1 o_2} \quad \triangle_{k_3 o_4 \int_5}$	*!		
b. $\sigma_b \quad \sigma_a \quad \sigma_c$ $\triangle_{b_1 o_2} \quad \int_1 \emptyset \quad \triangle_{k_3 o_4 \int_5}$		*!*	
c. $\sigma_b \quad \sigma_a \quad \sigma_c$ $\triangle_{b_1 o_2} \quad \triangle_{k_3 o_4} \quad \triangle_{k_3 o_4 \int_5}$			**

The proposal in this paper follows this assumption about copying as fission that can repair otherwise marked structure: either phonotactically illicit structure or empty prosodic nodes.

### 3.2. Nasal copying

Nasal copying is taken to result from an additional empty prosodic position in the representation for the /-tsi/ suffix. More concretely, it is assumed that the segmental portion of this morpheme is followed by a mora (=μ) that does not dominate any segment. The fact that the copying process is morpheme-specific is hence a simple consequence of different underlying representations: the non-singular marker /-tsi/ contains a floating μ and non-triggering suffixes like /-ka/ do not have an empty μ.

The grammar of Bantawa then ensures that copying is the unmarked repair strategy to fill this prosodic node with segmental material. The relevant constraints for such a grammar are given in (29). MAXμ and μ>S ensure that the μ may not simply be deleted (as in candidate (30a)) or remain without a segment that it dominates (as in candidate (30b)). The fact that epenthesis is a suboptimal strategy to provide segmental content for the μ is ensured by DEPS (in candidate (30c)). Fission of underlying segments as in candidate (30e) hence becomes optimal. It violates INT since an input segment has multiple output correspondents but this faithfulness constraint is too low to have an

effect (why the more specific version  $INT_A$  (29d) is relevant for Bantawa is explained below). Finally, the fact that only heteromorphic elements can be copied follows from ALT (29e). This constraint excludes candidate (30d) where a (copy of a) segment with the same morphemic affiliation or ‘colour’ (van Oostendorp 2006) as the  $\mu$  itself associates to the  $\mu$ .

- (29) a.  $MAX_\mu$  (McCarthy & Prince 1995)  
Assign a violation mark for every input mora without a correspondent in the output.
- b.  $\mu > S$   
Assign a violation mark to every  $\mu$  not dominating a segment.
- c.  $DEPS$  (McCarthy & Prince 1995)  
Assign a violation mark for every output segment without a correspondent in the input.
- d.  $INT_A$  (cf. (26))  
Assign a violation mark for every affix input segment with multiple output correspondents
- e.  $ALT$  (=ALTERNATION; van Oostendorp 2007, 2012)  
Assign a violation mark for every association line that links two elements of colour  $\alpha$  that does not have the colour  $\alpha$ .

(30) *Nasal copying in Bantawa: Fission to fill the empty  $\mu$*

	$\mu_a$ u <sub>1</sub> + $\eta_2$ + ts <sub>3</sub>	$\mu_b$ $\mu_c$ i <sub>4</sub>	$\mu > S$	ALT	DEPS	$MAX_\mu$	$INT_A$
a.	$\mu_a$ u <sub>1</sub>	$\mu$ $\eta_2$	$\mu_b$ i <sub>4</sub>			*!	
b.	$\mu_a$ u <sub>1</sub>	$\mu$ $\eta_2$	$\mu_b$ $\mu_c$ ts <sub>3</sub> i <sub>4</sub>	*!			
c.	$\mu_a$ u <sub>1</sub>	$\mu$ $\eta_2$	$\mu_b$ $\mu_c$ i <sub>4</sub> n		*!		
d.	$\mu_a$ u <sub>1</sub>	$\mu$ $\eta_2$	$\mu_b$ $\mu_c$ i <sub>4</sub> ts <sub>3</sub>		*!		*
e.	$\mu_a$ u <sub>1</sub>	$\mu$ $\eta_2$	$\mu_b$ $\mu_c$ i <sub>4</sub> $\eta_2$				*

I assume that faithfulness constraints can be parametrized to only stem- or affix-material (cf. the overviews in Urbanczyk 2011 or Trommer 2010). Crucially,  $INT_A$  in (29d) is only sensitive to affix material and is hence never violated if a stem segment has multiple output correspondents. The counterpart  $INT_S$  is rather high-ranked in Kiranti and excludes any fission of stem-segments as is shown in (31). If no affix-segment precedes the /-tsi/, no copying can apply to fill the  $\mu$  with a segment and it is deleted. Note that the autosegmental representations are abbreviated in the following tableaux and only the segmental string is given, the additional  $\mu$  given as a superscript after the /-tsi/.

(31) *Nasal Copying in Bantawa: No stem fission*

	$INT_S$	$\mu > S$	ALT	DEPS	MAX $\mu$	$INT_A$
$k_1o_2n_3\text{-}ts_4i_5^\mu$						
a. $k_1o_2n_3ts_4i_5^\mu$		*!				
b. $k_1o_2n_3ts_4i_5$					*	
c. $k_1o_2n_3ts_4i_5n_3$	*!					

Another crucial restriction on nasal copying is its locality: only an affix (nasal) consonant that directly precedes the /-tsi/ is ever copied. A crucial empirical observation in this respect is that all non-adjacent non-stem nasals are always part of an affix that is larger than the monoconsonantal /-m/ and /-ŋ/. The fact that non-local copying in such a context where, for example, /-na/ precedes /-tsi/ is excluded hence follows from the high-ranked LINEARITY (McCarthy & Prince 1995) constraint (32) that is specified only for homomorphic elements, i.e. for elements that belong to the same morpheme.

(32) MLIN (Horwood 2002)

Assign a violation mark for every pair of elements  $i_w$  and  $i_x$  if

$i_w$  corresponds to output  $o_w$  and  $i_x$  to output  $o_x$ ,

$i_w$  precedes  $i_x$ ,

$o_x$  precedes  $o_w$ , and

$i_w$  and  $i_x$  are part of the same morpheme.

Copying of a nasal that is either the final or the only segment of an affix preceding the /-tsi/ does not induce additional violations of MLIN as can be seen in (33-i-b). General LINEARITY is violated twice in this candidate since the copied /ŋ<sub>1</sub>/ follows /ts<sub>2</sub>/ and /i<sub>3</sub>/ – two elements that the corresponding input

element precedes. Since these two segments belong to another morpheme, however, no violation of MLIN arises. Copying of only the initial consonant of a CV-affix, however, induces additional violations of MLIN as can be seen in (33-ii-b). The copied /n<sub>1</sub>/ now follows /a<sub>2</sub>/ – an element of the same morpheme that it precedes in the input. Again, copying is blocked and the  $\mu$  is deleted in the winning candidate (33-ii-a).<sup>10</sup>

(33) *Non-local copying and MLIN*

	MLIN	$\mu > S$	*P] <sub><math>\sigma</math></sub>	DEPS	INTS	MAX $\mu$	LIN	INT <sub>A</sub>
i. - $\eta_1$ - $ts_2i_3$ $\mu$								
a. $\eta_1ts_2i_3$						*!		
$\text{☞}$ b. $\eta_1ts_2i_3\eta_1$							**	*
ii. - $n_1a_2$ - $ts_3i_4$ $\mu$								
$\text{☞}$ a. $n_1a_2ts_3i_4$						*		
b. $n_1a_2ts_3i_4n_1$	*!						***	*

Note that this tableau also shows why MLIN is necessary and the general gradient LINEARITY constraint is not sufficient to predict the locality restriction on copying: copying across /-tsi/ always induces minimally two violations of LINEARITY and these violations are tolerated in case the nasal directly precedes /-tsi/. LINEARITY must hence crucially be dominated by  $\mu > S$  and MAX $\mu$  ensuring that copying happens in the first place. The increased number of violations for a non-adjacent nasal in (33-ii-b) is hence irrelevant.<sup>11</sup>

Recall that the generalization that only affix material and only adjacent

<sup>10</sup> Another possible candidate / $ts_2i_3\eta_1$ / only undergoes reordering and associates the only output correspondent of the nasal to the affix  $\mu$  (not violating INT<sub>A</sub> but violating LINEARITY twice). This structure is excluded by NOVACDOCK (Wolf 2007, Saba Kirchner 2010) ensuring that a (floating) affix  $\mu$  can not simply associate to an underlying element, replacing a phonologically predictable  $\mu$ . The copying candidate / $\eta_1ts_2i_3\eta_1$ / avoids a violation of NOVACDOCK since one nasal corresponding to / $\eta_1$ / is dominated by another (presumably epenthetic)  $\mu$ .

(i) NOVACDOCK( $\mu$ ) (Saba Kirchner 2010: 49)

*Informally:* If a floating  $\mu$  docks to a non-epenthetic segment, then a correspondent of that segment is also dominated by another  $\mu$ .

<sup>11</sup> In a model using weighted constraints (Legendre et al. 1990, Pater to appear), such a threshold effect for non-local copying could in principle be predicted from a single LINEARITY constraint:

elements are ever copied were sufficient to exclude all contexts where copying of a non-nasal consonant is expected. This additional restriction would easily follow as an Emergence of the Unmarked effect predicted from high-ranked  $*P]_{\sigma}$  (34): only unmarked sonorant codas are predicted to be copied into an otherwise empty coda position.

- (34)  $*P]_{\sigma}$  (cf. Botma & van der Torre 2000, van der Hulst 2008)  
Assign a violation mark for every obstruent in coda position.

A final parameter that was discussed in section 2.1 was the copying of only full morphemes. In Bantawa, Puma, and Limbu, it was possible to copy only parts of morphemes but in Yakkha and Yamphu, there was at least some evidence that copying is blocked if only a part of a morpheme was expected to be copied. Such a restriction is enforced by the CONTIGUITY constraint (35) that penalizes pairs of segments affiliated to the same morpheme that are contiguous in the input but not in the output. In contrast to the standard morpheme CONTIGUITY versions that basically penalize morpheme-internal deletion or insertion (McCarthy & Prince 1995, Landman 2002), (35) is specifically formulated over all output instances of a segment and hence has crucial consequences for contexts where a segment has multiple output correspondents.

- (35) MCNT (after Landman 2002)  
For every input element X that is contiguous to Y and both belong to the same morpheme:  
Assign a violation mark for every x (corresponding to X) in the output that is not contiguous to an y (corresponding to Y).

In candidate (36b), an affix nasal has multiple output correspondents in order to fill the otherwise empty  $\mu$ . However, since this nasal is only a part of the morpheme  $/-o_{1\eta}/$ , MCNT is violated: there are output correspondents to input  $/\eta_2/$  and  $/o_1/$  in the output but one instance of  $/\eta_2/$  is not contiguous to an  $/o_1/$  – the morpheme  $/ts_3i_4/$  intervenes. Contiguous affix copying in candidate (36c) is excluded since it requires an additional  $\mu$  to host the additionally copied affix vowel.

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crossing two segments is tolerated whereas crossing of more segments outweighs the need to fill the  $\mu$  with copied material.

(36) *Blocked partial affix copying in Yamphu*

	MCNT	$\mu > S$	DEPS	DEP $\mu$	MAX $\mu$	INT <sub>A</sub>
$-\text{?}_1\text{i}_2\text{n}_3\text{-}\mathfrak{C}_4\text{i}_5^\mu$						
a. $\text{?}_1\text{i}_2\text{n}_3\mathfrak{C}_4\text{i}_5$					*	
b. $\text{?}_1\text{i}_2\text{n}_3\mathfrak{C}_4\text{i}_5\text{n}_3$	*!					*
c. $\text{?}_1\text{i}_2\text{n}_3\mathfrak{C}_4\text{i}_5\text{?}_1\text{i}_2\text{n}_3$			*!			***

In the three languages where we have evidence that partial copying of affixes is possible, MCNT is consequently lower-ranked. This constraint is also crucial in the discussion of syllable copying in section 3.3.

Table (37) summarizes the paramaters restricting the copying of nasals in Kiranti and how they follow in the analysis proposed above.

(37) *Summary: Theoretical implementation of the empirical findings*

Generalization	Account	Tableau
Morpheme-specific	/-tsi/ has floating $\mu$	(30)
Only affix segments are copied	INT <sub>S</sub> $\gg$ MAX $\mu$ $\gg$ INT <sub>A</sub>	(31)
Only local copying	MLIN $\gg$ MAX $\mu$	(33)
No partial affix copying	MCNT $\gg$ MAX $\mu$	(36)

3.3. Syllable copying

Absolutely parallel to the representation of /-tsi/, the non-past marker /-t/ in Athpare is taken to contain empty prosodic structure that must be filled with segmental material. In contrast to /-tsi/, however, the /-t/ contains two empty  $\mu$ 's that are integrated under a syllable node that also dominates the /-t/. This prosodic treelet is defective since the  $\mu$ 's do not dominate any segmental material. Since Athpare also employs nasal copying we analysed for Bantawa in section 3.2, the basic ranking of constraints is identical: DEPS ensures that no epenthetic segments fill these empty  $\mu$ -positions and fission of affix segments becomes optimal. In (38), a copying context is optimized where the /-t/ is preceded by the suffixes /-u/ and /-ŋ/. Leaving the  $\mu$ 's without any segmental content (38a) is excluded by  $\mu > S$ . Epenthesis as one possible strategy to fill the  $\mu$ 's with material (38b) is excluded by high-ranked DEPS and fission of the two affix segments (38c) becomes optimal.

(38) Syllable copying in Athpare

	INTS	$\mu > S$	ALT	DEPS	MAX $\mu$	INTA
$\mu_a$ $u_1 + \eta_2 + t_3$ <div style="display: inline-block; vertical-align: middle; margin-left: 20px;"> <math>\sigma_I</math>  <math>\mu_b \mu_c</math> </div>						
a. $\mu_a$ $u_1 \eta_2 t_3$ <div style="display: inline-block; vertical-align: middle; margin-left: 20px;"> <math>\sigma_I</math>  <math>\mu_b \mu_c</math> </div>		*!*				
b. $\sigma$ $\mu_a \mu$ $u_1 \eta_2$ <div style="display: inline-block; vertical-align: middle; margin-left: 20px;"> <math>\sigma_I</math>  <math>\mu_b \mu_c</math>  <math>\emptyset \ ?</math> </div>				*!*		
c. $\sigma$ $\mu_a \mu$ $u_1 \eta_2$ <div style="display: inline-block; vertical-align: middle; margin-left: 20px;"> <math>\sigma_I</math>  <math>\mu_b \mu_c</math>  <math>u_1 \eta_2</math> </div>						**

In case the preceding affix material consists of only a vowel, on the other hand, the copied syllable remains coda-less. This optimization is shown in (39). Since ALT ensures that another instance of /t<sub>3</sub>/ cannot be integrated under the second  $\mu$  and fission of stem segments is excluded by high-ranked INTS, the second  $\mu$  cannot be filled and is deleted as in winning candidate (39c). This is absolutely parallel to the absence of nasal copying derived in tableaux (31) and (33): if there is no adjacent affix segment that can be copied, the  $\mu$  is deleted.

(39) Syllable copying in Athpare: Only vowel

	INTS	$\mu > S$	ALT	DEPS	MAX $\mu$	INTA
$\mu_a$ $u_1 + t_2$ <div style="display: inline-block; vertical-align: middle; margin-left: 20px;"> <math>\sigma_I</math>  <math>\mu_b \mu_c</math> </div>						
a. $\sigma_I$ $\mu_a$ $u_1 t_2$ <div style="display: inline-block; vertical-align: middle; margin-left: 20px;"> <math>\sigma</math>  <math>\mu_b \mu_c</math>  <math>\emptyset \ ?</math> </div>				*!*		
b. $\sigma_I$ $\mu_a$ $u_1 t_2$ <div style="display: inline-block; vertical-align: middle; margin-left: 20px;"> <math>\sigma</math>  <math>\mu_b \mu_c</math>  <math>u_1 t_2</math> </div>			*!			**
c. $\sigma_I$ $\mu_a$ $u_1 t_2$ <div style="display: inline-block; vertical-align: middle; margin-left: 20px;"> <math>\sigma</math>  <math>\mu_b</math>  <math>u_1</math> </div>					*	*

Now we can turn to the two additional contexts in (21) where more than a single vowel preceding the /-t/ was copied. The first crucial observation was that the whole morpheme /-tsi/ is copied. This is taken to be another effect straightforwardly predicted from MCNT (35): if one segment of a morpheme undergoes fission and this ‘copied’ segment is realized in a non-adjacent position, all other segments of this morpheme have to undergo fission as well in order to create another contiguous string of segments affiliated with this morpheme. This is illustrated in tableau (41): candidate (41a) induces a fatal violation of MCNT since one instance of [ts<sub>1</sub>] is not contiguous to a [i<sub>2</sub>]

A second important factor was the impossibility of the /-t/ to be syllabified as a coda consonant. In the present analysis, this is a direct consequence of the fact that the non-past morpheme is a defective prosodic treelet where the [t] is already associated to a syllable node as onset consonant. The underlying association to this syllable position is preserved due to the faithfulness constraint (40a), excluding candidate (41c). On the other hand, we know that complex onsets are impossible in Athpare (40b) and realization of the [t] in onset position and contiguous copying of the preceding /-tsi/ as in (41d) is hence impossible as well. The optimal repair strategy in such a context is fusion of the /-t/ with a copied instance of /ts/ as in winning candidate (40e). This ensures that all correspondents of /tsi/ are contiguous to the other segments of the morpheme and that /t/ is realized in its underlying onset position without creating a complex onset. This fusion induces an additional violation of UNIF (40c) since two output segments correspond to a single input segment. Since [t] and the affricate [ts] are nearly identical and only their specification for [±cont] differs, only a violation of low-ranked ID[CNT] is induced by fusion and all higher-ranked IDENT-constraints (ID[NAS] is only one exemplifying IDENT constraint given in (41)) are satisfied.

- (40) a. MAX|<sub>S</sub><sup>σ</sup>  
Assign a violation mark for every association line between a syllable σ and a segment S in the input that lacks a corresponding association line between the corresponding syllable and segment in the output.
- b. \*[CC (Kager 1999)  
Assign a violation mark for every complex onset.
- c. UNIF (=UNIFORMITY; McCarthy & Prince 1995)  
Assign a violation mark for every output segment corresponding to more than one input segment.

Tableau (41) hence illustrates the somehow paradoxical situation that MCNT demands fission of so many segments that fusion as a phonological repair becomes optimal. In a sense, the copy-triggering morpheme can hence be described as triggering its own destruction.

(41) *Syllable copying in Athpare: Fusion*

	$\begin{array}{c} \mu_a \\   \\ t_{s_1} \ i_2 \end{array} + \begin{array}{c} \sigma_i \\ / \ \backslash \\ \mu_b \ \mu_c \\   \ \   \\ t_3 \ i_2 \end{array}$	*[CC]	MCNT	INT <sub>S</sub>	ID[NAS]	MAX <sub>μ</sub>	MAX <sub>σ</sub>	UNIF	INT <sub>A</sub>	ID[CNT]
a.	$\begin{array}{c} \sigma \ \ \sigma_i \\ / \ \backslash \ / \ \backslash \\ \mu_a \ \mu_b \ \mu_b \ \mu_c \\   \ \   \ \   \ \   \\ t_{s_1} \ i_2 \ t_3 \ i_2 \end{array}$		*!			*			*	
b.	$\begin{array}{c} \sigma \ \ \sigma_i \\ / \ \backslash \ / \ \backslash \\ \mu_a \ \mu_b \ \mu_b \ \mu_c \\   \ \   \ \   \ \   \\ t_{s_1} \ i_2 \ t_3 \ t_{s_1} \ i_2 \end{array}$					*	*!		**	
c.	$\begin{array}{c} \sigma \ \ \sigma_i \\ / \ \backslash \ / \ \backslash \\ \mu_a \ \mu_b \ \mu_b \ \mu_c \\   \ \   \ \   \ \   \\ t_{s_1} \ i_2 \ t_3 \ t_{s_1} \ i_2 \end{array}$	*!				*			**	
d.	$\begin{array}{c} \sigma \ \ \sigma_i \\ / \ \backslash \ / \ \backslash \\ \mu_a \ \mu_b \ \mu_b \ \mu_c \\   \ \   \ \   \ \   \\ t_{s_1} \ i_2 \ t_{s_{1,3}} \ i_2 \end{array}$					*		*	**	*

The analysis for contexts where the affixes /-ŋa/ or /-na/ precede the /-t/ is in principle identical to the one in (41): the whole affix string [ŋa] and [na] must be copied and the expected complex onsets \*[tŋ] and \*[tn] are avoided via segment fusion. In these contexts, the outcome of this fusion operation, however, is not as straightforward as in (41) where the [t] is identical to the first portion of the affricate [ts]. Fusion of /t/ and a nasal, on the other hand, implies a featural change for many feature dimensions for at least one of the two segments since only one of the two opposing feature values for [±voice], [±nasal], and [±son] can be realized. The choice for one or the other feature value is taken to be an Emergence of the Unmarked Effect preferring a voiceless stop over a nasal. Note that the IDENT constraints for all the relevant feature dimensions are ranked above the markedness constraints preferring a stop, which ensures that not all underlying nasals are neutralized to stops. In a context like (43), however, where an IDENT violation is unavoidable since the

fused segment cannot faithfully realize both specifications of the corresponding input segments, lower-ranked markedness constraints have an effect. Special in this respect is the place feature specification that is taken to be protected for every segment by a relatively high-ranked  $\text{DEP|}_F^S$  constraint for association lines (42).<sup>12</sup> If this constraint is high-ranked, it follows that a fused segment that corresponds to two input segments cannot be associated to any place feature since any association to a feature induces a violation for  $\text{DEP|}_F^S$ . This effect is briefly illustrated with a partial autosegmental structure in tableau (43). If the onset consonant corresponding to both /t/ and /ŋ/ is specified for [Cor], a violation of  $\text{DEP|}_F^S$  arises since /ŋ<sub>1</sub>/ was underlyingly not associated to [Cor]<sub>c</sub>. Fusion of [t] and a nasal hence results in a place-less glottal stop [ʔ] (42c).  $\text{DEP|}_F^S$  has no effect for the fused segment resulting from [ts] since there is a higher-ranked markedness constraint that excludes a placeless affricate or [+cont] sound: in this case, a new association between the feature [Cor] and a segment is hence possible.

- (42)  $\text{DEP|}_F^S$   
Assign a violation mark for every association line between a segment S and a feature F in the output that lacks a corresponding association line between the corresponding segment and feature in the input.

- (43) *Syllable copying in Athpare: Nasal fusion*

	Dor <sub>a</sub> Cor <sub>b</sub>				
	 ŋ <sub>1</sub> a <sub>2</sub> + t <sub>3</sub>		*[CC	$\text{DEP }_F^S$	UNIF
a.	Dor <sub>a</sub> Cor <sub>b</sub> Dor <sub>a</sub>                             ŋ <sub>1</sub> a <sub>2</sub> t <sub>3</sub> ŋ <sub>1</sub> a <sub>2</sub>		*!		
b.	Dor <sub>a</sub> Cor <sub>b</sub>                ŋ <sub>1</sub> a <sub>2</sub> t <sub>1,3</sub> a <sub>2</sub>			*!	*
☞ c.	Dor <sub>a</sub>   ŋ <sub>1</sub> a <sub>2</sub> ʔ <sub>1,3</sub> a <sub>2</sub>				*

<sup>12</sup> Athpare has processes of predictable (nasal) place assimilation that are taken to be standard autosegmental feature spreading. In these contexts, association lines between segments and place features are hence indeed inserted. It is assumed that the constraint triggering place assimilation is consequently higher-ranked than  $\text{DEP|}_F^S$ .

The crucial generalizations about syllable copying are hence that the whole preceding affix needs to be copied to ensure a contiguous instance of this morpheme, and that the /t/ may not be syllabified in coda position.

The generalization that MCNT is active and triggers entire morpheme-copying is in fact different from the descriptive generalization given in Ebert (1997) where it is stated that ‘only that part of the immediately preceding string of phonemes is copied which makes a good syllable’ (p. 44, fn. 12). For sequences /nis-u-ŋ-tsi-t/ ‘I will see them’, it is hence assumed that only the part /siŋ/ of the suffix is copied, resulting in /nis-u-ŋ-tsiŋtsiŋ/, which avoids the illicit complex cluster \*/nis-u-ŋ-tsiŋttsiŋ/. However, it is immediately acknowledged that this generalization leaves forms like /-tsi-t/ → [ttsi] unexplained given that the sequence /Vt.tsV/ is licit in Athpare (cf. the discussion below (39)). In addition, this generalization is not sufficient to explain why stem segments are systematically invisible for copying.

The high position of MCNT in the grammar of Athpare predicts the same blocking of nasal copying that was observed in Yakkha and Yamphu if a longer affix precedes /-tsi/ (cf. tableau (36)). As already became clear in table (19), there is no way we can test this prediction in Athpare since there are no contexts where a longer nasal-final affix precedes /-tsi/.

#### 4. Alternative account: BR-correspondence

An alternative standard view of reduplication in OT is based on the assumption of BR-correspondence. A morpheme that triggers reduplication is taken to consist of the phonologically empty morpheme RED that establishes a new correspondence relation between the base and a reduplicant (McCarthy & Prince 1995).

Under this view, Kiranti affix copying would be taken to be an instance of morphological Fixed Segmentism Reduplication (=FSR). The non-past marker /-t/ and the /-tsi/ are reduplicative morphemes that also contain segments that are realized in all contexts (Alderete et al. 1999, Zimmermann & Trommer 2011). At least two crucially different types of FSR are usually differentiated (McCarthy & Prince 1986/1996, Yip 1998, Alderete et al. 1999): *first*, patterns where the fixed segment is an Emergence of the Unmarked Effect and, *second*, those where the fixed segment cannot be epenthetic and hence must be affixal. The ‘fixed segments’ in Kiranti copying are clearly of the latter type given that /ʔ/ is

the place-less default consonant in Kiranti and that the two ‘fixed segmentism’ patterns [t] and [tsi] co-exist in the copying processes of the language. An analysis of /-t/ as a reduplicative morpheme with a fixed segmentism is sketched in (44)<sup>13</sup>. The size of the reduplicant is restricted by AF=σ (=Generalized Template Theory McCarthy & Prince 1995).

(44) *Athpare syllable copying as FSR in correspondence theory*

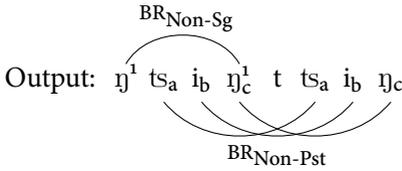
	MaxIO	Af=σ	MaxBR
$l_1e_2m_3-n_4a_5-t_6$			
a. $l_1e_2m_3n_4^a a_5n^a$	*!	*!	****
b. $l_1e_2m_3n_4^a a_5t_6n^a$		*!	*****
(  ) c. $l_1e_2m_3n_4^a a_5^b t_6n^a a^b$			****

Since every reduplicative morpheme establishes its own correspondence relation and the different BR-faithfulness constraints for these relations can be ranked differently, the co-existence of nasal and syllable copying and their interaction can in principle be predicted under such an account as well. An example of an analysis where two different reduplicative morphemes can co-occur and interact in words is given in Urbanczyk (1999) for double reduplication in Northern Lushootseed. There, it is acknowledged that it ‘is a matter of some delicacy to determine what portion of the output functions as the base for each morpheme’ (p. 518). The assumption in Urbanczyk (1999) is then simply that the base for a reduplicant consists of any segment following/preceding it in the output. For the copying in Kiranti, a crucial additional restriction is that only affix material may ever undergo reduplication, the base can hence not be determined by reference to linearity of segments alone. The correspondence relations for interacting nasal and syllable copying in Athpare would hence be as in (45). The different sizes of the two ‘reduplicants’ would then follow from different rankings of MAX-BR<sub>NON-PAST</sub> and MAX-BR<sub>NON-SING</sub> with respect to the markedness constraints determining the shape of an unmarked affix.

<sup>13</sup>Subscript numbers indicate IO-relations and superscript letters BR-correspondence. The winner is marked in parentheses since we know that onset fusion still needs to apply.

(45) *Nasal and syllable copying: Correspondence relations*

Input:  $\eta$  + tsi RED + t RED



The most crucial difference to the present account for the phonological output structure is the nature of the ‘copied’ segments and their morphological affiliation. Under the present view that copying is fission, the additional segments are output instances of an input element and hence share the morphemic affiliation with that segment. This is a natural consequence of the assumption made explicit in the theory of ‘morphological colours’ that all elements that are part of the representation of a morpheme bear the affiliation or ‘colour’ of this morpheme and may never change this affiliation in the output (van Oostendorp 2006). The fact that ‘copied’ segments are instances of affix segments is the basic reason why MCNT has an effect on the size of the copied portion forcing it to be contiguous to the other elements that belong to that morpheme in the input. Under the alternative view that the copied element is not another instance of the same segment, the formulation of MCNT is not as straightforward. A reference to the morphemic affiliation of the copied elements is only possible in the full model of correspondence (46b) that includes IR-correspondence relations (McCarthy & Prince 1995). MCNT must then be formulated for this IR-relation in order to predict whole affix copying.

(46) *Syllable copying and correspondence relations*

a. Copying as fission	b. Full model of BR-Corr
<p>Input: <math>n_1</math> <math>a_2</math> <math>t_3</math></p> <p>Output: <math>n_1</math> <math>a_2</math> <math>t_3</math> <math>n_1</math> <math>a_2</math></p>	<p>Input: <math>n_1</math> <math>a_2</math> <math>t_3</math></p> <p>Output: <math>n_1</math> <math>a_2</math> <math>t_3</math> <math>n_1</math> <math>a_2</math></p>

The alternative account where two abstract RED-morphemes trigger affix copying in Kiranti hence relies on multiplying faithfulness constraints for

additional types of correspondence relations and crucially also on specifying BR-correspondence constraints to specific BR-relations that are established by a certain abstract RED-morpheme. This latter ingredient has some resemblance to morpheme-specific constraints (Pater 2000, Pater & Coetzee 2005, Flack 2007, Pater 2009, Mahanta 2012), an assumption that substantially increases the theoretical complexity and predictive power of an account.

In addition, the BR-correspondence account faces a severe undergeneration problem in its account for Athpare. It was shown in section 3.3 that the onset fusion effect is straightforwardly predicted under the assumption that the /t/ is underlyingly syllabified as onset of an otherwise empty syllable node. In a theory where the abstract RED triggers copying, however, this syllable position restriction remains mysterious. Of course, it is in principle possible to assume that RED triggers copying *and* /t/ is underlyingly syllabified as onset, but this is a complex superset-theory. If the fact that /t/ cannot be realized in onset position is an independent argument for the existence of prosodic structure in the input, then the additional assumption of the mysterious RED morpheme seems completely superfluous given that empty prosodic structure is marked and copying is one way to provide additional segmental material.

## 5. Conclusion

A close investigation of segmental copying in Kiranti languages reveals several interesting restrictions: *first*, the process is triggered only by specific affixes and *second*, only affix material is ever copied. *Third*, only affix material that is directly adjacent to the triggering affix is ever copied and *fourth*, there are two different repairs for avoiding the copying of only parts of morphemes: either no copying applies if the morpheme is ‘too big’ or copying of so much additional material applies that the additional phonological repair of segment fusion becomes optimal. This latter effect resembles a Duke of York effect: segments undergo fusion so that fission is possible. These morpheme contiguity effects were the main argument for proposing the new constraint MCNT demanding that *all* instances of a morpheme string in the output must be contiguous.

Whenever no adjacent affix segment precedes the triggering affix, copying is blocked. This is interesting from a typological perspective since many languages employ some alternative strategy if the preferred copying operation is unavailable. In Northern Lushootseed, for example, vowel epenthesis is

observed for CV reduplication if the stem vowel cannot be copied since it is either /ə/ or a long vowel (Urbanczyk 1999) and in Nakanai, a non-local vowel can be copied if this is the most sonorous one in the base (Kawahara 2007).

It was shown how all the restrictions on Kiranti affix copying straightforwardly fall out under the assumption that copying is segment fission that applies to fill otherwise empty prosodic nodes with segmental material. Especially insightful in this respect is the pattern of onset fusion in Athpare syllable copying. The fact that the /t/ must be realized in a specific syllable position can be understood as an independent argument for prosodic structure in the input – and that can easily trigger copying given the standard assumption that prosodic nodes must be filled with segmental material. The account hence predicts the morpheme-specific copying process in a purely representational account and without any morpheme- or construction-specific mechanisms (Pater 2009, Inkelas 2008).

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# From polarity to reduplication in Gã

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## Abstract

There seems to be an intricate connection between reduplication of indefinite DPs and clausal negation in Gã; the reduplication is only permitted in the presence of negation. Thus, such reduplicated DPs can be construed as negative polarity items (NPIs). In this paper, I provide a detailed description of the facts about this phenomenon following what has been reported for NPIs elsewhere. I show that the patterns we observe exhibit typical properties of strong and strict NPIs. Subsequently, I propose how such indefinite DPs can be accounted for both in frameworks which see NPIs as resulting from a negatively-valued polarity feature e.g. Giannakidou (2000), and also frameworks which treat NPIs as resulting from NEG-raising, particularly Collins & Postal (2014).

## 1. Introduction

Negative polarity items (NPIs) are, simplifying somewhat, nominal and adverbial elements which are permitted only in contexts where there is some form of negation in a given structure. A well-known case of NPIs is the *any*-series in English, as exemplified in (1a), but also adverbial elements like *ever* in (1b), where omitting the negation will lead to ungrammaticality (NPIs are marked in italics).

- (1) a. John did\*(n't) invite *anybody*.
- b. The residents did\*(n't) *ever* report the incident to the police.

Every language is predicted to have NPIs (see Haspelmath 1997), and they have been extensively studied in many Indo-European languages. In this paper, I discuss NPIs in Gã, a Kwa language, spoken in Ghana. What makes NPIs in this language interesting is that the equivalents of the *any*-series in English are reduplicated indefinite DPs, as exemplified in (2). Thus, similar to the

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occurrence of *anybody* in (1a), the reduplication of *mɔko* in (2) is only permitted when there is negation in the sentence. No language is known to exhibit such a morphological strategy in the formation of NPIs (Dholuo being the only notable exception (3), as reported by Cable 2009).

- (2) Kwei tsé-\*(éé) *mɔ-ko-mɔ-ko*.  
 K. call-NEG person-INDEF-person-INDEF  
 ‘Kwei didn’t call anybody.’
- (3) Ok achámo gi *mo(o) a-mor(o)-a*  
 NEG I.eat thing some RED-some-RED  
 ‘I didn’t eat anything.’ (Dhuluo; Cable 2009: 12)

The data from Gã suggest an interesting interplay between morphology, syntax, and semantics in the sense that the reduplication of the relevant DPs is only possible in the scope of negation, but it seems to respect syntactic constituency. In this paper, I try to address three key issues posed about NPIs by Ladusaw (1979), i.e. what is the licenser?, what is the licensee?, and what are the licensing conditions? I outline the facts about the morphological properties, and syntactic distribution of these NPIs, given what we know about NPIs in other languages. I then show how the data may be modeled in at least two existing frameworks that deal with NPIs: First, in frameworks which see NPIs as the result of a valued weak polarity feature on indefinites, for instance Giannakidou (2006), second, in frameworks which treat NPIs as resulting from *Classical NEG-raising*, specifically, the proposal by Collins & Postal (2014).

The remainder of the paper is structured as follows: Section 2 gives an overview of negation, and negative polarity contexts in Gã. In section 3, I detail out the morpho-syntactic distribution of NPIs of the type in (2). Section 4 gives the possible analyses, and section 5 gives the summary and conclusion.

## 2. Negation and negation-triggering contexts in Gã

Since negative polarity typically involves some kind of clausal negation, a general overview of how sentential negation works in Gã is in order. The first part of this section deals with this. The second part discusses various negation-triggering contexts in Gã.

## 2.1. Clausal negation

Clausal negation in Gã, just like many of its neighbours and languages such as Turkish (see e.g. Zeijlstra 2013: 797), is marked via affixation on a verbal element. In constructions where there is only one verbal element, negation is marked on the sole verb in the clause, as in (4). But in constructions where there is (what I will refer to as) an ‘auxiliary verb’, such as *nyɛ* in (5), the marking of negation is possible only on the auxiliary verb.

- (4) a. Kwei é-ná shía.  
 K. PERF-get house  
 ‘Kwei has got a house.’  
 b. Kwei ná-ko shía.  
 K. get-NEG.PERF house.  
 ‘Kwei hasn’t gotten a house.’
- (5) a. Kwei é-nyé é-ná shía.  
 K. PERF-able 3SG.NOM-get house  
 ‘Kwei has been able to get a house.’  
 b. Kwei nyé-ko é-ná(\*ko) shía.  
 K. able-NEG.PERF 3SG.NOM-get-neg.perf house  
 ‘Kwei hasn’t been able to get a house.’

Cases like (5) are to be differentiated from constructions involving serial verbs, in which case negation is usually marked on all the verbs, as in (6).

- (6) a. Kwei é-ná shía é-hó.  
 K. PERF-get house 3SG.NOM-sell  
 ‘Kwei has gotten a house and sold it.’  
 b. Kwei ná-ko shía é-hó-ko.  
 K. get-NEG.PERF house 3SG.NOM-sell-NEG.PERF  
 ‘Kwei hasn’t gotten a house and sold it.’

Whatever the distribution of negation marking may be, the morphology of the negation marker seems to interact with the tense, aspect, and mood (TAM) properties of the construction.<sup>1</sup> In (7), I present a general picture of the relevant affixes for marking negation in Gã, see Kropp Dakubu (2008: 96).

<sup>1</sup>See Kropp Dakubu (2008) for a discussion of the morphological neutralization of the negation affix with respect to aorist, habitual, and progressive aspects.

(7) *Clausal negation affixes in Gã*

TAM	AFFIX	EXAMPLE	GLOSS
Aorist/Past	-V́V́	ná-áá	‘didn’t get’
Habitual	-V́V́	ná-áá	‘doesn’t get’
Progressive	-V́V́	ná-áá	‘isn’t getting’
Future	-ŋ	ná-ŋ	‘won’t get’
Perfective	-ko	ná-ko	‘hasn’t got’
Imperative	kaá-	kaá-ná	‘don’t get’
Subjunctive	áká-	áká-ná	‘shouldn’t get’

Given (7), I will propose in section 4.1.1 that T heads in Gã have a polarity feature, just like indefinite DPs.

## 2.2. Gã NPIs

Having given some background to clausal negation, the main licenser of NPIs cross-linguistically in Gã, we can now focus on NPIs proper. I will show that unlike English, as in (8), every context in which NPIs are permitted in Gã strictly requires the presence of an overt negation marking, and this is certainly the case for NPIs formed by reduplicating indefinite DPs which are otherwise equivalent to the *any*-series.

(8) We’ve barely seen *any snow* this winter.

2.2.1. *Reduplicated indefinite DPs as NPIs*

In Gã, any singular indefinite DP may be reduplicated to get the equivalent of ‘*any/no X*’ NPIs in English. In (9), I show that the strategy is as productive as the *any*-series in English. In what follows, I give evidence for the NPI status of the reduplicated forms.

(9) *Productivity of reduplicated NPIs in Gã*

BASE	GLOSS	RED	GLOSS
<i>mɔ ko</i>	'a person/someone'	<i>mɔko-mɔko</i>	'anybody/nobody'
<i>nɔ́ kó</i>	'a thing/something'	<i>nɔ́kó-nɔ́kó</i>	'anything/nothing'
<i>hé kó</i>	'a place/somewhere'	<i>hékó-hékó</i>	'anywhere/nowhere'
<i>bee ko</i>	'a time/some time'	<i>beeko-beeko</i>	'anytime/ no time'
<i>gbi ko</i>	'a day/some day'	<i>gbiko-gbiko</i>	'anyday/ no day'
<i>shía ko</i>	'a house/some house'	<i>shíako-shíako</i>	'any house / no house'

Indefinite DPs may occur as non-NPIs. In such contexts, the presence of negation in the clause is completely optional, as illustrated in (10a). However, the reduplication of such indefinite DPs is possible only when there is negation. Thus (10b) is ungrammatical without the negation, given that the indefinite DP is reduplicated.<sup>2</sup> So, while the presence of negation is optional for the occurrence of non-reduplicated indefinite DPs, negation is obligatory for their reduplicated counterparts. Clearly, this suggests that the reduplicated forms are licensed by negation, a property that they share with other NPIs in the language (as I will show in section 2.3), and indeed NPIs in other languages, hence the reference to forms like *shíako-shíako* in (10b) as NPIs in Gã.

- (10) a. Kwei ná-(áá) *shía ko*.  
 K. get-NEG house INDEF  
 'Kwei did(n't) get a house.'
- b. Kwei ná-\*(áá) *shía ko shía ko*.  
 K. get-NEG house INDEF house INDEF  
 'Kwei didn't get any house(s).'

Another piece of evidence in support of the tight relationship between the reduplicated indefinite DPs and negation comes from the fact that definite DPs in the language cannot be reduplicated for the same effect, whether there is negation or not (11), i.e. negative polarity is blocked by definiteness. This behaviour may follow from the fact that across many languages, there is a close connection between negative polarity and indefiniteness (see Haspelmath 1997).

<sup>2</sup>For the sake of simplicity, I will henceforth represent parts of the reduplicated constituent as a unit i.e. a reduplicated *shía ko* will be *shíako-shíako*.

- (11) a. Kwei ná-(áá) shía lé.  
 K. get-NEG.PST house DEF  
 ‘Kwei did(n’t) get the house.’  
 b. \*Kwei ná-áá shía lé shía lé.  
 K. get-NEG.PST house DEF house DEF

Yet another interesting property which supports this relationship is the fact that plural indefinite DPs do not permit the reduplication process, as in (12).

- (12) Kwei ná-áá shía-i ko-mɛi (\*shía-i ko-mɛi).  
 K. get-NEG.PST house-PL INDEF-PL house-PL INDEF-PL  
 ‘Kwei didn’t get any houses.’

Again this is consistent with what has been noted about NPIs elsewhere. In many languages, the NPI particle combines with an indefinite DP to mean something like *not even one* (see for instance Lahiri 1998). In this regard, one could postulate a similar connection between the numeral *é-kó* ‘one’ in Gã, and the indefinite determiner *ko*, as we have seen so far.

It is also important to mention that the reduplication mechanism obeys syntactic constituency; no part of the targeted indefinite DP may be left out in the reduplication process. This also holds for indefinite DPs with adjectival modifiers. For instance, in (13), neither the determiner, nor the adjective may be left out in the reduplicant.

- (13) a. shía hee ko shía \*(hee) ko  
 house new INDEF house new INDEF  
 b. shía hee ko shía hee \*(ko)  
 house new INDEF house new INDEF  
 ‘any new house’

However, there seems to be a size restriction on what may be reduplicated (see e.g. Müller this volume). For instance, it becomes increasingly ungrammatical when the NP complement of the indefinite head is modified by more than one adjective. This constraint accounts for examples like (14).

- (14) ?\*shía hee fɛ́é fɛ́ó ko shía hee fɛ́é fɛ́ó ko  
 house new beautiful INDEF house new beautiful INDEF  
 ‘any new beautiful house’

## 2.3. Other NPIs in Gã

Reduplication of indefinite DPs is not the only source of NPIs in Gã. The following illustrate a number of NPIs, which do not take the form of reduplicated indefinites. The first group, exemplified in (15) and (16), is comparable to one-word, and semi-negative adverbial expressions like *ever* in (1-c).

- (15) a. Kwei yó\*(-óó) ju-ló lé kwrákwrá.  
K. recognize-NEG steal-NML DEF at.all  
'Kwei didn't ever recognize the thief.'
- b. Kwei yó\*(-óó) ju-ló lé kəkəkə.  
K. recognize-NEG steal-NML DEF at.all  
'Kwei didn't recognize the thief at all.'
- c. Amɛ-fólɔ-i shí\*(-íí) amɛ shéleŋ.  
3PL.POSS-parent-PL leave-NEG 3PL shilling  
'Their parents didn't leave them a dime.'
- d. Kwei yé\*(-ko) ótsí yɛ maŋ néé mli péŋ.  
K. spend-NEG.PERF one.week at town DEM inside ever  
'Kwei has never spent a week in this town.'
- (16) a. Gbi-i été né, Kwei ná\*(-ko) tsu.  
day-PL three it.is K. get-NEG house  
'It's been three days, Kwei has got no house.'
- b. Gbi-i été né ní Kwei ná\*(-ko) tsu.  
day-PL three it.is COMP K. get-NEG house  
'It's already three days since Kwei got a house.'

For NPIs like (16), I draw attention to the significance of having either a pause (16a), or a complementizer, as in (16b), after the time adverbial as a trigger for a polarity.

The second group comprises templatic verb phrases whose environments seem to trigger negation.

- (17) a. Kwei é-ná\*(-áá) bɔ ní e-fé-ɔ e-he po.  
K. 3SG-see-NEG how 3SG--do 3SG-self even.  
'Kwei didn't even know how to contain her excitement.'
- b. \*(Kaa-)gba o-he naa ní o-tee  
NEG.SG.IMP-hit 2SG-self mouth and 2SG-go.PST  
'Don't bother yourself to go.'

- c. Kwei *sha*-(\*)*(aa)* *gbaŋ* e-*wo*-(\*)*(oo)* *amɛ-he*  
 K. fart-NEG sound 3SG-put-NEG 3PL-self  
 ‘Kwei didn’t care a hoot about them.’
- d. Kwei *na*-(\*)*(aa)* *tsina-loo* *lɛ oɔ*.  
 K. get-NEG cow-flesh DEF exclusive  
 ‘Kwei really appreciated the beef.’
- e. *Maŋ-bii* *lɛ hwé*-(\*)*(éé)* *yɛ kpa* *nɔ*.  
 town-people DEF play-NEG at line top  
 ‘The people are very serious-minded.’

### 3. Distribution of reduplicated NPIs

Despite the similarities between the *any*-series and the reduplicated indefinite DPs, there are a number of distributional properties that differentiate them. In this section, I discuss the relevant properties. I show that unlike the *any*-series, the reduplicated indefinite DPs cannot occur in downward entailing contexts other than negation. Furthermore, they can be used as subjects with the same morphology, require clause-mate negation, and show NEG-raising properties.

#### 3.1. Downward entailment and reduplicated indefinite DPs

Since Ladusaw (1979), the key defining characteristic of NPIs has been that they tend to occur in so-called ‘downward entailing’ (DE) environments. By DE, Ladusaw makes specific reference to relations like those in (18), where there is an entailment relation between a less specific expression (e.g. *a bike*) and a more specific expression (e.g. *a red bike*), i.e. entailment from supersets to subsets, but not *vice versa*. Compare the example in (19), which is a non-downward entailing environment. Here, the entailment relation goes in the other direction from more specific to less specific expressions (subsets to supersets). These environments are termed *upward entailing*.

#### (18) *Downward Entailment*

- a. [i] Nobody owns a bike → [ii] Nobody owns a red bike.  
 b. [i] Nobody owns a red bike → [ii] Nobody owns a bike.

#### (19) *Upward Entailment*

- a. [i] John owns a bike → [ii] John owns a red bike.  
 b. [i] John owns a red bike → [ii] John owns a bike.

Ladusaw observed that negative polarity items seem to only be licensed in DE environments such as (18), and similar constructions in many other languages (20).

- (20) a. Nobody owns *anything*. (downward entailing)  
 b. \*John owns *anything*. (upward entailing)

Based on evidence like this, he proposed (21) as the licensing condition for NPIs, following which a number of syntactic and semantic contexts have been identified in the literature as being DE environments.

- (21) *Licensing condition for NPIs (cf. Ladusaw 1979)*  
 $\alpha$  is a trigger for negative polarity items in its scope iff  $\alpha$  is downward entailing.

NPIs such as the *any*-series and *ever* have been claimed to be weak NPIs, while others like *lift a finger* and *until next week* (22) have been said to be strong NPIs. These differ from so-called ‘weak NPIs’ in that they are only licensed in a narrower set of DE environments.

- (22) John can\*(not) participate in the workshop *until next week*.

Recent works such as Giannakidou (1998), Zwarts (1998), Collins & Postal (2014) among others, have shown that the characterization of NPIs based on their (in)ability to occur in DE contexts is inadequate.<sup>3</sup> They show that while some NPIs in some languages e.g. the *any*-series in English, and *bhii*-NPIs in Hindi (Lahiri 1998), behave strictly in accordance with this proposal, there are also other NPIs which are allowed in non-DE contexts. In this regard, I show that Gã reduplicated NPIs, just like Ewe (Collins et al. 2015) and Japanese (Hasegawa 1987), fall into the latter group of languages; they consistently fail all the DE tests that characterize their English counterparts as weak NPIs. Let us consider some examples for the various DE contexts that have been proposed. I illustrate these with the NPI *shíako-shíako*. Note that for each example, whereas the English equivalent with *any* is perfectly grammatical, Gã only permits the indefinite DP reading.

<sup>3</sup>Giannakidou (1998) shows that the inability of NPIs to occur in *non-veridical* is a superior criterion, as contexts such as conditionals and polar questions are not DE.

(23) *Polar questions*

Ani o-ná shiako(\*-shiako) ?  
 Q 2SG.NOM-get house.INDEF-house.INDEF  
 ‘Did you get a/#any house?’

(24) *Surprise predicates*

E-feé mi naakpɛɛ áké o-ná shiako(\*-shiako)  
 3SG.NOM-do 1SG surprise COMP 2SG.NOM-get house.INDEF-RED  
 ‘It surprised me that you got a/#any house.’

(25) *Before clauses*

Kwei hé shikpɔŋ lé dáni e-ná shiako(\*-shiako).  
 K. buy land DEF before 3SG.NOM-get house.INDEF-RED  
 ‘Kwei bought the land before he got a/#any house.’

(26) *Restrictor of a universal quantifier*

- a. Mɔ-féé-mɔ ní ná shiako(\*-shiako) lé je La.  
 person-all-person REL get house.INDEF-RED CD be.from L.  
 ‘Everybody who got a/#any house hailed from La.’
- b. Awulá-í ko-meí ní ba bíe ná shiako(\*-shiako).  
 lady-PL INDEF-PL REL come here get house.INDEF-RED  
 ‘Some ladies who came here got a/\*any house.’

(27) *Scope of ‘only’*

La-bíí pé ni ná shiako(\*-shiako).  
 L.-folks only FOC get house.INDEF-RED  
 ‘Only La folks got a/#any house.’

(28) *Conditional clauses*

Ké jí o-ná shiako(\*-shiako) lé, kéé-mó mí.  
 if 2SG.NOM-get house.INDEF-RED CD tell-IMP 1SG  
 ‘If you get a/#any house, tell me.’

Considering examples (23)–(28), we can conclude that Red-indefinite DPs in Gã are not weak NPIs; they are not licensed in most of the typical DE contexts for NPIs. Conversely, we can conclude that they are superstrong NPIs in the sense of Zwarts (1998), i.e. they are only licensed by negation (in antimorphic environments).

## 3.2. Strict NPIs

The body of literature on NPIs also makes a distinction between strict and non-strict NPIs. In its simplest sense, a strict NPI requires its negative element, i.e. the licenser, to be in its immediately local clause, and allows no intervening clausal boundary (29a). Non-strict NPIs such as *any*-DPs do not have this restriction (29b).

- (29) a. \*John didn't say [<sub>CP</sub> that Mary would leave *until tomorrow*]  
 b. John didn't say [<sub>CP</sub> that Mary saw *anyone*]

We see that NPIs in Gã do not behave like non-strict *any*-NPIs. In the following examples, for instance, while it is fine for the negation and the NPI to occur in separate clauses in the English equivalent (as in the translation), the Gã equivalent disallows this, as in (30a). We see this problem resolved in (30b) where both the NPI and the negation occur in the same minimal clause.

- (30) *Clause-mate negation*
- a. Kwei é-ké-éé [<sub>CP</sub> áké Dede ná *shíako*(\*-*shíako*) ]  
 K. SBJ-say-NEG COMP D. get house.INDEF-RED  
 'Kwei didn't say that Dede got a/#any house.'
- b. Kwei kéé [<sub>CP</sub> áké Dede ná-áá *shíako-shíako*]  
 K. say COMP D. get-NEG house.INDEF-RED  
 'Kwei said that Dede got no house.'

But as one might expect, so-called NEG-raising predicates like 'imagine', 'think', etc. permit the negation and the NPI to stay in different clauses, as in (31). This is not problematic for the evidence presented in (30a) given that the negation that is associated with a NEG-raising predicate is traditionally assumed to have originated in the same minimal clause as the predicate.

- (31) *NEG-raising*
- Dede súsú-úú [<sub>CP</sub> áké Kwei ná *shíako-shíako* ]  
 D. imagine-NEG COMP K. get house.INDEF-RED  
 'Dede didn't imagine that Kwei got any house.'

## 3.3. Subject-Object NPIs

Lastly, I would like to make a few remarks about the structural position where the reduplicated indefinite DPs can occur. As example (32) shows, it may occur in both subject and object positions without a change in morphology. In this respect, these Gã NPIs are again unlike their English counterparts. They are similar to NPIs in languages like Ewe and Hindi (Lahiri 1998). Thus it is possible to have reduplicated NPIs as subject and object of the same clause without a change in their form, as in (33).

(32) *Subject NPI*

*Nuuko-nuuko*                      bá-áa.  
 man.INDEF-man.INDEF come-NEG  
 ‘No man came.’

(33) *Mɔko-mɔko*              ná-áá    *nɔ́kó-nɔ́kó*.  
 person.INDEF-RED get-NEG thing.INDEF-RED  
 ‘Nobody got anything.’

## 3.4. Summary

To summarize this section, we have seen that NPIs in Gã, which are equivalent to the *any*-series in terms of meaning, have entirely different distributional and morphological properties. First, they are not licensed in DE contexts other than negation, and as such should be viewed as superstrong NPIs. Second, they are strict NPIs, because they require clause-mate negation. And third, they can occur in subject positions. In the next section, I propose how these NPIs may be derived.

## 4. How reduplicated indefinite DPs become NPIs

The vast literature on NPIs contains several proposals about how to account for the phenomenon. For instance, Progovac (1994) proposes a binding approach. In this section, I attempt to account for the Gã data following two main proposals in the literature about how NPIs are derived, i.e. the polarity feature valuation approach pursued by Giannakidou (2000, 2007), Dikken (2006), Merchant (2013), among others, and the NEG-Raising approach proposed by Collins & Postal (2014), following Postal (2000). The fundamental difference

between these two frameworks lies in the conception of what an NPI comprises. For instance, while the feature-based approaches see NPIs as indefinites, the NEG-raising approaches construe them as negative quantifiers. I first illustrate the basic machinery required for each approach and then proceed to show how it may be deployed to model the pattern that we observe for Gã.

#### 4.1. NPI as a spellout of a valued polarity feature

Giannakidou (2000) proposes that NPIs should be viewed as elements with a polarity sensitivity requirement, and that in the case of strict NPIs, this requirement is fulfilled by a negation licenser. Appealing to a simplified version of this proposal adopted by Merchant (2013), the polarity interpretation of DPs depends on the valuation of an inherent unvalued *polarity* feature which they bear. One crucial assumption here is that only indefinite DPs (D[\*INDEF\*]) have this feature, as in (34). Thus under this approach, NPIs are conceptualized as indefinite DPs, not as negative quantifiers. This straightforwardly rules out the fact that definite DPs are least susceptible to being interpreted as NPIs across many languages.

- (34) *Structure of indefinite DPs in Gã*  
 DP [\*INDEF\*, \*POL:□\*]

The feature [\*POL:□\*] is essentially syntactic in nature, and it may be valued as positive or negative. The valuation is only possible via *Agree* by a *c*-commanding licenser head  $\Sigma$ , which is specified as negative (–) i.e. negation, or positive (+). When the DP in (34) is negatively valued, then it is interpreted as NPI, as in (35a). When it is positively valued, it is interpreted as a non-NPI, as in (35b).

- (35) a. John did\*(n't) invite *anybody*.  
 b. John did(n't) invite *somebody*.

For our purposes, I emphasize the morphological consequence of the valuation process, as put forward by Merchant (2013: 447), and summarized:

This approach assimilates, counter surface appearances, polarity items to other items that vary in their appearance: certain expressions have varying morphological realizations, depending on their syntactic environment. Which morphology is realized is determined by agreement with a valuer; *the allomorph is determined by the nature of the valuer*.

(Merchant 2013: 447, emphasis mine)

(36) *Spellout rules for any (cf. Merchant 2013: 442)*

- a. D: [INDEF, Infl[POL:+]] → *any*
- b. D: [INDEF, Infl[POL:-]] → *some*

Thus, it is the polarity value of indefinite DPs which differentiates NPIs like *anybody* from their non-NPI counterparts like *somebody* in the grammar, as (36) shows. I will claim that a similar mechanism obtains in Gã.

#### 4.1.1. A feature valuation approach to Gã NPIs

The mechanism outlined above can be readily adapted to Gã. The idea of there being a polarity specified head in the structure may be plausible and independently motivated by the observation in (7), i.e. that the morphology of the negation in Gã also depends on the tense/aspect feature. Accordingly, I assume that T/Asp heads in Gã also bear this polarity feature, as exemplified for past tense in (37), and the other tense/aspect paradigms in (38).

(37) *Spellout rules for tense*

- a. T: [PST, POL:-] → -vv
- b. T: [PST, POL:+] → Ø

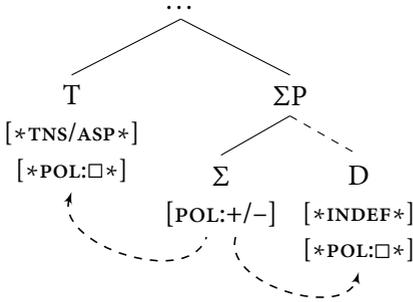
(38) *Spellout rules for tense/aspect (cf. (7))*

- a. T: [FUT, POL:-] → -íj
- b. Asp: [HAB/PROG, POL:-] → -vv
- c. Asp: [IMP, POL:-] → kaá-
- d. Asp: [PERF, POL:-] → -ko
- e. Asp: [SBJNC, POL:-] → áká-

Putting everything together, I postulate the structure in (39), where (still adopting Merchant's notation,)  $\Sigma$  is the polarity head that agrees and values

both the indefinite D, and the T heads. Note that the most important relationship in the structure is the one between  $\Sigma$  and D, i.e the former c-commands the latter. (I will not concern myself with the structural position of T heads in this paper.)

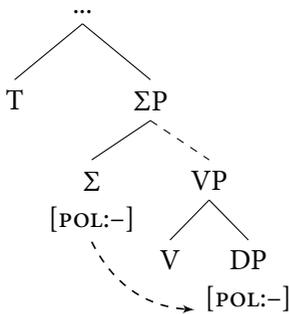
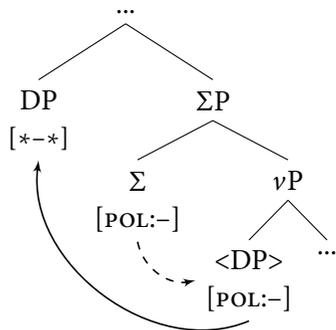
(39) *Structure of reduplicated NPIs:*



If this assumption about the featural composition of indefinite D heads in Gã is correct, then we are able to account for why definite DPs never receive NPI interpretation, (and be reduplicated for that matter). Their D heads lack this polarity-sensitive feature [ $*POL:\square*$ ], as in (40). Thus they do not even have the option of being interpreted as NPIs or otherwise, to begin with.

(40) *Structure of definite DPs in Gã*  
 D: [ $*DEF*$ ]

Now let us see how the structure in (39) can derive the NPIs in both object and subject positions. These are possible if we assume the structures in (41) and (42) respectively (where the dashed arrows indicate agreement and the direction of the copying of polarity features). For object NPIs,  $\Sigma$  straightforwardly establishes an Agree relation with the D head of the DP complement of V, and then values its polarity feature accordingly. For subject NPIs, as in (42), given that where it is spelled out shows the D head and  $\Sigma$  in a reverse c-command relation, we need to assume that the valuation takes place while the indefinite subject DP is still in Spec,  $\nu$ P, as indicated with the dashed arrows in (42). The surface position thus follows standard spec,  $\nu$ P to Spec, TP movement, as indicated with the solid arrow in (42)

(41) *Object NPIs*(42) *Subject NPIs*

The most crucial aspect of this account, which also derives the main difference between the form of NPIs in English and Gã, is the morphological realization of these valued features. Whereas a positively valued polarity feature results in a null realization (43a), I propose that a negatively valued indefinite D head in a Gã is realized as the reduplicative morpheme RED, that is as an instruction to make a full copy of the DP (43b).

(43) *Spellout rules for Gã indefinite DPs*

- a. [POL:+] → ∅
- b. [POL:-] → RED / \_\_\_ [INDEF]

Following standard approaches to reduplication in phonology (cf. McCarthy & Prince 1995), this RED morpheme is what leads to the reduplicated indefinite DP in negative contexts. The phonological constraints of the particular language regulate the form of reduplication (full reduplication in Gã) (44).

(44) RED-*shía ko* ⇒ *shía ko-shía ko*

## 4.2. Reduplicated NPIs as NEG-raising

In the framework of Collins & Postal (2014), NPIs are DPs with a modifying negative quantifier, not indefinite DPs. The main motivation comes from the equivalent interpretation of non-NPIs like *nobody*, and NPIs *anybody*, in contexts like (45a, b). Accordingly, they assume that both constructions must have a similar underlying structure, as in (46), where the negation (NEG) modifies the quantifier *some* in a DP headed by *body*.

- (45) a. I saw nobody.  
 b. I didn't see *anybody*.

(46) [[NEG SOME]body]

The difference between (45a) and (45b) is thus accounted for by the assumption that in (45b), NEG raises higher, as in (47). This operation, known as NEG-raising, they assume, leads to the realization of *some* as *any*. I refer the interested reader to Collins & Postal (2014) for the details of this account. In what follows, I will outline a similar account based on the Gã data.

(47) I did NEG<sub>i</sub> see [[ <NEG<sub>i</sub>> SOME]body]

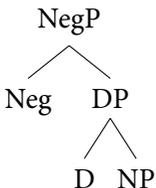
#### 4.2.1. NEG-raising for Red-NPIs

In section 3.2, we saw that Gã shows some properties of NEG-raising. For instance we saw that although reduplicated NPIs are strict NPIs, they can occur in minimal clauses without negation if only there is a NEG-raising predicate involved. The relevant example is repeated in (48).

- (48) Dede súú-úú [CP áké Kwei ná *shía-ko* *shía-ko* ]  
 D. imagine-NEG COMP K. get house-INDEF house-INDEF  
 'Dede didn't imagine that Kwei got any house.'

The data we have seen so far suggest that the reduplicated indefinite DP is permitted only in the context of negation, i.e. without negation, reduplication is *not* possible. If we cast this in terms of Collins & Postal's approach, this implies that negation is inherent in whichever mechanism it is that leads to the DP doubling. I interpret this to mean that such indefinite DPs are part of a structure headed by NEG, and accordingly assume the structure in (49). This structure is different from the base structure of their non-reduplicatable indefinite DPs, as represented in (50).

(49) NPI indefinite DPs:

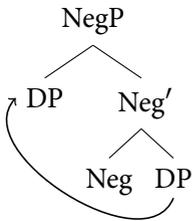


(50) Non-NPI indefinite DPs:

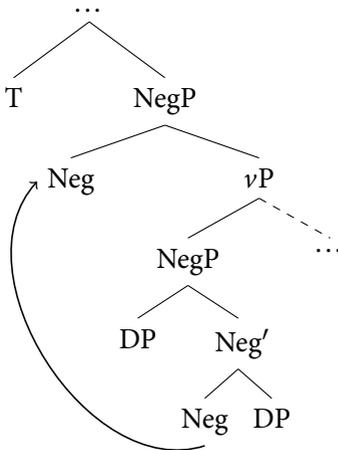


At this point, the three issues to address are first, how do we get two DPs from (49)? Second, how does NEG reach its surface position? And third, what becomes of the copies of the moved elements? One obvious solution to the the doubling problem is to assume that the presence of a NEG head triggers a copying of its DP complement, yielding the structure in (51). This could plausibly be derived as a kind of repair for illicit ‘antilocal’ movement from the complement to specifier position of the same phrase (see e.g. Grohmann & Nevins 2004, Barnickel & Hein this volume). Subsequently, NEG *raises* to the relevant higher functional head position, as in (52) for object NPIs, and (48), for subject NPIs.

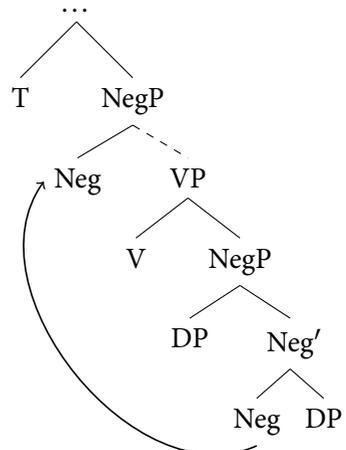
(51) *DP doubling in NEG-raising contexts:*



(52) *NEG-raising from subject:*



(53) *NEG-raising from object:*



Finally, regarding the copies problem, in the case of the raised NEG, only the higher copy gets pronounced. But for the copied DP, both copies are pronounced at spellout.

## 5. Summary and conclusion

To summarize the discussion so far, I have given a detailed description of the facts about NPIs in Gã. Particularly, I have shown that reduplicating indefinite DPs is the most productive way to form NPIs in this language. But while they may be comparable to the *any*-series in English in terms of their meaning, their distribution and morphology are quite different. Those of Gã are strong and strict NPIs, and they can occur in subject positions.

I have also tried to sketch an account of how the observed patterns may be captured in terms of polarity feature checking, and NEG-raising. With the former, I have shown that reduplicated indefinite DPs can be viewed as the result of a negatively valued polarity feature on D. For the latter, one could account for the indefinite DP doubling by assuming that the NEG head which is merged with indefinite DPs instantiates a copying of the DP. At spellout, both copies such indefinite DPs are pronounced.

This tentative account is not without problems. I will point out a few. First, regarding the feature valuation approach, the account faces a major challenge if the idea of phases (Chomsky 2001) is taken into consideration. For instance, assuming that the [ $*\text{POL}:\square*$ ] on an object indefinite DP is merged in the spellout domain of  $\nu\text{P}$  which has been argued to be a phase, then that domain would be lost before its valuer  $\Sigma$  is merged. Another problem with this account could come from the agreement mechanism and locality constraints. Given that both subject and object indefinite DPs may bear [ $*\text{POL}:\square*$ ], an agreement operation targeting a lower position might be impeded by an intervening one.

Second, with the NEG-raising approach it is not clear, why the system would conform to the Copy Theory of Movement (Nunes 2004), by deleting the lower copy of NEG in the chain so formed, but in the case of the indefinite DPs, both copies are spelled out at PF. However, it is possible to view this exceptional Spell-Out as the result of an antilocal movement step, as in the approach by Grohmann & Nevins (2004) and Barnickel & Hein (this volume), among others. Another challenge for this account will be how to model the morphological

connection between the form of NEG independent of NPIs. These are some issues that future work on this subject should address.

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# Focus and verb doubling in Limbum

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## Abstract

In this paper, we propose an account for capturing two distinct focus constructions and verb doubling in Limbum. We assume two distinct FocPs in the clause, namely a higher one in the CP domain and a lower one above TP. The high FocP marks information focus involving movement, while the low FocP expresses identificational focus on the constituent with an [exh] feature immediately c-commanded by the low Foc<sup>0</sup>. Verb focus, encoded by the doubling of the verb, features the rather unexpected order of SVOV for identificational focus. Our analysis predicts this pattern: the bare verb moves to the low Foc<sup>0</sup>, leaving the VP as immediate constituent in its scope. Since the VP does not bear an [exh] feature, it is forced to move out of the scope into a higher position.

## 1. Introduction

The present paper presents a somewhat tentative account of two different focus constructions in Limbum (Grassfields Bantu; Cameroon), which helps us understand verb doubling in verb focus constructions. Our aim is two-fold: we provide a structural account of the two focus constructions, which at the same time provides the basis for an analysis of syntactic verb doubling in the language.

As for the focus constructions, we follow Belletti (2004) and Aboh (2007) in arguing for a structural low focus phrase within TP. In contrast to other Bantu languages (e.g. Aghem) previously addressed with respect to a low focus phrase, Limbum does not only feature low focus but also a structural high focus phrase within the CP, as has been argued for in Rizzi (1997). Consequently, one could speak of a very abstract type of replication: structure in the clause, i.e. the focus projection and the function of syntactic focus itself.

Examples of both high and low focus, respectively, are given in (1).<sup>1</sup>

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\*We want to thank Andrew Murphy for his helpful comments.

- (1) a. á ndúr wà (cí) m bí l̄rī  
 FOC brother my (COMP) I FUT1 pick.up  
 ‘I will pick up *my brother*.’  
 b. m bí l̄r bá ndúr wà  
 I FUT1 pick.up FOC brother my  
 ‘It is my brother whom I will pick up.’

The constructions will be addressed in detail in section 3. Along the lines of É. Kiss (1998), we argue for a functional difference between the two focus phrases in Limbum: The high FocP (Foc<sub>H</sub>P) will be shown to express information focus, while the low FocP (Foc<sub>L</sub>P) involves identificational focus.

With the structure of focus established, we then turn to verb doubling in Limbum (section 4), which exhibits two interesting patterns both being compatible with the two focus phrases in Limbum. In verb doubling, the reduplicated verb can appear in either focus position with a corresponding difference in meaning, as is illustrated in (2a) and (2b):

- (2) a. á r-l̄r m bí l̄r ndúr wà  
 FOC INF-pick.up I FUT1 pick.up brother my  
 ‘I will *pick up* my brother.’  
 b. m bí l̄r ndúr wà l̄rī  
 I FUT1 pick.up brother my pick.up  
 ‘It is picking up that I will do to my brother.’

In addition, verb doubling involving copying of phonetic material will serve as second and more concrete example of replication in Limbum.

## 2. Preliminary remarks on the structure of Limbum

Like many other Bantu languages, Limbum shows a strict SVO word order. TAM-marking auxiliaries always occur pre-verbally as shown in (3).

- (3) ɲwè f̄ àm tí ɲgū  
 man DET PST3 cut wood  
 ‘The man cut the wood’

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abbreviations used are: PST1 – today’s past, PST2 – near past, PST3 – remote past, FUT1 – today’s future, FUT2 – tomorrow’s future, FOC – focus marker, DET – determiner.

The verb usually occurs as a root; it does not feature agreement. Nevertheless, Limbum has certain free markers occurring immediately before the verb, which seem to show agreement between the verb and the subject, as they can co-occur with a subject NP within the same clause. However, somewhat similar to pronominal clitics in Romance or some resumptive pronouns, these markers do not occur in all clauses (they depend on the realization of the subject and on tense).<sup>2</sup>

As for information structure, both topic and focus (the latter not exclusively) are expressed in the left periphery in Limbum. We will see in the next section that focused elements are preceded by a focus marker; topics on the other hand have no such marker. Since topics will not be addressed in the remainder of the paper, we will make some brief remarks about topics here. Example (4) shows an object that is topicalized in the left periphery of the clause:

- (4) *mbǎ fɔ̄, wōyè ó ∅ fā zhí nì yē wéé*  
 money DET they 3PL PERF give it PREP him/her already  
 ‘The money, they already gave it to him/her.’

Although focused elements also surface in the left periphery, they cannot co-occur with topics (5a); only low focus and topic are felicitous within the same clause (5b):

- (5) a. *\*mbǎ fɔ̄, á nì yē wōyè ó ∅ fā zhí*  
 money DET FOC PREP him/her they 3PL PERF give it  
 ‘As for the money, they gave it to him/her.’  
 b. *mbǎ fɔ̄, wōyè ó ∅ fā zhí bá nì yē*  
 money DET they 3PL PERF give it FOC PREP him/her  
 ‘As for the money, it is to him/her that they gave it.’

### 3. The two focus constructions in Limbum

This section discusses the two possible focus constructions in Limbum. We argue for two different focus phrases in the clause, which represent identificational and information focus, respectively (see sections 3.2 and 3.3). Section 3.4 follows

<sup>2</sup>Since a more detailed account of those markers goes beyond the scope of the present paper, it will not be discussed further here. A more detailed description can be found in Franssen (1995: sec. 9.1). In the glosses, we indicate these agreement markers by their  $\phi$ -features, whereas pronouns are given in their English counterparts.

with a brief discussion of supporting evidence for two distinct FocPs from *wh*-questions.

### 3.1. The data

The two constructions relevant here involve a focused element being marked as such by a preceding focus marker, *á* or *bá*. The two markers are dedicated to distinct positions within a clause: *á* occurs clause initially (in what we call the ‘high focus phrase’ Foc<sub>H</sub>P), while *bá* appears after the verb in the low focus phrase (Foc<sub>L</sub>P). The focused element surfaces in one of those two positions following the focus marker.

Let us consider the examples in (6) and (7) below.

#### (6) *Subject focus*

- a. *á Nfò* (cí) í *bā zhē bāā*  
 FOC Nfor (COMP) 3SG PST1 eat fufu  
 ‘Nfor ate fufu.’
- b. *à bā zhē bá Nfò bāā*  
 EXPL PST1 eat FOC Nfor fufu  
 ‘It is Nfor who has eaten fufu.’

#### (7) *Object focus*

- a. *á Ngàlá* (cí) *mè bí kōnī*  
 FOC Ngala (COMP) I FUT1 meet  
 ‘I will meet Ngala.’
- b. *mè bí kōnī bá Ngàlá*  
 I FUT1 meet FOC Ngala  
 ‘It is Ngala whom I will meet.’

The constructions in (6) and (7) illustrate instances of high and low focus for subject and object DPs, respectively. In both (6a) and (7a), the focused element is preceded by the focus marker *á* in the left periphery of the clause.

As for the focused object in (7a), it is obvious that it no longer occurs in its base position but has moved higher. However, as the complementizer can be optionally spelled out in both (6a) and (7a) below the focused constituent, we can assume that also the focused subject in (6a) must be in a higher position.

Example (6b) illustrates that the subject can occur in the postverbal position as well. Note that in this case, an expletive must fill the higher subject position

in SpecTP in order to check the EPP feature. This way, the subject can stay in the lower focus position (we will come back to a structural analysis later in this section).

Apart from arguments and DPs, adverbs and adjuncts can also be focused in these same patterns from (6) and (7). Example (8) below illustrates this for adverbs:

- (8) a. á àyàɲsè (cí) sì bifū yé Shey  
 FOC tomorrow (COMP) we.INCL FUT2 see Shey  
 ‘We will see Shey *tomorrow*.’  
 b. sì bifū yé Shey bá àyàɲsè  
 we.INCL FUT2 see Shey FOC tomorrow  
 ‘It is tomorrow that we will see Shey.’

By analogy, example (9) shows a focused locative adjunct, headed by a preposition:

- (9) a. á mà ntāā (cí) yà táā à m̀̀ d̀̀ d̀̀  
 FOC PREP market (COMP) my father 3SG PST3 go  
 ‘My father went *to the market*.’  
 b. yà táā à m̀̀ d̀̀ d̀̀ bá mà ntāā  
 my father 3SG PST3 go FOC PREP market  
 ‘It is to the market that my father went.’

Since we assume that the two focus positions represented form part of the basic clause structure of Limbum, they should equally be available in embedded clauses. The next example shows that, indeed, embedded clauses allow for the same focus constructions as matrix clauses:

- (10) a. í bā lá nè á ndū zhì à m̀̀ yú rkár f̄  
 she PST1 say COMP FOC husband her 3SG PST3 buy car DET  
 ‘She said that *her husband* bought the car.’  
 b. í bā lá nè à m̀̀ yú bá ndū zhì rkár f̄  
 she PST1 say COMP EXPL PST3 buy FOC husband her car DET  
 ‘She said that it was her husband who bought the car.’

Another piece of evidence for two distinct focus phrases comes from multiple focus constructions, which allow both focus positions (headed by the respective focus marker) to be filled at the same time:

- (11) a. á mɪkɸɪ (cí) wó mū nō bá mbrò?  
 FOC chiefs COMP 3PL PST2 drink FOC wine  
 ‘It is wine that *the chiefs* drank.’
- b. á mbrò? (cí) à mū nō bá mɪkɸɪ  
 FOC wine COMP 3SG PST2 drink FOC chiefs  
 ‘It is the chiefs who drank *wine*.’

### 3.2. Information vs. identificational focus

The two focus constructions seen in the previous section provide evidence for the structural distinction between information (presentational) focus and identificational (exhaustive) focus as has been argued for in É. Kiss (1998). The author defines the two focus types as follows:

(12) *Information focus*

Information focus merely conveys non-presupposed information.

(13) *Identificational focus*

Identificational focus represents a subset of the set of contextually or situationally given elements for which the predicate phrase can potentially hold; it is identified as exhaustive subset of this set for which the predicate actually holds.

(É. Kiss 1998: 245)

On the basis of Hungarian and English, É. Kiss demonstrated that in-situ focus expresses information focus, while ex-situ focus (e.g. clefts in English) marks identificational focus.<sup>3</sup> Following this distinction and using three diagnostic tests, namely (i) *also*-phrases, (ii) universal quantifiers, and (iii) *only*-phrases, it can be shown that Limbum features a similar structural distinction of two focus types.

#### 3.2.1. *Also-phrases*

The test using *also*-phrases to distinguish between the two focus types explores that identificational focus entails exhaustivity, while information focus does not. Hence, clauses featuring identificational focus cannot be extended by

<sup>3</sup>Based on these definitions, we will use clefts in the English translations of examples in order to show identificational focus, while translations of information focus are given with *in situ* focus in English, marked by italics.

an *also*-phrase (É. Kiss 1998: 248). In (14), the subject (14a), object (14b), an adverb (14c), and an adjunct (14d) are illustrated in high focus. Note that all focused elements allow for extending the referent in question by an *also*-phrase:

- (14) a. á Nfò (cí) í bā zhē bāā (bá Tánkó fój)
   
FOC Nfor (COMP) 3SG PST1 eat fufu (and Tanko also)
   
'Nfor ate fufu (and so did Tanko).'
- b. á Ngálá (cí) mē bí kōnī (bá ŋgwá zhì fój)
   
FOC Ngala (COMP) I FUT1 meet (and wife his also)
   
'I will meet Ngala (and also his wife).'
- c. á àyàṅsè (cí) sì bífū yé Shey (bá mínji
   
FOC tomorrow (COMP) we.INCL FUT2 see Shey (and behind
   
àyàṅsè fój)
   
tomorrow also)
   
'We will see Shey *tomorrow* (and also the day after tomorrow).'
- d. á mà ntāā (cí) yà táā à m̀ d̀ (bá mà
   
FOC PREP market (COMP) my father 3SG PST3 go (and PREP
   
rfà fój)
   
work also)
   
'My father went *to the market* (and also to work).'

The following sentences in (15) feature the low focus counterparts to the sentences from (14). In this position, extension by an *also*-phrase is not felicitous for any of the focused constituents:

- (15) a. à bā zhē bá Nfò bāā (#bá Tánkó fój)
   
EXPL PST1 eat FOC Nfor fufu (and Tanko also)
   
'It is Nfor who ate fufu (#and so did Tanko).'
- b. mē bí kōnī bá Ngálá (#bá ŋgwá zhì fój)
   
I FUT1 meet FOC Ngala (and wife his also)
   
'It is Ngala (#and also his wife) whom I will meet.'
- c. sì bífū yé Shey bá àyàṅsè (#bá mínji àyàṅsè
   
we.INCL FUT2 see Shey FOC tomorrow (and behind tomorrow
   
fój)
   
also)
   
'It is tomorrow (#and also the day after tomorrow) that we will see Shey.'

- d. yà táā à m̀ d̀ b́à mà ntāā (#b́à mà rfà f́ɔŋ)  
 my father 3SG PST3 go FOC PREP market (and PREP work also)  
 ‘It is to the market (#and also to work) that my father went.’

Thus, it seems to be the case that high focus expresses information focus, while low focus marks identificational (exhaustive) focus. To ensure that this effect is not due to other unexpected interactions, we will also test for universal quantifiers and *only*-phrases, which both show different compatibility patterns with the two focus types.

### 3.2.2. *Universal quantifiers*

Since universal quantifiers semantically entail identification without exclusion, they are inherently incompatible with identificational focus, which exclude by identification (É. Kiss 1998, Kenesei 1986). Information focus, on the other hand, is perfectly compatible with them. As for the Limbum constructions discussed here, this would predict that the high focus position can be filled by a universal quantifier, in contrast to the low focus position. The following examples show that this is indeed the case: the high focus constructions with universal quantifiers in (16) are felicitous, while the low focus ones in (17) are not:

- (16) a. á ŋwè nsíp (cí) í b́à zhē b́āā  
 FOC person all (COMP) 3SG PST1 eat fufu  
 ‘Everybody ate fufu.’  
 b. á ŋwè nsíp (cí) m̀ b́í k̀nī  
 FOC person all (COMP) I FUT1 meet  
 ‘I will meet *everybody*.’  
 c. á ǹŋ nsíp (cí) sì ćī ýé Shey  
 FOC day all (COMP) we.INCL PROG see Shey  
 ‘We will be seeing Shey *everyday*.’  
 d. á à b́dī? síp (cí) yà táā à m̀ d̀  
 FOC PREP place all (COMP) my father 3SG PST3 go  
 ‘My father went *everywhere*.’
- (17) a. \*à b́ā zhē b́ā ŋwè nsíp b́āā  
 EXPL PST1 eat FOC person all fufu  
 ‘It is everybody who ate fufu.’

- b. \*mè bí kōnī bá ŋwè nsíp  
 I FUT1 meet FOC person all  
 ‘It is everybody that I will meet.’
- c. \*sì cī yé Shey bá nòŋ nsíp  
 we.INCL PROG see Shey FOC day all  
 ‘It is everyday that we will be seeing Shey.’
- d. \*yà táā à m̀ dò bá à b̀dì? s̀íp  
 my father 3SG PST3 go FOC PREP place all  
 ‘It is everywhere that my father went.’

### 3.2.3. Even-phrases

The third test invoked here makes use of the semantic nature of the additive particle *even*, which ‘identifies a member of the relevant set of persons for whom the predicate holds without excluding any members for whom it does not hold’ (É. Kiss 1998: 252). The particle *even* being semantically incompatible with identificational focus, we would again predict that high focus constructions are compatible with *even*, while low focus constructions are not.

In Limbum, the semantics of *even* are expressed by the particle *ká?*, which seems to function as focus marker of its own,<sup>4</sup> so that it cannot co-occur with the usual focus marking particles *á* or *bá*. It also precedes the constituent it refers to and shows restrictions as to where it can occur in the clause, i.e. it is featured in the high focus position (18), while it cannot occur in the low focus position (19):

- (18) a. *ká?* Nfò à bā zhē bāā  
 even Nfor 3SG PST1 eat fufu  
 ‘Even *Nfor* ate fufu.’
- b. *ká?* Ngàlá m̀è bí kōnī  
 even Ngala I FUT1 meet  
 ‘I will meet even *Ngala*.’
- c. *ká?* àyàŋsè̀ sì bífū yé Shey  
 even tomorrow we.INCL FUT2 see Shey  
 ‘We will see Shey even *tomorrow*.’

<sup>4</sup>This seems to be an areal feature, see Zimmermann (2014) for a comparative overview of exclusive, additive, and scalar particles in West African languages.

- d. *ká? mà ntāā yà táā à m̀ dò*  
 even PREP market my father 3SG PST3 go  
 ‘My father went even *to the market*.’

In (19c) and (19d), the particle *ká?* is not unacceptable in the low focus position, but seems to be less felicitous in contrast to (18c) and (18d), respectively. At this point, we do not have a good explanation for that; this would need to be addressed in more detail in future research.

- (19) a. \*à bā zhē *ká?* Nfò bāā  
 EXPL PST1 eat even Nfor fufu  
 ‘It is even Nfor who ate fufu.’  
 b. \*m̀è bí k̀nī *ká?* Ngàlá  
 I FUT1 meet even Ngala  
 ‘It is even Ngala whom I will meet.’  
 c. ?sì bífū yé Shey *ká?* àyàŋsè  
 we.INCL FUT2 see Shey even tomorrow  
 ‘It is even tomorrow that we will see Shey.’  
 d. ?yà táā à m̀ dò *ká?* mà ntāā  
 my father 3SG PST3 go even PREP market  
 ‘It is even to the market that my father went.’

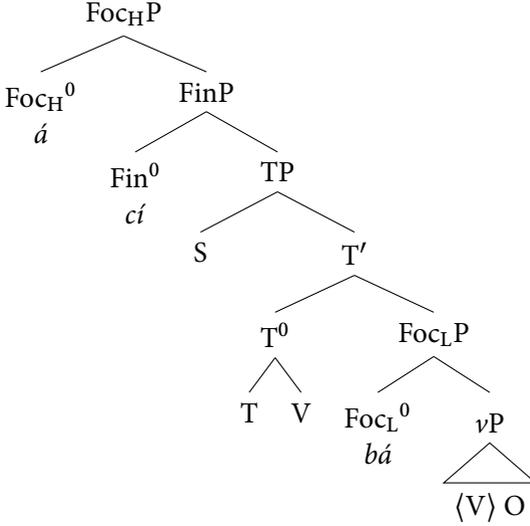
The fact that the particle *ká?* does not simply co-occur with the information focus marker *á*, but surfaces in the exact same position within the clause and is not felicitous in the other position, is yet another argument for two distinct high and low focus positions. Furthermore, it is evidence for the fact that the head of the high focus phrase in Limbum can be realized either by the usual focus marker (*á*) or alternatively a focus sensitive operator such as *ká?* ‘even’.

### 3.3. An analysis of Foc<sub>H</sub>P and Foc<sub>L</sub>P

We will now turn to the structure of the two focus constructions. In the spirit of the cartographic approach to syntax (e.g. Rizzi 1997), several works (e.g. Belletti 2004, Samek-Lodovici 2006, van der Wal 2006, Aboh 2007, Zubizarreta 2010) argue for the structural richness of the *v*P in analogy to the CP, and provide arguments in favour of another, second focus position in the left periphery of the *v*P based on data from Romance and Bantu. Accordingly, in this paper, we assume a focus phrase in the CP and another focus phrase directly above *v*P.

We assume the following basic structure of the Limbum clause with both FocPs schematized in (20):

(20) *Basic clause structure in Limbum*



The Foc<sub>H</sub>P with *á* as its head dominates a FinP, adopted from the structural make-up of the CP argued for in Rizzi (1997). This is relevant here, because the complementizer *cí* can surface to the right of Foc<sub>H</sub>P. Since it selects for a finite clause and can effect the agreement marker of the subject,<sup>5</sup> we assume that it is the head of FinP.

The TP hosts the subject in its specifier position and the verb in T<sup>0</sup> due to V-to-T movement.<sup>6</sup> Below TP, there is another focus projection Foc<sub>L</sub>P. The head of the latter is the identificational focus marker *bá*.

<sup>5</sup>In case the complementizer is present, the agreement marker for 3SG is no longer *á* but *í*, which we indicate by brackets in the examples to which this applies. As it is not of major concern to the topic discussed in the present paper, we will have to leave this locality effect open for future research.

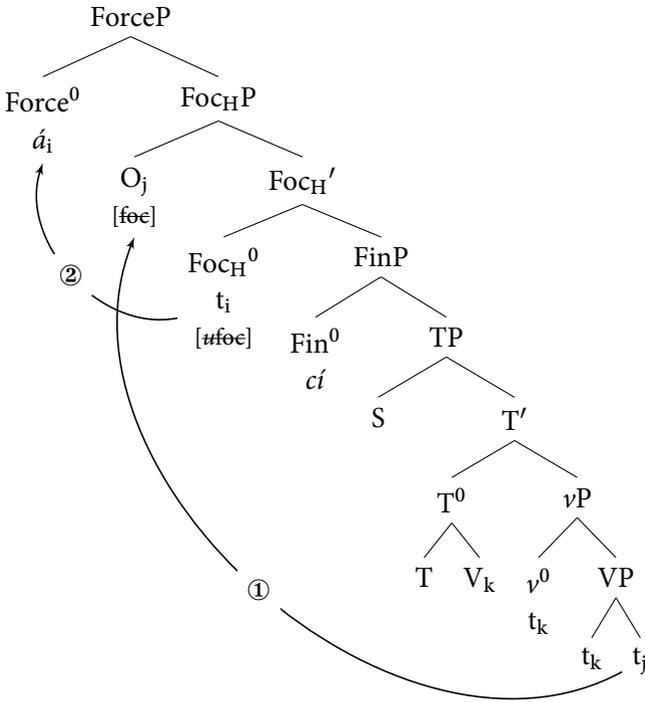
<sup>6</sup>We assume that the verb generally is spelled out in a high position; it shall suffice here to note that adverbs cannot occur between the subject and the verb, but follow the latter. Furthermore, movement of the verb out of vP has also been suggested for other Grassfields languages such as Aghem (Aboh 2007), Nweh (Nkemnji 1995), and other Bantu, e.g. Zulu (Sabel & Zeller 2006). In the surface structure, the auxiliary marks tense, which should not be relevant to the syntactic structure argued for here, once a DM-like late insertion in morphology is assumed.

We will address  $\text{Foc}_{\text{H}}\text{P}$  in more detail now. Consider example (21) repeated below with the schematic word order represented in brackets:

- (21) a. á *Nfò* (cí) í bā zhē bāā  
 FOC Nfor (COMP) 3SG PST1 eat fufu  
 ‘*Nfor* has eaten futu.’ (á S (Comp) V O)
- b. á *Ngàlá* (cí) mē bí kōnī  
 FOC Ngala (COMP) I FUT1 meet  
 ‘I will meet *Ngala*.’ (á O (Comp) S V O)

The derivation of the structure relevant to high focus involves two steps: first, the focused phrase moves to  $\text{SpecFoc}_{\text{H}}\text{P}$  in order to check its [foc] feature. Once the features have been checked, we assume head movement of the  $\text{Foc}_{\text{H}}$ -head (the focus marker) to the next highest head  $\text{Force}^0$ , since it linearly precedes the focused element. The higher projection is labelled  $\text{ForceP}$  here for the sake of contiguity with Rizzi’s (1997) terminology, it could equally be labelled CP in a recursive CP system (see van Craenenbroeck 2010) or FP (functional projection). The derivation is given in (22) for a focused object as in (21b); deriving the focus construction of other focused constituents works in a similar way in that it involves no crucially different derivations.

(22) Object focus in  $Foc_{HP}$



We can now turn to  $Foc_{LP}$  and its focus marking mechanism, which differs from the one of  $Foc_{HP}$ . This might not be entirely unexpected given that the two projections host different types of focus. We saw for  $Foc_{HP}$  that the focused constituent must move into  $Foc_{HP}$  in order to get its focus interpretation. The necessity of this movement can be directly observed in the surface structure. This is not the case for focus in  $Foc_{LP}$ . Since there is no good evidence for movement of the focused constituent (and as we will see later, there seems to be rather evidence against it), we assume that the focused constituent stays in-situ. Therefore, we postulate the following property for  $Foc_{LP}$ :

(23)  $Foc_{LP}$  condition

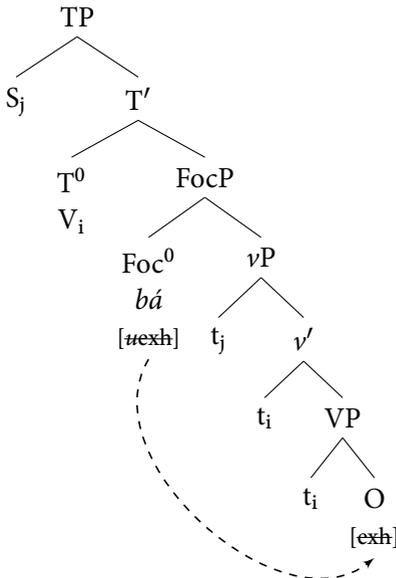
The first major constituent in the scope of the  $Foc_{LP}$  head must be exhaustively focused, that is, bear a [exh] feature.

As will be shown later, this requirement is necessary to account for the linear order in low focus constructions (an even more evidently, in cases of verb doubling). Before we address the derivation of the latter in detail, the low focus constructions with subject and object are repeated in (24):

- (24) a. à bā zhē bá Nfò bāā  
 EXPL PST1 eat FOC Nfor fufu  
 ‘It is Nfor who ate fufu.’ (Expl V bá S O)
- b. mē bí kōnī bá Ngàlá  
 I FUT1 meet FOC Ngala  
 ‘It is Ngala whom I will meet.’ (S V bá O)

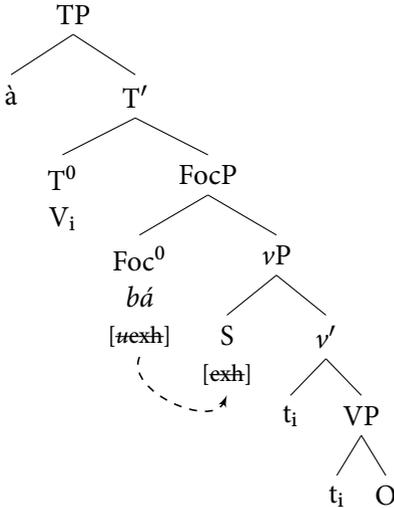
The structure in (25) illustrates the object low focus derivation. The  $Foc_{LP}$  head searches downwards for a constituent that can check its  $[uexh]$  feature. Independently from the focus projection, the subject has moved out of  $Spec_{vP}$  to check the EPP feature and the verb has undergone V-to-T movement. Consequently, the closest candidate that the  $Foc_{LP}$  head finds is the object. Being the immediate constituent below  $Foc_L^0$ , its  $[exh]$  feature checks the  $[uexh]$  of  $Foc_L^0$ , so that the uninterpretable feature of the latter can be deleted.

(25) Object focus with  $Foc_{LP}$



For a subject with identificational focus, the derivation is similar. As is illustrated in (24a), the subject does not obligatorily move to SpecTP in order to check its EPP feature, instead, an expletive can be inserted into that position to fulfil the criterion. The subject, on the other hand, stays in SpecvP immediately below  $\text{Foc}_L^0$  within the scope of  $\text{Foc}_{LP}$ , which searches for a goal to check its  $[\text{uexh}]$  feature:

(26) *Subject focus with  $\text{Foc}_{LP}$*



Regarding the expletive  $\acute{a}$ , there is not much clear language internal evidence for it in other constructions; typical expressions involving expletives such as weather verbs, locative inversions, or existential constructions do not show  $\acute{a}$  in Limbum. In the related languages Aghem and Igbo, on the other hand, we find similar elements in both focus and existential constructions. In Aghem (27), the sentence with the expletive is ambiguous between a focus and an existential reading; example (28) shows an existential sentence from Igbo:

- (27)  $\acute{a}$  m̀ ñ́íj t́bvú á<sup>+</sup>z̀óó  
 EXPL PST run dogs yesterday.  
 ‘There ran dogs yesterday /  
 It is the dogs that ran yesterday.’

(Aghem, Hyman & Polinsky 2006: 8)

- (28) *A ga-agba ọsọ*  
 EXPL FUT-run race  
 ‘There will be a running race.’ (Igbo, Akinremi 2013: 1132)

Therefore, we conclude that *à* in Limbum can be viewed as expletive.

### 3.4. Evidence from wh-questions

The present section provides some examples of wh-questions (rather than the full pattern) in support of the two FocPs assumed in this approach. Similar to what has been shown for focused constituents in the previous section, wh-words can appear either in-situ or in both Foc<sub>HP</sub> and Foc<sub>LP</sub> focus positions.

The default questions expressing information focus feature the wh-word in-situ. This is illustrated below for subject (29a) and object (29b):

- (29) a. *ndá á bā zhē bāā*  
 who 3SG PST1 eat fufu  
 ‘Who ate fufu?’  
 b. *wè bā yé kéré*  
 you.SG PST1 see what  
 ‘What did you see?’

In addition to such in-situ questions, Limbum allows for wh-words to occur in both focus positions, as is shown for subject (30) and object (31) questions:

- (30) a. *á ndá (cí) í bā zhē bāā*  
 FOC who (COMP) 3SG PST1 eat fufu  
 ‘Who is it that ate fufu?’  
 b. *à bā zhē bá ndà bāā*  
 EXPL PST1 eat FOC who fufu  
 ‘Who (if not X / of them) ate fufu?’  
 (31) a. *á kéré wè bā yé*  
 FOC what you.SG PST1 see  
 ‘What is it that you saw?’  
 b. *wè bā yé bá kéré*  
 you.SG PST1 see FOC what  
 ‘What (if not X) did you see?’

Without going into more detail here, it can be noted that the questions parallel

the structure and focal interpretation of the constructions seen in 3.1 and 3.2, schematized in the bracket structures below for (30b) (subject in  $\text{Foc}_{\text{L}}\text{P}$ ) and (31a) (object in  $\text{Foc}_{\text{H}}\text{P}$ ), respectively:

(32) [TP à [ $\text{TP}^0$  bā zhē [ $\text{Foc}_{\text{L}}^0$  bá<sub>[#exh]</sub> [ $\nu\text{P}$  ndà<sub>[exh]</sub> [ $\nu\text{P}$  bāā ] ] ] ] ]

(33) [ $\text{ForceP}^0$  á [ $\text{Foc}_{\text{H}}\text{P}$  kÉÉ<sub>[fœ]</sub> [ $\text{Foc}_{\text{H}}^0$  [<sub>[#fœ]</sub> [TP wè [ $\text{TP}^0$  bā yÉ ] ] ] ] ] ] ]

A wh-word in  $\text{Foc}_{\text{H}}\text{P}$  checks its [foc] feature and hence receives focus interpretation, while a wh-word with the [exh] feature below  $\text{Foc}_{\text{L}}\text{P}$  is focused exhaustively if it is immediately c-commanded by an active  $\text{Foc}_{\text{L}}^0$ .

#### 4. Verb doubling

Having established the existence of  $\text{Foc}_{\text{H}}\text{P}$  and  $\text{Foc}_{\text{L}}\text{P}$  in the Limbum clause, we will address verb doubling in this section. Syntactic verb doubling in Limbum can be accounted for by the assumption of those two structural projections, and at the same time, it provides even stronger evidence that is visible in the surface structure for the derivations addressed in 3.3, e.g. for the  $\text{Foc}_{\text{L}}\text{P}$  requirement.

##### 4.1. The data

Like in many other West African languages (including Yoruba (Manfredi 1997), Ewe and Akan (Ameka 1992), Ga (Kropp Dakubu 2005), Gungbe (Aboh 1998, 2006), Nweh (Nkemnji 1995), Vata (Koopman 1984), Kabiye (Collins & Essizewa 2007), Buli (Hiraiwa 2005), Fongbe (Lefebvre & Brousseau 2002), Tuki (Bilola 1997), Asante-Twi (Hein this volume), and Krachi (Kandybowicz & Torrence 2016)), verb focus in Limbum is realized by doubling of the verb. As for intransitive verbs, the two copies of the verb appear adjacent to each other and do not yet indicate syntactically motivated doubling per se. This is exemplified in (34) for an unergative, in (35) for an unaccusative verb.

- (34) a. á r-cāŋ (cí) ŋgwá wò à mū cāŋī  
 FOC INF-run (COMP) wife your.SG 3SG PST run  
 ‘Your wife ran.’  
 b. ŋgwá wò à mū cāŋ cāŋī  
 wife your.SG 3SG PST run run  
 ‘It is running that your wife did.’

- (35) a. á *r-gwè* (cí) ndāp fō à ∅ *gwè*  
 FOC INF-FALL (COMP) house DET 3SG PERF fall  
 ‘The house *fell*.’  
 b. ndāp fō à ∅ *gwè gwè*  
 house DET 3SG PERF fall fall  
 ‘It was falling that the house did.’

Example (36) features a doubled transitive. In this case, the two copies of the verb are no longer adjacent to each other in the low focus construction, but precede and follow the object (36b):

- (36) a. á *r-yū* (cí) njíjwè fō bí *yū* msāŋ  
 FOC INF-buy (COMP) woman DET FUT1 buy rice  
 ‘The woman will *buy* rice.’  
 b. njíjwè fō bí *yū* msāŋ *yú*  
 woman DET FUT1 buy rice buy  
 ‘It is buying that the woman will do to the rice.’

Note that in (34a), (35a), and (36a), the copy of the verb that has moved to Foc<sub>H</sub>P is no longer a verbal root but marked by an infinitive prefix. We hence assume that Foc<sub>H</sub><sup>0</sup> can only select for non-verbal elements, so that V is realized as infinitive at Spell-Out. In cases of low verb doubling, the expected focus marker *bá* is not spelled-out, focus marking is visible on the surface only through verb doubling. Another rather unexpected fact concerning low verb focus is that it is the lower copy which is prosodically more prominent than the higher one. This suggests that the lower copy of the verb is the one in Foc<sub>L</sub>P.<sup>7</sup>

In all the three examples above, only the verb and not the entire predicate is focused. Moreover, predicate focus cannot be expressed by the constructions discussed here, as is demonstrated in the following two infelicitous examples:

- (37) a. \*á *r-yū* *msāŋ* (cí) njíjwè fō bí *yū* msāŋ  
 FOC INF-buy rice (COMP) woman DET FUT1 buy rice  
 intended: ‘The woman will *buy* rice.’  
 b. njíjwè fō bí *yū* msāŋ *yú*  
 woman DET FUT1 buy rice buy  
 ‘It is buying rice that the woman will do.’

<sup>7</sup>Note that the high tone of the lower verb *yú* in (36b), contrasting with the mid tone (*yū*) in all other instances of the verb in (36) is an effect independent from focus: the base form of the verb (*yú*) has a high tone, which is lowered after a high tone TAM marker (e.g. *bí*).

Interestingly, the ungrammatical construction in (37a) showing predicate focus involving  $\text{Foc}_{\text{HP}}$ , can be repaired by *do*-support instead of verb doubling:

- (38) á r-yū msāŋ (cí) njíŋwè f̄s bí gī  
 FOC INF-buy rice (COMP) woman DET FUT1 do  
 ‘The woman will *buy rice*.’<sup>8</sup>

Note that a low focus counterpart to (38) with *do*-support replacing the verb copy that is not in  $\text{Foc}_{\text{LP}}$  is not grammatical:<sup>9</sup>

- (39) \*njíŋwè f̄s bí gī (bá) yū msāŋ  
 woman DET FUT1 do (FOC) buy rice  
 intended: ‘It is buying rice that the woman will do.’

A more detailed account of the constructions with *do*-support would exceed the purpose of the present paper; we will therefore not consider it in the following sections. However, the analysis proposed to account for high and low focus as well as verb doubling can principally also capture the construction involving *do*-support. As for a detailed account of the distribution of verb doubling and *do*-support see Hein (this volume). Based on the ordering of head movement and chain reduction at PF, either both copies of the verb can be spelled out or one copy is deleted so that we observe *do*-support instead. In principle, this analysis should also be applicable to the Limbum data.

Similar to focus constructions in embedded clauses, dependent infinitives can be focused in both  $\text{Foc}_{\text{HP}}$  and  $\text{Foc}_{\text{LP}}$  as well.

- (40) m̄è cī tà? à yèè ndúr wà yèè  
 I PROG want 3SG see brother my see  
 ‘It is *seeing* my brother that I want to do.’

In addition to the example of the dependent infinitive given in (40), also the control verb *tà* ‘want’ can be focused by doubling. However, the lower copy does not surface in the expected clause-final position (41b), instead, both copies of the verb occur adjacent to each other preceding the clausal argument (41a):

<sup>8</sup>In order to be coherent, we gave an English functionally equivalent counterpart with in-situ and hence information focus, instead of the formally more similar cleft construction *It was buying rice that the woman will do*.

<sup>9</sup>In section 4.3 we will show that it has to be the lower copy of the verb which is in  $\text{Foc}_{\text{LP}}$ .



- (44) a. *ká?* *r-lá* (cí) wèr à *lá* bzhīī  
 even INF-cook COMP we 1PL cook food  
 ‘We even *cooked* the food.’  
 b. wèr à *lá* bzhīī (*\*ká?*) *lá*  
 we 1PL cook food (*\*even*) cook  
 ‘It is (*\*even*) cooking that we did to the food.’

Combining the verbs in the doubling constructions with *kū* ‘only’ as in (45) has the opposite effects as its semantics include exhaustivity.

- (45) a. *\*kū* *r-lá* (cí) wèr à *lá* bzhīī  
 only INF-COOK COMP we 1PL cook food  
 ‘We only *cooked* the food.’  
 b. wèr à *lá* bzhīī *kū* *lá*  
 we 1PL cook food only cook  
 ‘It is only cooking that we did to the food.’

Thus, verb doubling not only follows the structure of the two focus constructions, but also conveys the same meanings of information focus (Foc<sub>HP</sub>) vs. identificational focus (Foc<sub>LP</sub>), which makes it evident that the derivations of the two expressions must be linked to each other.

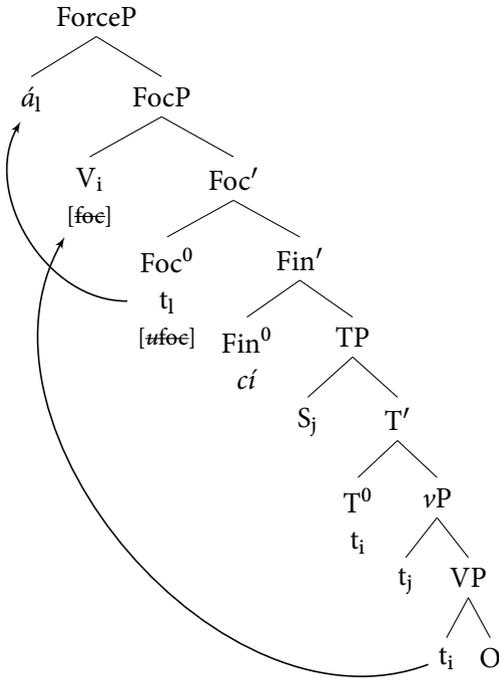
#### 4.3. An analysis of verb doubling

The account for verb doubling in order to focus verbs is based on the analysis of focus constructions argued for in section 3.3. Here, we show that the copy of the verb moves into Foc<sub>HP</sub> and Foc<sub>LP</sub> similar to other focused constituents.

We will now turn to verb doubling with information focus, as it was illustrated in (36a), repeated below.

- (46) á *r-yū* (cí) njíjwè fō bí *yū* msāŋ  
 FOC INF-buy (COMP) woman DET FUT1 buy rice  
 ‘The woman will *buy* rice.’

By analogy to the derivation proposed in (22), the structure of verb doubling involving Foc<sub>HP</sub> is the following:

(47) *Verb doubling with Foc<sub>HP</sub>*

The verb has a [foc] feature that it can check by moving to SpecFoc<sub>HP</sub>.<sup>10</sup> The head of Foc<sub>HP</sub>, in turn, moves into a higher projection, since it precedes the verb copy in the surface structure. The latter is spelled out as infinitive, we could assume that the Foc<sub>HP</sub> head can only select for a non-verbal element, so that the verb is nominalized by its infinite marker. This would also account for the fact that we see multiple spell-out of the verb: the standard case of movement only allows the highest copy of a movement chain to be realized at PF, however, since the highest copy is phonetically different, both copies are realized.

The account of verb doubling involving the Foc<sub>LP</sub>, in contrast to the verb doubling discussed above, is perhaps less straightforward, since the object

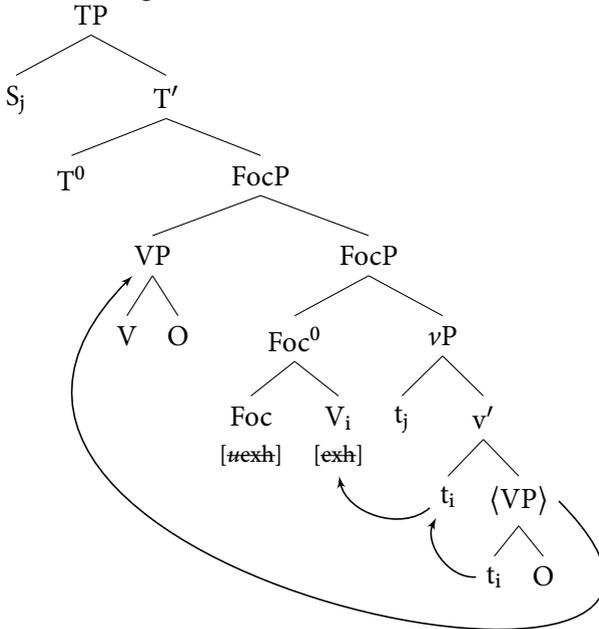
<sup>10</sup>Head movement is problematic in this case, since the verb would need to move to Fin<sup>0</sup> as well. Instead, following Vicente (2009), we propose that the bare verb can directly move to SpecFoc<sub>HP</sub>.

occurs between the two copies of the verb, while prosody suggests that the lower copy is the one which bears the focus interpretation. Example (36b), repeated below, illustrates this again.

- (48) njíjwè fɔ́ bí yū msāj yú  
 woman DET FUT1 buy rice buy  
 ‘It is buying that the woman will do to the rice.’

We propose the following derivation to account for clauses such as (48):

- (49) *Verb doubling with Foc<sub>L</sub>P*



Since the subject moves to SpecTP, it is not affected by the Foc<sub>L</sub>P condition. The verb undergoes head movement to Foc<sub>L</sub><sup>0</sup> in order to check its focus feature. Once Foc<sub>L</sub><sup>0</sup> being filled by the verb, the focus marker *bá*, which we would expect in such a context, is blocked and does not surface. At this point, the VP is the immediate constituent below Foc<sub>L</sub><sup>0</sup>, where it would violate the Foc<sub>L</sub>P condition since it is the first major constituent c-commanded by the low focus head not being (exhaustively) focused, that is, bear a [exh] feature.

In order to prevent this, it has to move out of the scope of Foc<sub>L</sub><sup>0</sup>, i.e. to the

specifier of  $\text{Foc}_{\text{LP}}$ . The lower copy of V still being active in syntax, scrambling of VP will lead to another copy of V in  $\text{SpecFoc}_{\text{LP}}$ , paralleling the linear order of SVOV. Multiple Spell-Out of V can, in this case, be accounted for by the fact that the two copies of the verb do not belong to the same movement chain (see Hein this volume).

At this stage, the Limbum facts recall scrambling phenomena in Germanic, where elements that normally appear within the VP scramble out of this domain, so that lower elements in the VP can be focused (Zubizarreta 1998, Drubig 2003, Fanselow 2003).<sup>11</sup>

Fanselow (2003) labels this ‘altruistic movement’, an illustration from German is given in (50). In the default word order, the adverb *gestern* ‘yesterday’ precedes the object in (50a); by ‘moving to the left’, the object allows either the verb or the adverb to be focused in (50b):

- (50) a. dass die Polizei *gestern* *Linguisten* verhaftete  
 COMP ART police yesterday linguists arrest.PST.3SG  
 ‘that the police arrested the linguists yesterday’  
 b. dass die Polizei *Linguisten* *gestern* verhaftete  
 COMP ART police linguists yesterday arrest.PST.3SG  
 ‘that the police arrested linguists *yesterday*’

(Fanselow 2003: 198)

Further evidence in support of VP scrambling in order to avoid focus comes from constituent following the lower copy of the focused verb in  $\text{Foc}_{\text{L}}^0$ . The  $\text{Foc}_{\text{LP}}$  condition requires the immediate constituent below  $\text{Foc}_{\text{L}}^0$  to bear an [exh] feature. As it seems, only one constituent can be focused in each  $\text{Foc}_{\text{P}}$ , so that no other constituent is allowed to have a [exh] feature if the verb is already focused in  $\text{Foc}_{\text{L}}^0$ . Consequently, we predict that no other constituent can follow the focused copy of the verb. Indeed, (51) shows that the prediction holds for both adjuncts and adverbs:

<sup>11</sup>Manfredi (1997) proposes a similar account for a phenomenon other than focus, namely the rather unusual OV order in different Kru and Kwa languages. In durative contexts, the object is forced to move out of the VP in order to escape the scope of the durative semantics of the verb, which it is incompatible with. The so-called ‘scopophobic’ behaviour of the object hence results in the OV order.

- (51)  $\eta w\grave{e}$   $rt\bar{a}$   $\grave{a}$   $m\bar{u}$   $k\acute{o}$   $nzh\grave{e}$   $k\acute{o}$  (\* $m\grave{a}$   $nt\bar{a}\bar{a}$ ) (\* $n\grave{i}\eta k\grave{o}r$ )  
 man cap 3SG PST2 catch thief catch (PREP market) (yesterday)  
 ‘It was catching that the policeman (lit. capped man) did to the thief (at the market) (yesterday).’

In order to rescue sentences as (51) above, the adjunct and the adverb can occur as topics in the left periphery of the clause or before the lower copy of the verb in  $Foc_L^0$ , i.e. within the scrambled VP:

- (52) ( $m\grave{a}$   $nt\bar{a}\bar{a}$ ) ( $n\grave{i}\eta k\grave{o}r$ ),  $\eta w\grave{e}$   $rt\bar{a}$   $\grave{a}$   $m\bar{u}$   $k\acute{o}$   $nzh\grave{e}$  ( $m\grave{a}$   
 (PREP market) (yesterday) man cap 3SG PST2 catch thief (PREP  
 $nt\bar{a}\bar{a}$ ) ( $n\grave{i}\eta k\grave{o}r$ )  $k\acute{o}$   
 market) (yesterday) catch  
 ‘(Yesterday) (at the market,) it was catching that the police man (lit. capped man) did to the thief (at the market) (yesterday).’

Low (identificational) focus of constituents other than the verb, on the other hand, does not involve movement of the focused constituent to  $Foc_L P$ , since the  $Foc_L^0$  searches downwards in order to check its [*uexh*] feature. For that reason, there always is a constituent immediately below  $Foc_L^0$  with a [*exh*] feature in such constructions. We hence predict that in contrast to low focus of the verb, further elements can appear below other low focused constituent. Example (53) demonstrates that for identificational focus of the subject in opposition to (51):

- (53)  $\grave{a}$   $m\bar{u}$   $k\acute{o}$   $b\acute{a}$   $\eta w\grave{e}$   $rt\bar{a}$   $nzh\grave{e}$  ( $m\grave{a}$   $nt\bar{a}\bar{a}$ ) ( $n\grave{i}\eta k\grave{o}r$ )  
 EXPL PST2 catch FOC man cap thief (PREP market) (yesterday)  
 ‘It is the police man (lit. capped man) who caught the thief (at the market) (yesterday).’

## 5. Conclusion

In this paper, we presented two different instances of replication in Limbum. On the one hand, section 3 showed focus constructions to result from two distinct focus projections in the clause, which is a rather abstract example of replication involving structure of the clause. On the other hand, section 4 addressed verb doubling (a more concrete instance of replication) which proved to make use of the same focus projections.

Along the lines of the cartographic approach to syntax, we developed an

analysis of the two focus constructions in section 3.3. We argued for a higher  $\text{Foc}_{\text{HP}}$  in the CP layer marking information focus and a lower  $\text{Foc}_{\text{LP}}$  above  $\nu\text{P}$  denoting indentificational focus. Focus marking in  $\text{F}_{\text{HP}}$  was obtained by movement of the focused constituent into  $\text{SpecF}_{\text{HP}}$ ; focus in  $\text{F}_{\text{LP}}$ , on the other hand, did not feature movement of the focused constituent. Instead, we argued that the latter requires the immediate constituent in its scope to bear a [exh] feature.

We also demonstrated that verb focus constructions expressed by doubling of the verb, follow the same basic patterns as focus of other constituents. As for identificational verb focus (in  $\text{F}_{\text{LP}}$ ), the structure seemed to be less straight-forward, the linear order of constituents being SVOV. However, this is what our account predicted: the focused verb being moved to  $\text{F}_{\text{L}}^0$ , the VP is the immediate constituent in the scope of  $\text{F}_{\text{L}}^0$ . As the VP does not bear a [exh] feature, it is forced to move out of the scope of  $\text{F}_{\text{H}}^0$ , resulting in the linear order of SVOV. In addition, it was shown that no other constituent could follow the lower copy of the verb in such constructions, contrarily to low focus of e.g. subjects.

The aim of the present paper was to capture the basic patterns of focus and verb doubling in Limbum. More specific issues, such as doubling of control verbs (see example (41) on page 75) and predicate focus realized by *do*-support (see example (38) on page 75) instead of verb doubling, need to be addressed in more detail in future research.

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# Verb doubling and the order of operations at PF: Insights from Asante Twi

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## Abstract

Most work on predicate clefts seems to presuppose the implication that if a language shows verb doubling when the verb alone is fronted it also shows verb doubling when the verb is fronted together with its internal argument(s). In this paper, I present data from Asante Twi, where the verb is doubled in the former case but there is *do*-support in the latter instead. I argue that the patterns can be accounted for by varying orders of the operations Chain Reduction (CR) and Head-to-Head Movement (HHM) at PF. CR may either bleed HHM, giving rise to consistent *do*-support (as in German) or counterbleed it, leading to consistent verb doubling (as in Hebrew). The Asante Twi pattern then is a result of neutralisation due to the inability of  $\bar{A}$ -head movement to form chains. The account provides a unified analysis of verb doubling and *do*-support in predicate clefts, which derives all attested patterns to the exclusion of the unattested reverse Asante Twi pattern.

## 1. The issue

The Asante Twi dialect of Akan, a Kwa language spoken in Ghana, has a verbal focus construction where two copies of the main verb are overtly realised: one clause-initially and the other in its base position. This construction, also often termed *predicate cleft* (though see Aboh 2006), is quite common in West African languages (e.g. Vata and Nweh, Koopman 1984, 1997; Yoruba, Manfredi 1993; Gungbe, Aboh 1998, 2006; Tuki, Biloa 1997; Buli, Hiraiwa 2005; Ewegbe, Ameka 1992; Gã, Kropp Dakubu 2005; to name only a few). Furthermore, it is also attested in languages outside of Africa (e.g. Hebrew, Landau 2006; Yiddish,

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Cable 2004; Russian, Abels 2001, Aboh & Dyakonova 2009; Polish, Bondaruk 2009, 2012; Brazilian Portuguese, Bastos-Gee 2009; Spanish, Vicente 2007, 2009; Hungarian, Ürögdi 2006; Vietnamese, Trinh 2011) where it is largely used to express verbal topics.

Predicate clefts in Asante Twi show an interesting asymmetry. Consider the sentences in (1) (tones will generally not be marked throughout this article unless stated otherwise).

- (1) a. *Sí-(é) na Kofi á-sí/\*á-yɔ́ dán.*  
 build-NMLZ FOC Kofi PRF-build/PRF-do house  
 ‘Kofi has BUILT a house.’
- b. *Dán sí-é na Kofi \*á-sí/á-yɔ́*  
 house build-NMLZ FOC Kofi PRF-build/PRF-do  
 ‘Kofi has BUILT A HOUSE.’
- c. *Kofi á-si dán.*  
 Kofi PRF-build house  
 ‘Kofi has built a house.’
- d. *Dán na Kofi á-sí.*  
 house FOC Kofi PRF-build  
 ‘It is a house that Kofi has built.’

Examples (1a, b) are both predicate cleft constructions where a (nominalised) verbal constituent – the verb alone (1a) or the verb with its internal argument (1b) – appears in focus position. As in many other West African languages, there are two copies of the main verb in (1a), one of them fronted and nominalised/non-finite, the other in its base position and finite. In (1b), on the other hand, the finite copy of the main verb is replaced by a dummy verb *yɔ́* (translatable as ‘do’), while the only copy of the main verb appears in the fronted nominalised object-verb complex.<sup>1</sup> The data in (1c, d) provide examples of a standard transitive sentence exemplifying the basic SVO word order and a standard object focus construction, respectively.

This kind of asymmetry is unexpected both conceptually and typologically. If verb doubling is necessary and possible because the tense and aspect features

<sup>1</sup>Nominalisation is obligatory with focussed verb phrases while it is optional with focussed bare verbs. This difference, however, is not tied to the choice of *yɔ́* vs. main verb in base position: *Yɔ́* is ungrammatical with a fronted bare verb, be it nominalised or not. Likewise, a fronted non-nominalised verb phrase is ungrammatical, irrespective of whether there is *yɔ́* or a copy of the main verb in base position.

need a host in order to be spelled out (see Landau 2006), then why is it not used with VP focus? Likewise, if a strategy like *do*-support exists as a Last Resort in the language to avoid violation of a constraint against stray affixes (the Stray Affix Filter, Lasnik 1981) when the VP is fronted, why is it not used with bare V fronting? In other words, one would expect the language to be symmetric in using only one repair mechanism for the two similarly illicit structural configurations rather than having a different one for each of them. Typologically, this expectation seems to be met: Each of the languages discussed in the literature on predicate clefts instantiates verb doubling in V fronting and VP fronting, if both types of fronting are available. A prime example of such a language with symmetric verb doubling is Hebrew (2).

- (2) a. *Liknot*, hi *kanta* et ha-*praxim*.  
 buy.INF she buy.PST ACC DEF-flowers  
 ‘As for buying, she bought the flowers.’  
 b. *Liknot* et ha-*praxim*, hi *kanta*.  
 buy.INF ACC DEF-flowers she buy.PST  
 ‘As for buying the flowers, she bought (them).’ (Landau 2006: 37)

In Hebrew, the main verb is doubled when a verbal constituent appears clause initially, irrespective of whether this constituent is a bare verb (2a) or a verb phrase (2b).

The Asante Twi data raise two questions, one typological and the other theoretical: (i) If *do*-support and verb doubling are two legitimate strategies to deal with displaced predicates in one and the same language as evidenced by Asante Twi, are there languages that instantiate its mirror image, namely exhibiting *do*-support with V fronting and verb doubling with VP fronting, and (ii) can the attested asymmetric and symmetric patterns be derived under Minimalist assumptions about syntax and PF, and if yes, how?

The first question may be answered negatively. To the best of my knowledge my knowledge, there are no languages that show verb doubling in VP fronting contexts but *do*-support with V fronting. The attested patterns are shown in (3).

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Also, I will have nothing to say about the different order of verb and object in a nominalised vs. verbal VP (OV vs. standard VO) as this issue is orthogonal to the questions pursued in this paper.

(3) Attested repair strategy patterns in predicate displacement

		V fronting	
		V doubling	<i>do</i> -support
VP fronting	<i>do</i> -support V doubling	Asante Twi Hebrew	(German <sup>2</sup> ) —

The remainder of the present article is an answer to the second question. After showing in section 2 that Asante Twi predicate clefts involve  $\bar{A}$ -movement, I argue in section 3 against an analysis with prosodically conditioned  $y\mathcal{O}$  insertion as proposed for the phonologically and semantically similar element  $y\mathcal{E}$  by Kandybowicz (2015). An analysis inspired by parallel chains is presented in section 4, which derives the attested patterns to the exclusion of the unattested one by means of the order of the operations Head-to-Head Movement (HHM) and Chain Reduction (CR), which are both taken to apply at PF. The analysis will be extended to languages that move V- $\nu$ /VP instead of V/VP in section 5 and to remnant VP/ $\nu$ P movement as found in German and Polish in section 6. Section 7 summarises and concludes the paper.

A remark on terminology: I will use the terms (bare) V fronting and VP fronting to refer to surface configurations where a verb alone or respectively a verb and its internal argument(s) occur sentence-initially with a focus or topic interpretation, irrespective of whether the fronted constituent is syntactically a V-head or a complex V- $\nu$ -head and a VP or a  $\nu$ P. The terms V(P) or  $\nu$ (P) movement will be used to denominate the actual syntactic constituents in displacement.

## 2. The syntactic structure of predicate clefts

### 2.1. Movement or base generation

There have been two main lines of syntactic analysis of predicate clefts in the literature: base generation and  $\bar{A}$ -movement. On the one hand, Cable (2004) argues that the fronted constituent in predicate clefts in Yiddish (and at least in some varieties of Brazilian Portuguese, see also Bastos-Gee 2009) must be base generated in a peripheral topic position rather than moved there from a

<sup>2</sup>On the pattern in German verb (phrase) topicalisation, see section 6.

clause-internal base position. (But it may then move to higher topic positions later on.)

On the other hand – building on Koopman (1984) – Landau (2006) and Vicente (2007, 2009) propose movement-based analyses for predicate cleft constructions in Hebrew and Spanish, respectively, where predicate cleft dependencies show the characteristics of  $\bar{A}$ -movement: they can cross finite clause boundaries and are sensitive to islands such as the *wh*-island, the complex NP island, the subject island, and the adjunct island (to varying degrees, at least in Hebrew). Also, Cable (2004) explicitly acknowledges that Hebrew predicate clefts most plausibly involve movement because no evidence in favour of a base generation approach can be found there.

In the case of Asante Twi, predicate clefts involve movement rather than base generation. There are two pieces of evidence in favour of this position. First, the dependency can cross finite clause boundaries (4) and is sensitive to islands such as *wh*-islands (5), complex NP islands (6), subject islands (7), relative clause islands (8), and adjunct islands (9).<sup>3</sup>

- (4) a. Sí-(é)        na Ama ká-a sé    Kofi á-si        dán.  
       build-NMLZ FOC Ama say-PST COMP Kofi PRF-build house  
       ‘Ama said that Kofi has BUILT a house.’  
    b. Dán sí-é        na Ama ká-a sé    Kofi á-yó.  
       house build-NMLZ FOC Ama say.PST COMP Kofi PRF-do  
       ‘Ama said that Kofi has BUILT A HOUSE.’
- (5) *Wh-island*  
    a. \*Sí-(é)        na Ama bísá-a se    dabén na Kofi sí-i  
       build-NMLZ FOC Ama ask-PST COMP when FOC Kofi build-PST  
       dán.  
       house  
       ‘Ama asked when Kofi BUILT a house.’

<sup>3</sup>This contradicts Saah & Goodluck (1995), who show that Asante Twi does not exhibit island effects in question formation, relativisation, and topicalisation. However, they only tested cases of  $\bar{A}$ -movement from argument positions, the island insensitivity of which is, as Korsah & Murphy (2015) argue, due to Asante Twi having obligatory overt resumption with animates and obligatory covert resumption with inanimates, where resumption can obviate island effects (Borer 1984). Consequently, verb doubling (and *do*-support) in Asante Twi cannot be treated on a par with resumption (i.e. as ‘verbal resumption’) because one would expect it to be insensitive to islands, too, contrary to fact.

- b. \*?Dán sí-é na Ama bísá-a se dabén na Kofi  
 house build-NMLZ FOC Ama ask-PST COMP when FOC Kofi  
 yó-ɔ́é.  
 do-PST  
 ‘Ama asked when Kofi BUILT A HOUSE.’

(6) *Complex NP island*

- a. \*Sí-(é) na mé-ń-té-e atétésém bíará se Kofi  
 build-NMLZ FOC 1SG-NEG-hear-PST rumour.PL any COMP Kofi  
 á-si dán.  
 PRF-build house  
 ‘I didn’t hear any rumours that Kofi has BUILT a house.’
- b. \*?Dán sí-é na mé-ń-té-e atétésém bíará  
 house build-NMLZ FOC 1SG-NEG-hear-PST rumour.PL any  
 sé Kofi á-yó  
 COMP Kofi PRF-do  
 ‘I didn’t hear any rumours that Kofi has BUILT A HOUSE.’

(7) *Subject island*

- a. \*Sí-(é) na sé Kofi á-sí dán nó má-a Ama  
 build-NMLZ FOC COMP Kofi PRF-build house CD give-PST Ama  
 ání gyé-eé.  
 eye collect-PST  
 ‘That Kofi has BUILT a house made Ama happy.’
- b. \*Dán sí-é na sé Kofi á-yó nó má-a Ama ání  
 house build-NMLZ FOC COMP Kofi PRF-do CD give Ama eye  
 gye-eé.  
 collect  
 ‘That Kofi has BUILT A HOUSE made Ama happy.’

(8) *Relative clause island*

- a. \*Sí-(é) na Ama bísá-a ε-dá áa Kofi sí-i dán.  
 build-NMLZ FOC Ama ask-PST day REL Kofi build-PST house  
 ‘Ama asked for the day that Kofi BUILT a house.’
- b. \*?Dán sí-é na Ama bísá-a εdá áa Kofi yó-ɔ́é.  
 house build-NMLZ FOC Ama ask-PST day REL Kofi do-PST  
 ‘Ama asked for the day that Kofi BUILT A HOUSE.’

(9) *Adjunct island*

- a. \*Sí-(é) na Kofi nóm nsúo efrise ɔ-a-si dan.  
 build-NMLZ FOC Kofi drink water because 3.SG-PRF-build house  
 ‘Kofi drinks water because he has BUILT a house.’
- b. \*?Dán sí-é na Kofi nóm nsúo ésánsé ó-á-yó.  
 house build-NMLZ FOC Kofi drink water because 3.SG-PRF-do  
 ‘Kofi drinks water because he has BUILT A HOUSE.’

Second, there are a number of TAM constructions and some morphosyntactic processes in Asante Twi that lead to tonal changes on the verb (Boadi 2008, Paster 2010). Among these changes is a process of low tone raising on verbs with underlying L tones. It is triggered in certain syntactic environments, all of which typically involve  $\bar{A}$ -movement, like *ex situ* wh-questions (10b) and object focus (10c). It raises all L tones on the verb and attached aspectual (but not tense) affixes. The following examples illustrate this for the L toned verb *di* ‘eat’ and the L toned progressive aspect affix *re-* (10a).

- (10) a. Ama *re-di* bayéré  
 Ama PROG-eat yam  
 ‘Ama is eating a yam.’
- b. Déén na Ama *ré-dí*?  
 what FOC Ama PROG-eat  
 ‘What is Ama eating?’
- c. Bayéré na Ama *ré-dí*.  
 yam FOC Ama PROG-eat  
 ‘It is yam that Ama is eating.’

Korsah & Murphy (2015) argue that L tone raising is not a specific property of the *na*-construction (contra Marfo 2005, Marfo & Bodomo 2005), as one might suspect from (10b, c), because it is also attested in relative clauses (11a) and affects every verb in a long-distance dependency, where only one instance of *na* is present (11b, c). Note that there also is a parallel process of H tone lowering affecting complementizers (HL) that are crossed by an  $\bar{A}$ -dependency.

- (11) a. [DP Bayéré nó<sub>i</sub> [CP áa Ama *ré-dí* t<sub>i</sub> nó ]] *da* pónó nó só.  
 yam DEF REL Ama PROG-eat CD lie table DEF top  
 ‘The yam that Ama is eating is on the table.’

- b. [<sub>CP</sub> Kofi *nim* [<sub>CP</sub> sê Esi á-*ka* [<sub>CP</sub> sê Ama *dí* bayéré. ]]]  
 Kofi know COMP Esi PRF-say COMP Ama eat yam  
 ‘Kofi knows that Esi has said that Ama eats yam.’
- c. [<sub>CP</sub> Bayéré na Kofi *ním* [<sub>CP</sub> sɛ Esi á-*ká* [<sub>CP</sub> sɛ Ama  
 yam FOC Kofi know COMP Esi PRF-say COMP Ama  
*dí*. ]]]  
 eat  
 ‘It is yam that Kofi knows that Esi has said that Ama eats.’

Since tonal changes as reflexes of movement are well-attested cross-linguistically (Lahne 2008, Georgi 2014) and they are associated with verbs and complementizers (*v* and C) in Asante Twi thus corresponding to what are standardly assumed to be phase heads (Chomsky 2000, 2001), Korsah & Murphy (2015) analyse low tone raising on verbs in Asante Twi as a reflex of successive-cyclic  $\bar{A}$ -movement through Spec $\nu$ P. Crucially, this tonal change also occurs on the lower verb copy or *yɔ* and its aspectual affix in predicate cleft constructions (12).

- (12) a. Dí na Ama *ré-dí* bayéré.  
 eat FOC Ama PROG-eat yam  
 ‘Ama is EATING yam.’
- b. Bayéré *dí-é* na Ama *ré-yɔ*.  
 yam eat-NMLZ FOC Ama PROG-do  
 ‘It is eating yam that Ama does.’

If Korsah and Murphy’s analysis is on the right track, this means that these constructions involve an  $\bar{A}$ -dependency, too.

What this section has shown is that predicate clefts in Asante Twi exhibit typical  $\bar{A}$ -properties and thus lend themselves to an analysis in terms of movement rather than base generation.

## 2.2. Head movement or remnant movement

A second issue of debate concerning V fronting structures is whether the fronted constituent is a bare head (as proposed by e.g. Koopman 1984, van Riemsdijk 1989, Larson & Lefebvre 1991, Holmberg 1999, Fanselow 2002, Landau 2006, Harbour 2008, Bastos-Gee 2009) or rather a remnant VP or  $\nu$ P (as argued for by e.g. den Besten & Webelhuth 1990, Grewendorf & Sabel 1994, Koopman 1997, Takano 2000, Abels 2001, Hinterhölzl 2002, Aboh

& Dyakonova 2009, Bondaruk 2012, Müller 2014). Asante Twi shows no evidence for any VP/ $\nu$ P evacuating scrambling or licensing movements. This is illustrated in (13) for transitive and in (14) for ditransitive sentences. (13a) and (14a) exemplify the basic word order, whilst (13b) and (14b) show the ungrammaticality of object movement across the verb and across another object. I will thus take it as the most natural assumption to regard the fronted constituent in V fronting as a head.

- (13) a. Kofi á-si dán.                      b. \*Kofi dán á-si.  
       Kofi PRF-build house                Kofi house PRF-build  
       ‘Kofi has built a house.’            ‘Kofi has built a house.’
- (14) a. Kofi ma-a mmofrá nó krataá.  
       Kofi give-PST children DET book  
       ‘Kofi gave the children a book.’  
       b. \*Kofi ma-a krataa mmofra no.  
       Kofi give-PST book children DET.  
       ‘Kofi gave a book to the children.’

### 2.3. V(P) or $\nu$ (P)

The last question to be answered about the syntactic structure of predicate clefts in Asante Twi is about the size of the fronted category. As can be observed, no aspect marking appears on the fronted verb or verb phrase. This also holds for fronted bare verbs that are not nominalised. Overt aspectual marking even leads to ungrammaticality (15).

- (15) (\*Á-)Sí-(é) na Kofi á-sí dán.  
       (PRF-)build-NMLZ FOC Kofi PRF-build house  
       ‘Kofi has BUILT a house.’

Under the assumption that aspect features are encoded on  $\nu$ , one can conclude that  $\nu$  is not part of the fronted constituent. Under the alternative assumption that aspect is a separate head, Kandybowicz (2015) argues for it to be above V but below  $\nu$  in the Asante Twi clause structure.<sup>4</sup> Fronting of  $\nu$ (P) would

<sup>4</sup>Further support for Asp beneath  $\nu$  comes from the tonal movement reflex discussed above where a high tone is inserted when there is  $\bar{A}$ -movement to Spec $\nu$ P. Low toned aspectual affixes then undergo high tone overwriting while tense affixes do not. As Korsah & Murphy (2015) point out, this follows if Asp is lower in the structure than  $\nu$  and thus already present when the

then entail fronting of the aspect head predicting aspect marking to occur on the fronted constituent, contrary to fact. Hence, under either assumption, the fronted constituent in Asante Twi must be a V(P).<sup>5</sup>

### 3. $\gamma\text{ɔ}$ -insertion is not $\gamma\epsilon$ -insertion

In Asante Twi, there is a default verbal element  $\gamma\epsilon$ <sup>6</sup> which is phonologically similar to  $\gamma\text{ɔ}$  and can also be translated as ‘do’ (and ‘make’ and ‘be’, among others). This element has a curious distribution, obligatorily occurring in simple past tense clauses with intransitive verbs (unergative and unaccusative) (16a, b) and monotransitive simple past tense clauses where the object is moved (16c) (examples from Kandybowicz 2015).

- (16) a. Kofi sa-a           \*( $\gamma\epsilon$ ).  
           Kofi dance-PST  $\gamma\epsilon$   
           ‘Kofi danced.’
- b. Dua no shi-i       \*( $\gamma\epsilon$ ).  
           tree DEF burn-PST  $\gamma\epsilon$   
           ‘The tree burned.’
- c. Deɛn na Ama di-i   \*( $\gamma\epsilon$ )?  
           what FOC Ama eat-PST  $\gamma\epsilon$   
           ‘What did Ama eat?’

Kandybowicz (2015) analyses the occurrence of  $\gamma\epsilon$  in these cases as prosodically conditioned. Under the Match theory of syntactic-prosodic constituency correspondence (Selkirk 2011),  $\gamma\epsilon$  is inserted late as a Last Resort to avoid a mapping of prosodically vacuous domains from empty syntactic Spell-Out domains, which would violate his proposed constraint against prosodic vacuity. The relevant Spell-Out domain here is AspP, which is, as Kandybowicz (2015)

high tone is inserted. Tense affixes in T, however, enter the derivation too late to be affected by tonal overwriting.

<sup>5</sup>Under the former assumption, this entails that complements of phase heads are allowed to move, contrary to Abels (2003). If Abels were correct, one would expect that the VP as a complement of the phase head  $v$  was not able to move to SpecCP alone but had to be fronted as part of the larger  $v$ P or pied-pipe the  $v$  head. This, however, would leave the ungrammaticality of aspect features in fronted position (15) unaccounted for. The issue does not arise under the latter assumption, where the aspect head prevents VP from being the complement of  $v$ .

<sup>6</sup>This element is also often pronounced (and written) as a suffix  $-\epsilon$  attached to the long vowel of the verb in the past tense.

argues, the sister of the phase head  $v$ .  $Y\mathcal{E}$  never occurs if the verb is marked for aspect because in this case the verb has only moved to Asp and hence the AspP is not empty. However, if a verb shows an overt past tense affix it has moved out of AspP to T and, in case it is intransitive, left behind a fully evacuated AspP which triggers  $y\mathcal{E}$ -insertion (16a, b). In case the object of a transitive verb with an overt past tense affix has been moved away, too,  $y\mathcal{E}$  also occurs, because both the verb and the object have left AspP (16c).

Now let us consider predicate clefts. Since  $y\mathcal{O}$  is phonologically and semantically similar to  $y\mathcal{E}$ , one might be tempted to treat them as variants of one and the same underlying element, which one might call  $y\mathcal{E}$ , whose insertion is conditioned by prosodic vacuity, as proposed in Kandybowicz (2015). This is, however, not possible. As example (17) shows,  $y\mathcal{O}$  occurs in cases where the AspP is not empty but contains an overt aspectual affix. The constraint against prosodic vacuity not being violated here, insertion of  $y\mathcal{E}$  is unexpected and unexplained under the approach sketched above.

- (17) Dán sí-é            na Kofi ré-yó.  
       house build-NMLZ FOC Kofi PROG-do  
       ‘Kofi is BUILDING A HOUSE.’

One might argue that the aspect exponent in (17) is only inserted very late, as would be the case in Distributed Morphology, and that prosodically conditioned  $y\mathcal{E}$ -insertion happens earlier, at a point where the AspP is still devoid of any phonological material.  $Y\mathcal{O}$  might then be regarded as the affix-bearing allomorph of  $y\mathcal{E}$ . But this would suggest that prosodic domains are created (and prosodic vacuity is determined) before vocabulary insertion into f-morphemes<sup>7</sup> (roughly, functional heads) has taken place, i.e. before all the phonological material of a Spell-Out domain has been assembled. New phonological material, like the aspect affix, that becomes available only after construction of prosodic structure would have to be integrated into it, uneconomically requiring a second instance of prosodic structure creation.

<sup>7</sup>In DM, the term ‘morpheme’ denotes a syntactic terminal node and its morphosyntactic feature bundle, not the phonological exponent of that node. Terminals for which there is no free choice as to Vocabulary Insertion, i.e. whose phonological realisation is solely determined by their morphosyntactic content are f-morphemes. L-morphemes, on the other hand, allow for a choice, i.e. they may be filled by Vocabulary Items that denote language specific concepts. The distinction is roughly that between functional and lexical heads (cf. Halle 1992, Embick 1997, Marantz 1997, Harley & Noyer 1998, 1999).

However, even if one adopts the Late Insertion account, this cannot be the whole story because there are instances of  $\gamma\text{ɔ}$  in Spell-Out domains that contain more than just affixal material. Consider the grammatical sentence in (18), which combines VP fronting with simple past tense, where Asp is empty and the verb moves to T (Kandybowicz 2015), and exhibits both  $\gamma\epsilon$  and  $\gamma\text{ɔ}$ .

- (18) Dán sí-e            na Kofi  $\gamma\text{ɔ}$ - $\text{ɔ}$   $\gamma\epsilon$ .  
       house build-NMLZ FOC Kofi do-PST  $\gamma\epsilon$   
       ‘Kofi BUILT A HOUSE.’

According to an analysis that conflates  $\gamma\epsilon$  and  $\gamma\text{ɔ}$ , both instances of the default verbal element should be triggered by the need to avoid prosodically empty Spell-Out domains.  $\gamma\epsilon$  is inserted upon Spell-Out of the first phase domain that is sent to PF, which is the sister of  $\nu$ , i.e. the empty AspP. Under standard assumptions about phases, the next domain that is spelled out is the TP which is the domain of the next phase head C. This domain, however, is not empty in the above example as it contains the subject which, as an I-morpheme, crucially must have undergone vocabulary insertion before prosodic domain construction (otherwise every syntactic domain would map onto an empty prosodic domain reducing the whole approach to absurdity). Nevertheless,  $\gamma\text{ɔ}$  is inserted, although this, crucially, does not happen to avoid a prosodically empty domain but rather to provide a host for the past tense affix. I thereby conclude that Kandybowicz (2015) conditions for  $\gamma\epsilon$ -insertion are different from those of the phonologically and semantically similar element  $\gamma\text{ɔ}$  and that they therefore cannot be the same element.

Additionally, the asymmetric pattern of verb doubling with V fronting but *do*-support with VP fronting can also be found in Gã (and some other Kwa languages), which does not show instances of *do*-support (here realised by *feé* ‘do’) as a means to avoid prosodic vacuity.

- (19) a. Kofi há gbékébíí  $\epsilon$  shiká.  
       Kofi give children DEF money  
       ‘Kofi gave the children some money.’  
       b. Kofi báa-jó (\*feé).  
       Kofi FUT-dance do  
       ‘Kofi will dance.’

- c. Há-(mɔ) (ni) Kofi há/\*feé gbékébíí ɛ shiká.  
 give-NMLZ FOC Kofi give/do children DEF money  
 ‘Kofi GAVE the children some money.’
- d. Gbékébíí ɛ shiká há-mɔ (ni) Kofi \*há/feé.  
 children DEF money give-NMLZ FOC Kofi give/do  
 ‘Kofi GAVE THE CHILDREN SOME MONEY.’

Example (19a) provides a regular declarative sentence with a ditransitive verb while (19b) shows that there is no *do*-support of any kind when a verb has moved to T leaving an empty AspP/*v*P behind. Examples (19c, d) exemplify a V fronting and VP fronting structure, respectively. If the occurrence of *feé* in VP fronting (19d) were due to a prosodic constraint against empty AspP/*v*P, then it should also occur in (19b), contrary to fact. In Gã, *do*-support with VP fronting in the asymmetric pattern of verb doubling therefore cannot be governed by such a constraint.

This provides some further support for treating the asymmetric pattern in Asante Twi as a real and genuine phenomenon rather than an epiphenomenon resulting from the interaction of prosodically conditioned *do*-support and the AspP-emptying property of VP fronting.

## 4. An ordering analysis

### 4.1. Preliminaries

Under the Copy Theory of Movement, where movement is decomposed into the suboperations Copy and Merge and leaves a copy of the moved element in its base position (Chomsky 1993, 1995), verb doubling can be easily accounted for as being a consequence of Spell-Out of more than one copy of a moved element (Abels 2001, Nunes 2004). However, in the standard cases, only one link/copy in a movement chain is pronounced, namely the head of that chain, while the others are left unpronounced. Several attempts have been made to account for this (Brody 1995, Bobaljik 1995, Groat & O’Neill 1996, Pesetsky 1997, 1998), the most recent one by Nunes (2004). He proposes an operation of Chain Reduction that applies at PF and (in the standard case) deletes lower elements of a chain under phonological identity with the highest one. I will adopt his approach in the following insofar as I assume an operation Chain Reduction that applies to movement chains at PF and deletes lower copies. However, I

reject the identity requirement and the economy conditions assumed for it. A chain consists of positions that are related by syntactic movement (chain links). Chain Reduction then simply deletes the elements that occupy the lower positions (copies) irrespective of whether they are identical to or a proper subset of the copy in the highest chain link.<sup>8</sup>

What is then the reason that the verb is spelled out two times in the predicate clefts above? The answer is that the verb actually moves twice in those constructions thereby creating two distinct parallel chains whose respective heads are spelled out while their shared tail is deleted (Aboh 2006, Collins & Essizewa 2007, Chomsky 2008, Kandybowicz 2008, Aboh & Dyakonova 2009). One movement is  $\bar{A}$ -movement into SpecCP (either as a bare head or as part of the whole VP) in order to satisfy the focus feature on C and the other is head movement to *v* and/or T.

As mentioned above, V fronting in Asante Twi seems to involve movement of a bare head rather than remnant movement. This kind of  $\bar{A}$ -head movement into a specifier position has first been suggested by Koopman (1984) and, as Vicente (2007, 2009) shows, is not in conflict with current ideas about how movement works but rather is their logical extension. Since it shows all the characteristics of phrasal  $\bar{A}$ -movement, I assume that Head-to-Spec Movement (HSM) works just like the former in that it is triggered by the same features and has to obey the standard constraints on movement (Minimal Link Condition, Phase Impenetrability Condition).

With regard to Head-to-Head Movement (HHM), on the other hand, I diverge from Vicente's proposal. Going back to a suggestion by Chomsky (1995), many researchers have proposed accounts treating HHM as a PF operation rather than a syntactic one (cf. Brody 2000, Hale & Keyser 2002, Bury 2003, Harley 2004, Platzack 2013) mainly because it does not seem to have an effect on interpretation,<sup>9</sup> but also because it poses some technical problems for syntactic theory (e.g. it violates the Extension condition). I will adopt their view of HHM

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<sup>8</sup> Actually, for Nunes (2004) identity of copies must be restricted to identity of their phonological features ignoring their morphosyntactic ones. Otherwise, he would have to treat lower copies with unvalued morphosyntactic features, such as e.g. Case, as distinct from higher copies with the respective valued versions of these features. The way Nunes' system is set up, morphosyntactically, lower copies are necessarily (proper) subsets of higher copies. This property is used in a Late Insertion approach to resolution of movement chains by Muñoz Pérez (2015) in order to overcome several flaws of Nunes' original proposal.

<sup>9</sup> Though see Lechner (2001, 2004, 2007) and Roberts (2010) for arguments that at least in some cases head movement affects interpretation at LF.

and further assume that PF-movement does not leave any copies (or traces) (Boeckx & Stjepanović 2001, Sauerland & Elbourne 2002).

#### 4.2. The order of operations at PF

As a consequence, the two verbal movements now crucially happen on two derivationally separate levels, focus movement in (narrow) syntax and *V-to- $v$ /T* movement at PF. Chain Reduction, as already mentioned, also applies at the level of PF. In the spirit of recent work concerned with timing of elementary operations (Müller 2009, Arregi & Nevins 2012, Georgi 2014, Murphy & Puškar 2015, Puškar 2015, Assmann et al. to appear), I propose that there is an order between these two PF operations that is invariable within a language but may vary across languages. This order gives rise to either the symmetric or asymmetric pattern of verb doubling in the following way. In VP fronting, if HHM applies before CR, *V* head-moves out of the lower VP copy thereby leaving the lower link of the VP-movement chain. Subsequent CR, which deletes the element in that position affects the remnant VP but it crucially cannot affect the *V*. Since CR only applies to the elements that occupy the lower positions in a movement chain and the *V* head has been moved out of this position to *v*/T prior to application of CR, it evades deletion. Hence, CR counterbleeds HHM in this order as CR would have deleted the element undergoing HHM had it applied earlier. Both the lower *V* copy and the one in the VP copy in SpecCP survive, which results in verb doubling. If the reverse order holds at PF, CR applies to the lower chain link of the VP chain first. The VP copy occupying this position is deleted and with it its constituents including the *V* head. Subsequent HHM cannot apply (or can only apply to *v*) since there is no *V* anymore. Therefore, CR bleeds HHM which gives rise to *do* insertion into *v*/T in order to provide a host for Spell-Out of the aspect/tense affix in these functional heads. In *V* fronting, however, CR cannot apply to the lowest *V* copy even when it applies before HHM. *V* fronting involves  $\bar{A}$ -head movement of *V* to some specifier position, a movement step that cannot create a chain. If it did, this chain would violate the Chain Uniformity Condition (Chomsky 1995, van Craenenbroek 2010): Its lower link's phrase structure status would be minimal but not maximal, that of its upper link would be both minimal and maximal while the Chain Uniformity Condition demands that a chain be uniform with regard to phrase structure status. If the movement created a chain, it would be illicit. However, since such movement exists (Koopman 1984,

Landau 2006, Vicente 2007, 2009), it cannot create a chain. Because there is no chain in V fronting, Chain Reduction cannot apply and HHM may move V to  $\nu$ /T unimpededly, which gives rise to verb doubling under either order. An overview of the interactions between the type of fronting and the order of operations at PF is given in the table in (20) with a language exhibiting each order.

(20) *Interaction of fronting type with order of PF operations*

	V fronting	VP fronting	
HHM >> CR	verb doubling	verb doubling	(Hebrew <sup>10</sup> )
CR >> HHM	verb doubling	<i>do</i> -support	(Asante Twi)

In what follows, the relevant derivations will be discussed in more detail in a phase based model of syntax that takes  $\nu$  and C to be the only phase heads (Saddy 1991, Chomsky 2001, van Urk & Richards 2015). I will adopt the weak version of the Phase Impenetrability Condition (Chomsky 2001) where the domain of a phase is sent off to PF and thus becomes unavailable to further syntactic operations upon merge of the next higher phase head (i.e. C for the  $\nu$ P phase). This means that the VP is transferred to PF as soon as the C head is merged with the TP. In the case of the final CP, the domain is sent off upon completion of the phase. The head and edge of the CP phase are passed on to PF only after that. Due to the Phase Impenetrability Condition, in a phase based model of syntax, elements moving higher up in the clause need to do so successive-cyclically, passing through the respective phase heads' specifiers. A focussed V/VP thus needs to first move to Spec $\nu$ P where it leaves a copy, because upon merge of the C head, VP as the domain of  $\nu$ P is sent off to PF and becomes inaccessible for further syntactic movements.

#### 4.3. CR applies before HHM: asymmetric verb doubling

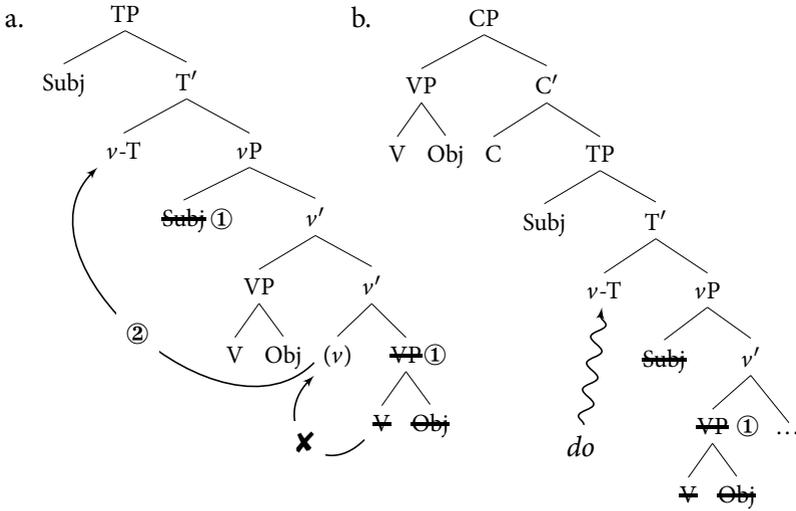
In this subsection, I will be concerned with the order CR before HHM considering VP fronting first and V fronting after it. This order derives the asymmetric pattern as found in Asante Twi. The mechanics of the system as

<sup>10</sup>For reasons of exposition and understandability, I will treat the moved constituent in Hebrew as V or VP although Landau (2006) convincingly argues that it is actually  $\nu$  and  $\nu$ P. As will be discussed in section 5, the proposed system can be extended to  $\nu/\nu$ P movement making the same predictions as for V/VP movement.

well as some of its peculiarities will become clear throughout the following discussion. Linearisation applies after syntax, hence the given tree structures do not necessarily reflect surface linearity. The next subsection will subsequently consider the reverse order.

**VP fronting** In the derivation of VP fronting, the VP ultimately has to arrive in SpecCP, a position which will only come into existence later. It is therefore first copied and moved to Spec $\nu$ P in the syntactic module due to the PIC in order to escape the domain of the first phase head  $\nu$ . When C is merged, this domain (i.e. the lower VP) is passed on to PF while the VP in Spec $\nu$ P is copied and moved to SpecCP in the syntax. At PF, CR applies vacuously because only a trivial chain (i.e. one chain link) is present at the moment and HHM applies vacuously because there is no head that could serve as the target for HHM of V. Upon completion of the CP phase, the TP is transferred to PF, which includes the VP copy in Spec $\nu$ P and the target heads  $\nu$  and T for HHM (21a). The original VP domain of  $\nu$  is still present at PF. The third VP copy in SpecCP is not visible to CR at this point because it has not been transferred to PF yet. Since the VP copy in its base position occupies the lower link in the (PF visible) chain, it is deleted (indicated by striking out). The subject copy in Spec $\nu$ P, by virtue of being the lower link in the subject movement chain, is deleted by CR, too. Subsequent HHM of V to  $\nu$  and T is impossible because the lower V copy, as a constituent of the lower VP, was deleted with it (21a). Only HHM of  $\nu$  to T can take place (solid lines). Recall that HHM does not leave any copies (indicated by parenthesis around the element in its position prior to movement). Next, the edge and head of the CP phase are transferred to PF containing the third VP chain link. CR deletes the VP copy in Spec $\nu$ P which is now the lower link of the VP chain (21b). As there are no new target heads for HHM of the V- $\nu$ -T complex in this cycle, subsequent HHM applies vacuously.

(21) CR ① >> HHM ② in VP fronting: Do-support

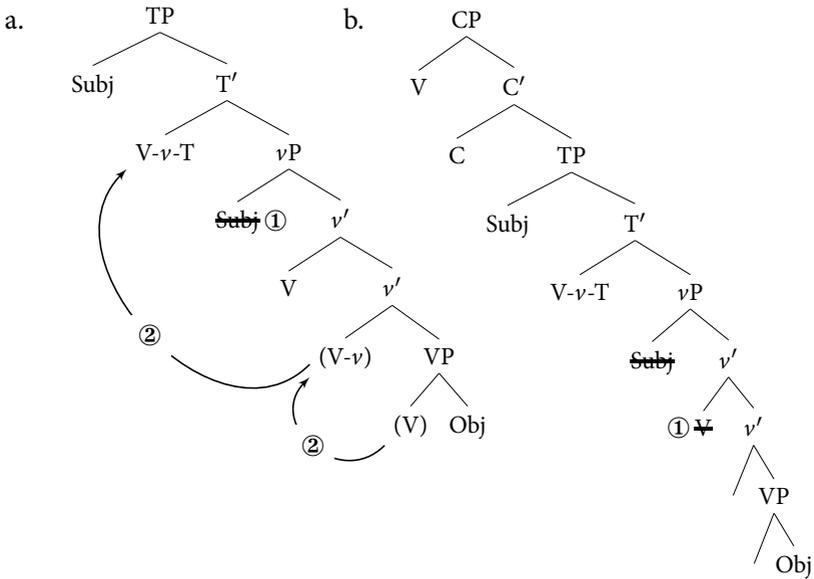


In order to enable Spell-Out of the aspect and tense affixes in  $v$  and T, a dummy verb *do* is inserted as a Last Resort. Hence, CR applying before HHM leads to *do*-support in VP fronting because the V head fails to evade deletion as part of the lower VP copy.

**V fronting** In the case of V fronting, on its way to SpecCP, V is first moved to SpecvP to remain syntactically available for a later stage of the derivation. Since this movement is  $\bar{A}$ -head movement in the syntactic module, CR cannot bleed HHM even though it applies before it. This is due to the nature of  $\bar{A}$ -head movement: Its first step relates a copy of a head in its base position, where it is minimal but not maximal, with a copy of that head in a specifier position, where it is both minimal and maximal. This movement does not create a chain since it would violate the Chain Uniformity Condition which demands that a chain be uniform with regard to phrase structure status. Therefore, when the V head is copied and moved to SpecvP in syntax, no chain is established between the two V copies. Upon merge of the phase head C, VP is sent off to PF, where CR and HHM apply vacuously as mentioned above in the case of VP fronting. Next, V in SpecvP is copied again and moved to SpecCP. Note that this movement step, in contrast to the first one, does create a chain since both the V copy in SpecvP and that in SpecCP are minimal and maximal, i.e. are

uniform with regard to their phrase structure status. The CP phase is thus completed and its domain TP is sent off to PF. CR applies and does not delete anything except the lower copy of the subject (22a). Importantly, both V copies that are present at PF at this point are not linked to each other by a chain. Consequently, CR cannot delete the lower one, which is not part of any chain, because it only applies to chains, whereas it cannot delete the upper one, which is part of a chain, since the higher chain link is not visible to PF yet. Therefore, HHM can move the lowest V copy to  $v$  and on further to T.

(22) CR ① >> HHM ② in V fronting: Verb doubling



In the next step, when the third copy of V in SpecCP reaches PF, CR applies to the chain between it and the V copy in Spec $v$ P, deleting the latter. HHM applies vacuously and the resulting structure contains two V copies, one in SpecCP and the other as part of the complex V- $v$ -T head (22b). Hence, CR >> HHM leads to *do*-support in VP fronting because V is deleted as part of the lower VP copy before it can move to  $v$ , but results in verb doubling in V fronting because V is protected from deletion by the peculiar property of  $\bar{A}$ -head movement to not

from a chain in the first movement step. CR >> HHM thus derives a pattern of verb doubling which is exactly the asymmetric pattern found in Asante Twi.<sup>11</sup>

#### 4.4. HHM applies before CR: symmetric verb doubling

In this subsection, I will be concerned with the order HHM before CR and its consequences first with regard to VP fronting and second with regard to V fronting. As will be shown, the order leads to a symmetric pattern of verb doubling as found in Hebrew and actually most other languages that allow verb doubling as well as V and VP fronting. Since nothing of interest to the present issue happens within the VP step of the derivations, it will be omitted from the following discussions.

**VP fronting** When the domain of CP, which contains two copies of VP in one movement chain, is passed on to PF, HHM applies before CR and moves V to *v* and the resulting complex head to T. Recall that HHM does not leave any copies so there is no V anymore in the VP copy constituting the lower link of the movement chain. Subsequent CR applies to the chain that contains the VP copy in its base position and the VP copy in Spec $\nu$ P. Since the VP copy in the base position occupies the lower link in the (PF visible) chain and is a subset of the VP copy in the higher chain link, it is deleted. The subject copy in Spec $\nu$ P is

<sup>11</sup>Kandybowicz (2015) argues that the verb in Asante Twi only moves on to T when the Asp head (here *v*) has a null realisation, otherwise it stops in *v*. The structures given here summarise over both possibilities always showing HHM of V-*v* to T. For sentences where both aspect in *v* and tense in T are overtly expressed (i) he argues that the subject stays in its base position.

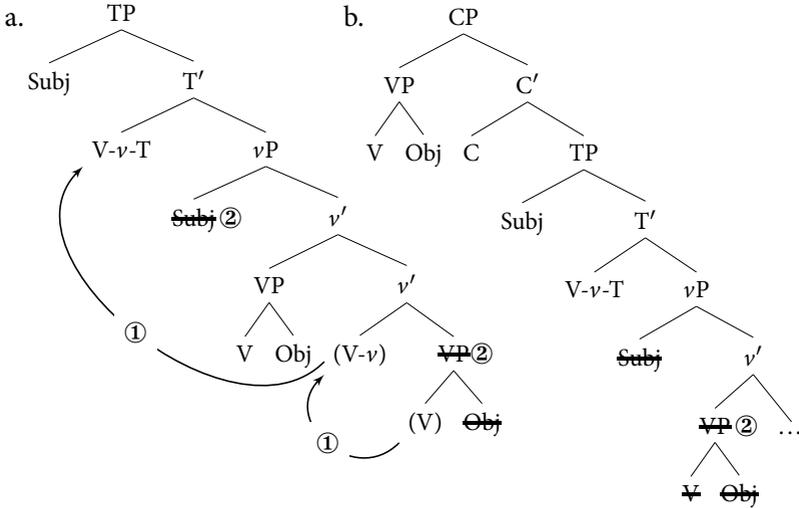
- (i) Ná Kofi á-si dán.  
 PST Kofi PRF-build house.  
 ‘Kofi had built a house.’

As predicted by the analysis, these sentence show the same pattern like those that only express either tense or aspect overtly. V fronting triggers verb doubling (iia) while VP fronting requires *do*-support (iib).

- (ii) a. Sí-(é) na Kofi á-sí/\*á-yó dán.  
 build-NMLZ FOC Kofi PRF-build/PRF-do house  
 ‘Kofi has BUILT a house.’  
 b. Dán sí-é na Kofi \*á-sí/á-yó  
 house build-NMLZ FOC Kofi PRF-build/PRF-do  
 ‘Kofi has BUILT A HOUSE.’

also deleted (23a). When the rest of the CP phase arrives at PF, HHM applies vacuously as there are no new target heads for HHM of the V-*v*-T complex in this cycle. CR, however, applies to the chain containing one VP copy in Spec*v*P and one in SpecCP deleting the former (23b).

(23) HHM ① >> CR ② in VP fronting: Verb doubling



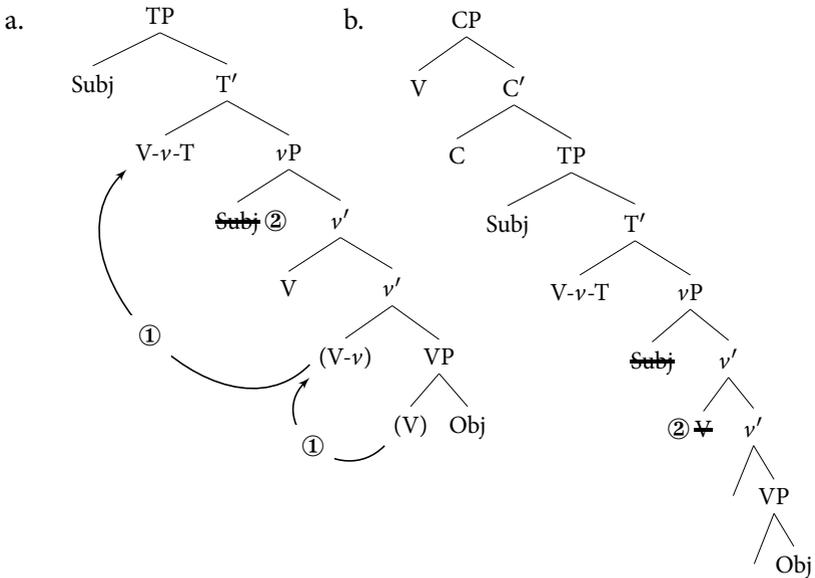
The resulting structure contains two copies of the V head, one as the head of the VP copy in SpecCP, and the other as part of the complex V-*v*-T head. Thus, contrary to the reverse order, HHM >> CR leads to verb doubling rather than *do*-support in VP fronting because the V head can move to *v* before the lower VP copy is deleted.

**V fronting** In V fronting, where the verbal head undergoes  $\bar{A}$ -head movement in the syntactic module, CR cannot delete the lower V copy for two reasons. First, due to Chain Uniformity there is no chain between the V copy in its base position and the V copy in Spec*v*P. Second, HHM applies before CR. Hence, when the V copy in Spec*v*P is copied again, moved to SpecCP, and the TP is sent off to PF, first, HHM applies moving the lowest V copy to *v* and on to T. Next, CR applies and does not delete anything except for the lower copy of the subject (24a).<sup>12</sup> Upon transfer of the CP's edge and head, the higher

<sup>12</sup>Note that even if there were a chain between the two V copies, CR applying after HHM could still not delete the lower one. This is due to chain links being defined as positions in the

link of the V chain in SpecCP becomes available. After vacuous application of HHM, CR deletes the lower V copy of the chain in SpecvP. The resulting structures in (23) and (24) each contain two copies of the verb, one as part of the complex V-*v*-T head and another in SpecCP either as part of a fronted VP or as a bare head. The order HHM before CR thus derives the symmetric pattern of verb doubling with both V and VP fronting as found in Hebrew and various other verb doubling languages. It does so by moving out of the lower VP in VP fronting before it gets deleted. The lower V copy in V fronting is protected by the above-mentioned idiosyncrasy of  $\bar{A}$ -head movement.

(24) HHM ① >> CR ② in V fronting: Verb doubling



4.5. Interim summary and predictions

As the preceding sections showed, a simple ordering of Chain Reduction and Head-to-Head Movement at PF derives the two patterns of verb doubling manifested by Hebrew on the one side and Asante Twi on the other. If HHM

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structure that are related by movement. If HHM moves the lower V out of the position that is the lower chain link (i.e. sister of Obj/daughter of VP), CR will only detect one copy in the chain (the one in SpecvP) and deletion will not be triggered as it is not necessary.

applies before CR, establishing a counterbleeding relation as in Hebrew, the verbal head V evades deletion by CR because it moves away before the element in the relevant chain link can be deleted. The result is verb doubling. In Asante Twi, CR applies before HHM, establishing a bleeding relation. V is deleted before it can be moved elsewhere, resulting in *do*-support unless there is no movement chain to begin with. This is the case for the first step of  $\bar{A}$ -head movement in V fronting where V survives CR by virtue of not being part of a chain. Subsequent HHM can apply to V and verb doubling results. The asymmetric pattern of verb doubling in Asante Twi therefore is a consequence of the language's order of operations at PF and the idiosyncratic property of  $\bar{A}$ -head movement to not form uniform chains in the first movement step.

Crucially, the reverse Asante Twi pattern, namely verb doubling in VP but *do*-support in V fronting is excluded by two independent principles of this proposal. First, due to the nature of  $\bar{A}$ -head movement in V fronting, it is not possible for CR to delete the V in its base position. Therefore, whenever the verb itself has been moved in the syntax there will be two copies of it in the structure, one of which will be used to host inflectional affixes, obviating the need for any *do*-support. Second, even if the verb formed a chain with its copy in V fronting, CR would have to apply before HHM to derive *do*-support. However, this order of operations also leads to *do*-support in VP fronting deriving a language that shows *do*-support in both kinds of verbal fronting. Such a language is German, which uses remnant VP movement instead of  $\bar{A}$ -head movement (den Besten & Webelhuth 1990, Grewendorf & Sabel 1994, Koopman 1997, Hinterhölzl 2002, Müller 2014) to front a verb without its arguments (25). Here, the lower verb copy within the evacuated VP remnant is part of the VP chain and may thus be affected by CR before it undergoes HHM to *v*/T.

- (25) [<sub>VP</sub> t<sub>1</sub> Lesen ]<sub>2</sub> tut sie [<sub>DP</sub> Bücher ]<sub>1</sub> gern t<sub>2</sub>.  
 read.INF do.3SG she books gladly  
 'She likes to READ books (as opposed to e.g. writing them).'

Before turning to remnant movement in section 6, the next section will introduce a modification of the present account that will allow it to be extended to cases of predicate fronting that involve V-*v*/*v*P instead of V/VP.

## 5. Extending the approach to V- $\nu$ /VP movement: Entire phases at PF

As it stands, the proposed account derives the correct patterns for V/VP movement. However, as Landau (2006) convincingly argues, the constituent that is fronted in Hebrew verbal topicalisation is actually not V/VP but rather V- $\nu$ /VP. Vicente (2007, 2009) shows that the same holds for Spanish predicate clefts. Both languages exhibit verb doubling in V fronting as well as VP fronting. This poses a problem for the ordering account: Copies are created only when an element is moved in the syntax but this element cannot be a complex V- $\nu$  head because complex heads are created by HHM, which applies only after syntax at PF. If it is only the  $\nu$  that moves and leaves copies in the syntax, it remains puzzling why we get two tokens of the lexical verb.

In order to integrate V- $\nu$  doubling into the ordering account, it is necessary to allow the output of HHM of V to  $\nu$  to serve as the input to syntax such that the whole complex head can be copied and moved. This is only possible if the entire phase is sent off to PF with its head and edge but not its domain accessible to further syntactic operations as argued for by Fox & Pesetsky (2003, 2005), Svenonius (2004, 2005), Fowlie (2010), Richards (2011) and Aelbrecht (2012). Under this premise, the entire phase would be transferred to PF upon completion. PF operations would apply and potentially alter the edge and head, e.g. creating a complex head. This altered edge/head could then be affected by further syntactic operations, e.g. movement. Crucially, though, V/VP movement and the effects that an order of PF operations has on it remain unaffected by this modification. The interaction of the different orders of PF operations with V- $\nu$ /VP movement is the same as with V/VP movement: HHM before CR gives rise to symmetric verb doubling while the reverse order CR before HHM results in asymmetric verb doubling. The respective derivations will be discussed in detail in the following subsections.

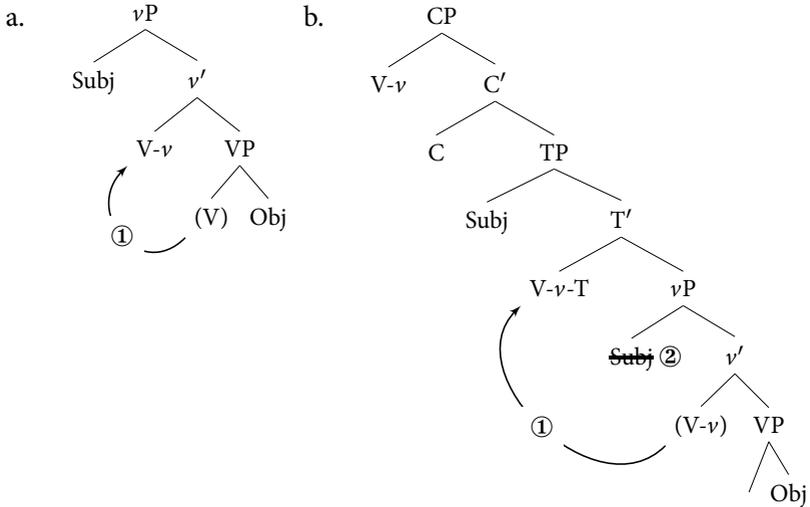
### 5.1. HHM applies before CR: symmetric verb doubling

In this subsection, I will discuss the order HHM before CR first for the case of V fronting of a complex V- $\nu$  head and thereafter for the case of VP fronting of a VP.

**V fronting** In V fronting of V- $\nu$ , apart from raising of the subject to SpecTP no syntactic movement takes place before C enters the derivation. When C is

merged, the entire  $\nu$ P phase is sent to PF, where HHM moves V to  $\nu$  creating the complex head  $V-\nu$  (recall that HHM does not leave any copies). CR applies vacuously since the higher link of the subject movement chain is not yet visible at PF (26a). Next, the newly formed complex  $V-\nu$  head is copied and moved to SpecCP. Since this movement is  $\bar{A}$ -head movement, it does not create a chain. The whole thus completed CP is transferred to PF, where first further HHM applies to the lower copy of the complex head moving and adjoining it to T. As there are no other movement chains, subsequent CR only applies to the subject chain deleting the lower copy and the derivation ends (26b).

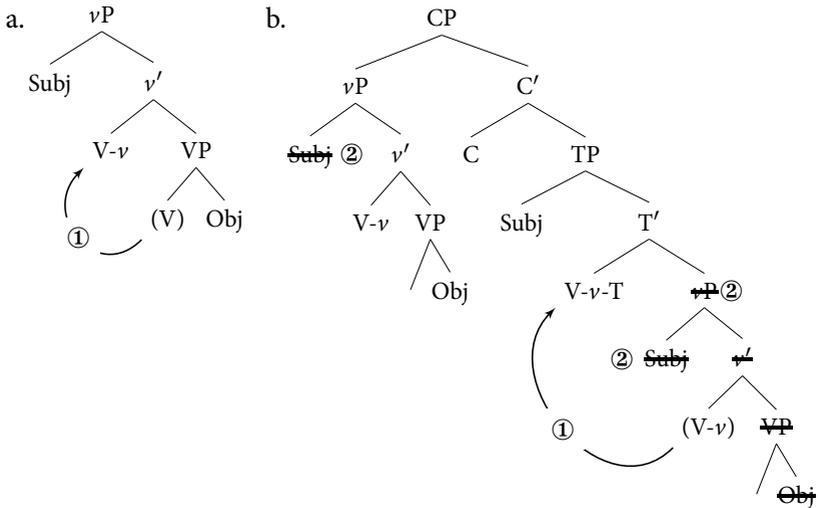
(26) HHM ①  $\gg$  CR ② in V fronting of  $V-\nu$ : Verb doubling



**VP fronting** In VP fronting where the fronted constituent is a  $\nu$ P, the first syntactic movement is that of the subject to SpecTP creating a chain. Afterwards, the C head is merged and triggers transfer of the entire  $\nu$ P phase to PF where V head-moves to  $\nu$  first. Subsequent CR applies vacuously (27a). Next, the whole  $\nu$ P still containing the lower link of the subject chain is copied and moved to SpecCP. Then the CP phase is sent to PF and HHM applies first moving the complex  $V-\nu$  head to T. Subsequent CR is now faced with a remnant movement configuration: The subject has been extracted out of the  $\nu$ P, which in turn has been moved above the subjects new position. Remnant movement is a perennial problem for the Copy Theory of Movement (Gärtner 1998) because

the copy of the extracted element contained in the higher copy of the remnant is no longer c-commanded by a higher copy of itself. It is, hence, not part of a chain and expected to evade deletion, which would result in it being phonetically realised, contrary to fact. Nunes (2004) proposes a solution that I will also adopt here. Chain links refer to positions in the tree filled by syntactic objects and Chain Reduction, upon inspecting a chain, determines which of its links are c-commanded by another link. It then proceeds to delete the elements in those links and identical elements in identical positions elsewhere in the tree. Therefore, when CR applies to the subject chain and identifies the lower link for deletion, i.e. the subject copy that is the sister of  $v'$  and the daughter of  $vP$ , it not only deletes that copy but the identical copy in the identical configuration (sister of  $v'$  and daughter of  $vP$ ) in the higher  $vP$  as well. Application of CR to the  $vP$  chain leads to deletion of the lower  $vP$  copy (27b).

(27) *HHM* ①  $\gg$  *CR* ② in *VP* fronting of  $vP$ : *Verb doubling*



The resulting structures in (26) and (27) both contain two copies of the  $V-v$  head, which manifests itself as verb doubling on the surface. Hence, the order *HHM*  $\gg$  *CR* leads to verb doubling in both  $V$  and  $VP$  fronting no matter whether the fronted constituent is  $V/VP$  or  $V-v/vP$ . Note, however, that movement of  $V-v$  to  $T$  is a necessary condition in order for verb doubling to occur in (27). If the lower copy of the complex head did not move to  $T$ ,

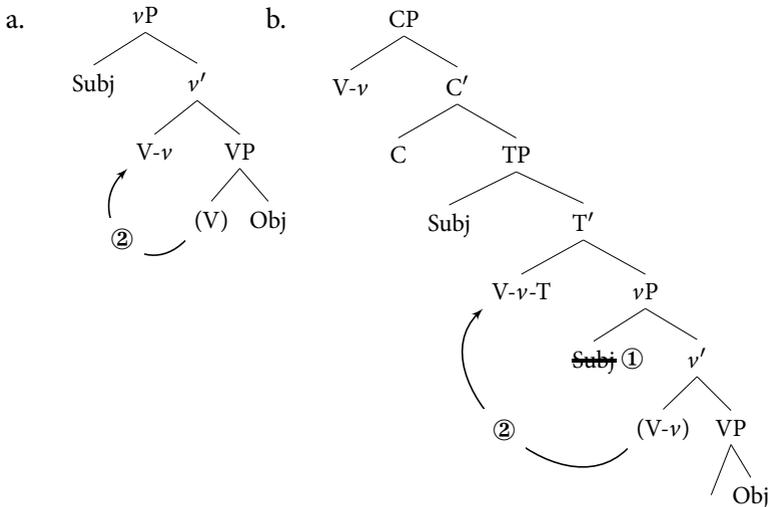
it would be deleted as part of the lower  $\nu$ P leaving only the copy in Spec $\nu$ P. In VP fronting where it is VP rather than the  $\nu$ P that moves, it is sufficient for the V head to move to  $\nu$  in order to evade deletion. This directly leads to the prediction that languages that do not have verb-to-T movement but nonetheless show fronting of  $\nu$ P do not exhibit verb doubling.

5.2. CR applies before HHM: asymmetric verb doubling

This subsection considers the order CR before HHM. I will treat V fronting of a complex V- $\nu$  head first followed by VP fronting of a  $\nu$ P.

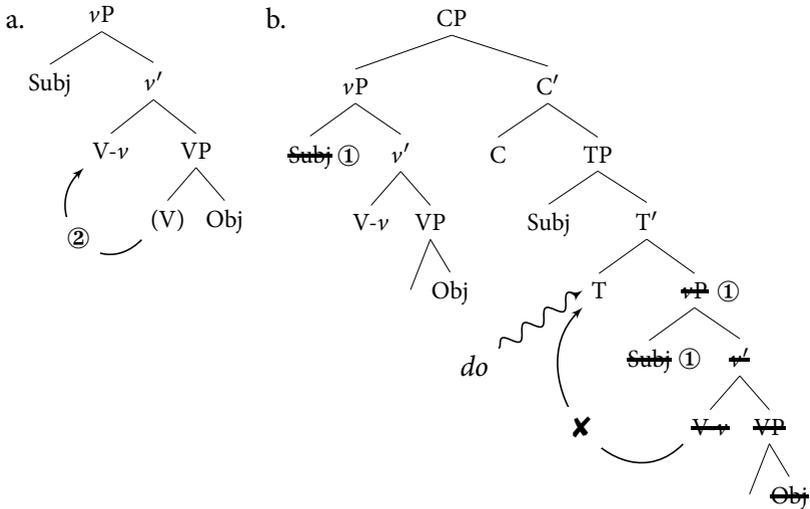
**V fronting** In V fronting, after merge of C the  $\nu$ P phase is transferred to PF. As the higher copy of the subject chain is not visible yet and there are no other chains, CR applies vacuously. Subsequent HHM moves V to  $\nu$  creating V- $\nu$  (28a). In syntax, this complex head  $\bar{A}$ -head moves to SpecCP. Recall that this type of movement does not create a chain. Upon completion of CP, the whole phase is sent off to PF where, first, CR applies to the one existent chain deleting the lower copy of the subject followed by HHM of V- $\nu$  to T (if the language has V to T movement) (28b). The resulting structure contains two copies of the complex V- $\nu$  head resulting in verb doubling on the surface, as was the case for V movement under the same order.

(28) CR ①  $\gg$  HHM ② in V fronting of V- $\nu$ : Verb doubling



**VP fronting** In VP fronting there is *do*-support. The first movement that takes place is that of the subject to SpecTP. Upon merge of C, the  $\nu$ P phase is sent to PF where CR applies vacuously (since the higher subject copy is not visible yet) and subsequent HHM moves V to  $\nu$  (29a). Next, the  $\nu$ P is  $\bar{A}$ -moved to SpecCP and the CP is transferred to PF. CR applies first and deletes the lower copy of the subject chain and the one in the higher copy of  $\nu$ P because it is in an identical position. Crucially, the lower copy of the  $\nu$ P chain is also deleted before HHM can move the complex head V- $\nu$  out of it to T. Consequently, HHM applies vacuously. Then, in order to enable Spell-Out of the affix in T, *do* is inserted as a Last Resort (29b).

(29) CR ①  $\gg$  HHM ② in VP fronting of  $\nu$ P: *Do* support



As with V/VP movement, the order CR  $\gg$  HHM derives an asymmetric pattern of verb doubling with  $\bar{V}$ - $\nu$ /VP movement, too. Again, verb doubling only occurs in V fronting due to  $\bar{A}$ -head movement not creating a uniform chain in the first step while *do*-support is triggered in VP fronting contexts.

### 5.3. Interim summary

As shown in the previous sections, assuming that the entire phase is sent off to PF allows us to derive from the same orders of PF operations the same patterns of verb doubling for languages like Hebrew and Spanish where the fronted

constituent is  $V-\nu/\nu P$  instead of  $V/VP$ .  $HHM \gg CR$  gives rise to the symmetric pattern and  $CR \gg HHM$  to the asymmetric pattern. Nothing changes under this assumption for the  $V/VP$  languages: They contain two copies of the moving  $V/VP$  in the  $\nu P$  phase already and at PF,  $HHM$  may save the  $V$  head by moving it to  $\nu$  prior to deletion of  $VP$  under the order  $HHM \gg CR$  resulting in verb doubling. If  $CR$  applies before  $HHM$ , the  $V$  inside the lower  $VP$  copy will be deleted before it can move to  $\nu$ , resulting in *do*-support. In cases of  $V$  fronting, under both orders  $CR$  cannot apply to the lower  $V$  copy since it is not part of a (uniform) chain anyway giving rise to verb doubling. Hence, for languages that move  $V/VP$  like Asante Twi, the assumption that the entire phase is transferred to PF does not affect the relation between order of PF operations and the resulting verb doubling pattern.

## 6. Remnant $VP/\nu P$ movement

In this section, I will discuss languages that make use of remnant  $VP$  or  $\nu P$  movement instead of  $\bar{A}$ -head movement to front a single verb without its arguments. It is shown that due to the absence of  $\bar{A}$ -head movement only symmetrical patterns arise. For such languages, the order  $CR \gg HHM$  results in *do*-support in both  $VP$  fronting and  $V$  fronting contrary to languages that employ  $\bar{A}$ -head movement where  $V$  fronting consistently leads to verb doubling. The reverse order  $HHM \gg CR$  gives rise to symmetric verb doubling, just as it did for languages with  $\bar{A}$ -head movement.

### 6.1. $CR$ applies before $HHM$ : *do*-support

As already hinted at in the table in (3) above, there are languages like German that exhibit the third logically possible pattern, namely *do*-support in both  $V$  and  $VP$  fronting as exemplified by the verbal topicalisations in (30a, b) respectively.

- (30) a. *Lesen tut sie Bücher gern. (Aber schreiben nicht.)*  
 read.INF do.3SG she books gladly (but write.INF not)  
 ‘She likes to READ books. But she doesn’t like to write them.’
- b. *Bücher lesen tut sie gern.*  
 books read.INF do.3SG she gladly  
 ‘She likes to READ BOOKS.’

In the present approach, *do*-support in VP fronting is a consequence of the order CR >> HHM at PF. Therefore, the derivation of the German example (30b) would proceed as illustrated in (29) in section 5.2. However, German V fronting cannot involve  $\bar{A}$ -head movement of V because this should result in verb doubling, contrary to fact, due to the special properties of the first step of that movement. Nevertheless, if German employed some other kind of movement that did not protect V from deletion by early CR, *do*-support would be the expected result. It has indeed been argued that German V fronting involves remnant VP movement (den Besten & Webelhuth 1990, Grewendorf & Sabel 1994, Koopman 1997, Hinterhölzl 2002, Müller 1998, 2014) rather than  $\bar{A}$ -head movement. Remnant VP movement under the order CR >> HHM gives rise to *do*-support in the following way.

In order to create a remnant VP, the object has to scramble out of it. There is considerable disagreement in the field about what kind of movement (if at all) scrambling actually is and which position(s) it targets (see Karimi 2005: for a recent overview). For the sake of explicitness, I will follow Hiraiwa (2010) who derives the condition in (31) from phase theory.

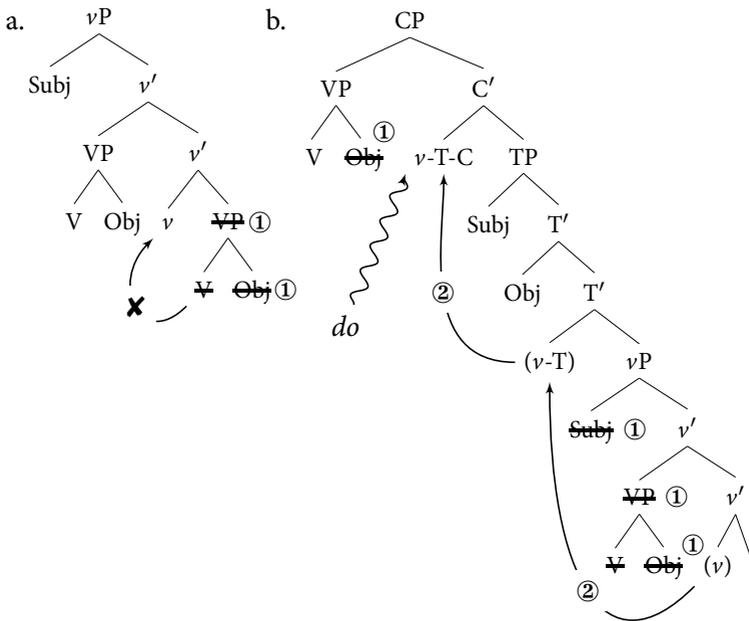
(31) *Condition on remnant movement* (Hiraiwa 2010: 135)

A remnant movement cannot apply when the operation that extracts *x* from the remnant is a movement to the edge of a phase.

Since German allows remnant movement it follows from (31) that the remnant creating movement does not target a phase edge like Spec $\nu$ P or SpecCP. In the case of remnant VP movement, I thus conclude that the object scrambles to SpecTP. This movement does not violate the weak version of the PIC that is presumed in this paper. When T is merged, the domain VP of the phase head *v* and thus the object is still accessible for syntactic operations because the next phase head C has not yet entered the tree. Turning back to the derivation, the object cannot first move to SpecTP followed by movement of VP to Spec $\nu$ P as the latter step would violate the Extension Condition (Chomsky 1993, 1995). Therefore, first, the VP has to move to Spec $\nu$ P in order to be accessible for movement to SpecCP later. Then, T is merged and attracts the subject and the object into its specifier. Upon merge of C, the entire  $\nu$ P phase is then sent off to PF where CR deletes the lower VP copy. Subsequent HHM cannot move V to *v* since there is no V in *v*'s c-command domain anymore (32a). In narrow syntax, the VP moves into the topic position in SpecCP. The complete CP is then

transferred to PF. CR applies and deletes the lower subject copy. Concerning the object and VP chains, CR is faced with the remnant movement configuration again: The object copy in the topicalised VP copy is not c-commanded by the object copy in SpecTP and thus not part of the object chain. However, it is in an identical position as the object copy in the lower link of the chain. CR therefore deletes both object copies that are sisters of V and daughters of VP. Also, the lower VP copy in Spec $\nu$ P undergoes deletion. Subsequent HHM moves  $\nu$  to T and the resulting complex to C (V2 in German). Last Resort *do* insertion takes place to provide a host for the inflectional affixes in  $\nu$  and T (32b). Note that I abstract away from the head finality of V,  $\nu$ , and T in German in order to keep the trees in line with the others in the paper for reasons of simplicity and comparability.

(32) CR ①  $\gg$  HHM ② in VP fronting of remnant VP: Do-support

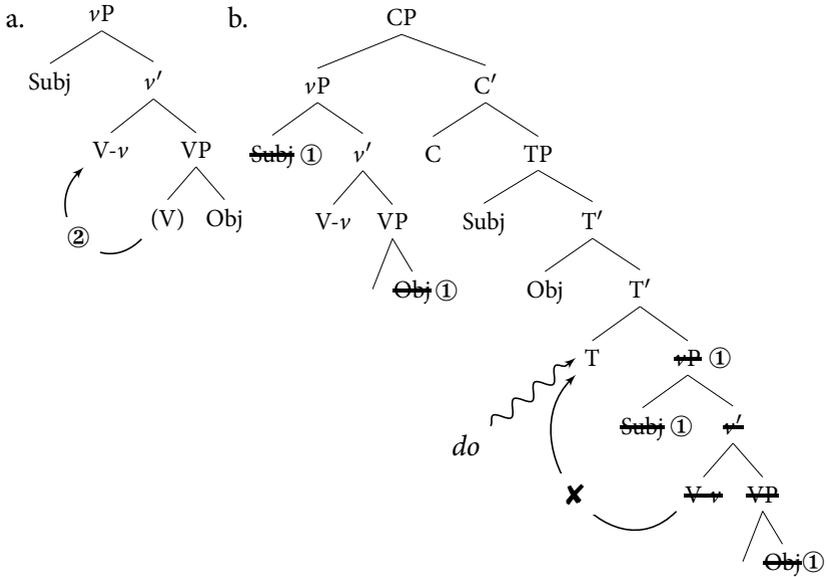


The resulting structure contains only one copy of the lexical verb as the sole constituent of VP in SpecCP – which gives the illusion of a fronted bare head – and shows *do*-support lower in the clause.

The same result obtains when the fronted constituent is a remnant  $\nu$ P. Again, the object moves to SpecTP just like the subject does. When C is merged, the

entire  $\nu P$  phase is sent off to PF. Within the  $\nu P$  there are no multiple copies of any constituent yet and HHM can move V to  $\nu$  after CR has applied vacuously (33a). In syntax, the  $\nu P$  is fronted to SpecCP. After transfer of the CP phase to PF, CR applies and deletes the copy in the lower link of each the subject chain and the object chain. Since for both subject and object there is a further copy in an identical position to that of the respective lower link (daughter of VP for the object, daughter of  $\nu P$  for the subject), namely the copy in the upper  $\nu P$  copy, that, too, gets deleted by CR. The lower copy of the  $\nu P$  itself also undergoes deletion. Therefore, subsequent HHM of the lower V- $\nu$  head to T is impossible since the head has been deleted along with the  $\nu P$  copy and *do*-support takes place (33b).

(33) CR ①  $\gg$  HHM ② in VP fronting of remnant  $\nu P$ : *Do*-support

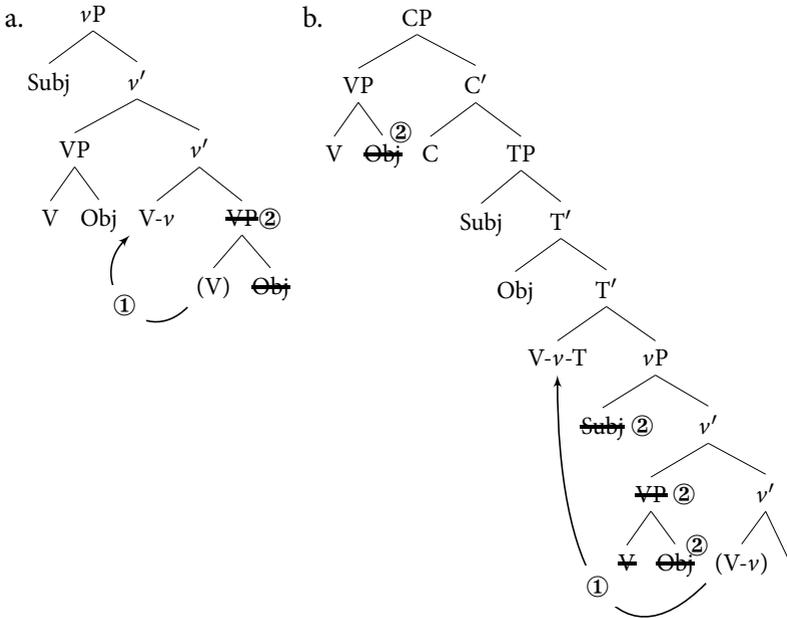


In both remnant VP movement and remnant  $\nu P$  movement, the order CR  $\gg$  HHM results in *do*-support just as it does with full VP/ $\nu P$  movement. Languages with this order that employ remnant movement instead of  $\bar{A}$ -head movement in V fronting thus show a symmetric pattern of *do*-support.

6.2. HHM applies before CR: verb doubling

If the order CR >> HHM with remnant VP movement leads to the same result of *do*-support as it does with standard VP movement, then the reverse order can be expected to give rise to verb doubling in remnant VP movement just as it does with full VP movement. This is indeed the case. First, the whole VP moves to Spec $\nu$ P. Then, T is merged and attracts both the subject and the object. After merge of C, the  $\nu$ P is transferred to PF where HHM applies first moving V to  $\nu$ . CR subsequently deletes the whole lower VP copy since it occupies the lower link of the movement chain (34a). The upper VP is then copied again and moved to SpecCP in syntax. CP is sent off to PF and the complex head V- $\nu$  is first moved to T before CR deletes the object copy in the lower chain link, the one in an identical position in the fronted VP, and the VP copy in Spec $\nu$ P (34b). In the end, the structure contains two copies of V and thus shows verb doubling as expected.

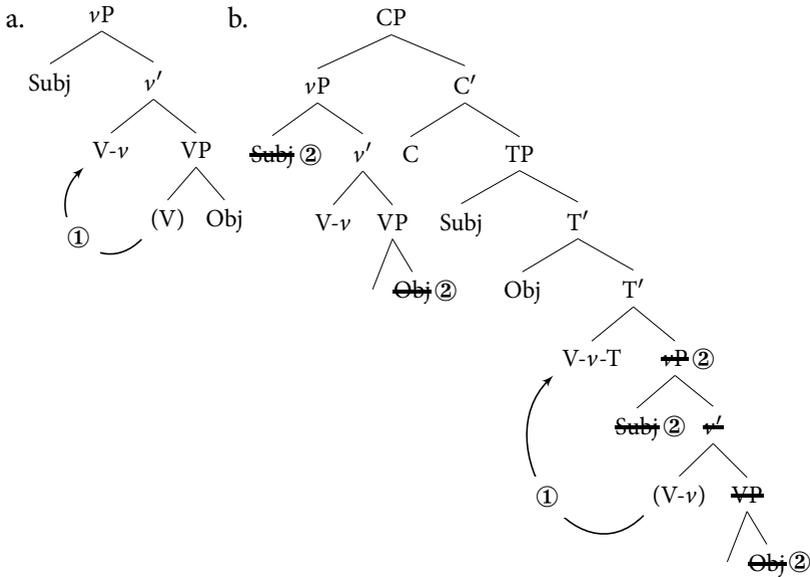
(34) HHM ① >> CR ② in VP fronting of remnant VP: Verb doubling



The same holds in the case of remnant  $\nu$ P movement. In syntax, the object and the subject are moved to SpecTP. C is merged and the  $\nu$ P phase arrives at PF. HHM creates the complex head V- $\nu$ , CR applies vacuously (35a). Next, the

whole  $\nu$ P raises to SpecCP and the CP phase is sent to PF. HHM applies first moving V- $\nu$  out of  $\nu$ P to T. Subsequent CR deletes the subject and object copies that are daughters of  $\nu$ P and VP, respectively, and the entire lower  $\nu$ P copy. Eventually, two copies of V- $\nu$  survive, one in the  $\nu$ P in SpecCP and the other as part of the complex V- $\nu$ -T head which gives a surface pattern of verb doubling (35b).<sup>13</sup>

(35) HHM ①  $\gg$  CR ② in VP fronting of remnant  $\nu$ P: Verb doubling



A language that exemplifies the above is Polish, which shows verb doubling in both V and VP fronting contexts (36).

- (36) a. *Wypić* (to) Marek *wypije* herbatę, ale nie *wypije*  
 drink.INF TO Marek drink.FUT tea but not drink.FUT  
*kawy*.  
 coffee  
 ‘As for drinking, Marek will drink tea, but he will not drink coffee.’

<sup>13</sup>Note that, analogous to full  $\nu$ P movement, verb doubling is predicted not to occur if the V- $\nu$  complex does not move to T and hence is deleted along with the lower  $\nu$ P copy. Therefore, HHM  $\gg$  CR does not lead to verb doubling in languages that move a  $\nu$ P in VP fronting structures and a remnant  $\nu$ P in V fronting structures.

- b. *Wypić herbatę (to) Marek wypije, ale nie wypije*  
 drink.INF tea TO Marek drink.FUT but not drink.FUT  
*kawy.*  
 coffee  
 ‘As for drinking tea, Marek will drink it, but he will not drink  
 coffee.’ (Bondaruk 2012: 55)

According to Bondaruk (2009, 2012), V fronting involves remnant movement rather than  $\bar{A}$ -head movement in Polish because the language has independently available scrambling movement of the object. Furthermore, the fronted category is claimed to be a (remnant)  $\nu$ P rather than a (remnant) VP, since the two verb copies have to agree with regard to their aspectual specification, which is assumed to be hosted on  $\nu$ .

## 7. Summary and conclusions

As I have shown in this paper, the answer to the second question in section 1, whether the attested asymmetric and symmetric patterns of verb doubling vs. *do*-support can be derived under Minimalist assumptions about syntax and PF, is yes. This is achieved by introducing a strict language-specific order between Chain Reduction and Head-to-Head Movement at PF. The account is able to derive a language’s pattern from two of its properties: (i) the order of operations at PF and (ii) whether it has  $\bar{A}$ -head movement or remnant movement in V fronting structures. Whether the fronted constituent is V(P) or  $\nu$ (P) has no influence on the pattern. With the exception of languages that have no V-to-T movement and front (remnant)  $\nu$ Ps rather than (remnant) VPs, the order HHM  $\gg$  CR leads to verb doubling no matter the type of movement ( $\bar{A}$ -head, VP/ $\nu$ P, or remnant VP/ $\nu$ P). In contrast, the reverse order CR  $\gg$  HHM gives rise to *do*-support for both VP/ $\nu$ P and remnant VP/ $\nu$ P movement but to verb doubling for  $\bar{A}$ -head movement. The effect of the order of operations is thus neutralised by this kind of movement. The reason is that it does not create a chain that early Chain Reduction could apply to because such a chain is precluded by the Chain Uniformity Condition (Chomsky 1995). A summary of the influence of the order of operations at PF and the moved constituent on the repair strategy is given in (37).

(37) *Repair strategy depending on order of operations and constituency*

Surface	Constituent	Order of PF operations	
		HHM >> CR	CR >> HHM
VP fronting	complete VP/vP	verb doubling	<i>do</i> -support
V fronting	remnant VP/vP	verb doubling	<i>do</i> -support
	bare V/V- <i>v</i>	verb doubling	verb doubling

Turning back to Asante Twi predicate clefts, their asymmetric pattern of verb doubling is not so puzzling anymore. It is simply the result of Asante Twi's underlying order of PF operations CR >> HHM and its use of  $\bar{A}$ -head movement. This order generally results in *do*-support, which is why Asante Twi shows  $\gamma_0$  insertion in VP clefts. Nevertheless, the effect of the order is neutralised by  $\bar{A}$ -head movement in favour of verb doubling, which is why Asante Twi pronounces two verb copies in bare V clefts. This pattern falls out from the proposed analysis just as naturally as the symmetric patterns of Hebrew, German, and Polish do.

Furthermore, a language with a pattern of *do*-support in V fronting and verb doubling in VP fronting has not yet been found. The account predicts this typological gap because the pattern is impossible to derive. In order to show verb doubling in VP fronting, a language would have to have the order HHM >> CR (and possibly also V-to-T movement). However, as mentioned above, this order results in verb doubling for V fronting, too, independent of whether it involves  $\bar{A}$ -head movement or remnant movement. The analysis thus not only accounts for the Asante Twi predicate clefts but also for the typology of verb doubling in predicate fronting by deriving all and only the three attested patterns to the exclusion of the unattested one. Moreover, it does so with recourse to minimalist proposals about phrase structure and movement that have independently been argued for in the literature.

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# Predicate doubling by phonological copying

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## Abstract

In this paper, I argue for an approach to copy constructions in syntax that does not rely on the Copy Theory of Movement; rather, it employs copy operations as in standard cases of reduplication. As a preliminary case study, I consider predicate doubling constructions in (two varieties of) German, Hebrew, and Asante Twi. I argue that the choice between copying and *do* support in predicate doubling constructions can be reduced to the order of the two operations Move and Copy.

## 1. Introduction

### 1.1. Two Sources for Copies

It is standardly assumed that there are two ways how copies (here conceived of as *overt* copies, i.e., identical linguistic *forms* that have a common source) can arise in natural language. On the one hand, movement is assumed to leave non-overt copies in syntax (Chomsky 1981, 1995, 2001); however, only a tiny fraction of these are actually realized as overt copies (Nunes 1999, 2004, Gärtner 2002). On the other hand, reduplication in morphology is assumed to arise as a consequence of an individual copy operation, triggered by specific morphemes (Marantz 1982, McCarthy & Prince 1994, 1995, McCarthy et al. 2012) or morphophonological diacritics (Frampton 2009). Thus, the first approach starts out with potential copies all over the place and then *filters out* most of the potential copies, leaving few (in most cases: no) actual, overt copies. In contrast, the second approach starts out with no copies and then *generates* each actual copy. What follows is based on the conjecture (pace Bierwisch 2015) that it is unlikely that there are two radically different processes in natural languages that can lead to overt copying in morphology and syntax. Against

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\*What follows is still a fairly rough sketch, and the analysis of predicate doubling that I present is programmatic rather than comprehensive at this point. For discussion, I am grateful to Fabian Heck, Johannes Hein, Jochen Trommer, and Sten Vikner.

this background, there are two options. The first option is to strengthen the *filtering* approach. On this view, the copy theory of movement (see Chomsky 1981, 1993, 2008) can be held responsible for many (ideally, all) replicative processes, including classic cases of reduplication. Approaches along these lines have been developed by Grohmann & Nevins (2004), Kimper (2008), Alexiadou (2010), van Oostendorp (2012), and Korsah (2015, this volume), among others. The second option is to strengthen the *generation* approach. The techniques required for morpho-phonological reduplication can then be held responsible for many (ideally, all) replicative processes, including syntactic copying.

Closer inspection reveals that extending the filtering approach based on the Copy Theory of Movement faces several major obstacles.

## 1.2. Against a Filtering Approach

### 1.2.1. *Submorphemic Material*

If the Copy Theory of Movement underlies morpho-syntactic reduplication phenomena, *subword material*, and in many cases even *submorphemic material* that is phonologically defined, must undergo movement. Consider, for example, the case of initial segment reduplication in Gothic class VII verbs (with an invariant default vowel *ai* (schwa)) in (1), or the case of syllable-based reduplication in Yidin<sup>y</sup> (Pama-Nyungan; see Marantz 1982) in (2).

- |     |          |                |                |
|-----|----------|----------------|----------------|
| (1) | haita    | haihait        | ‘I was called’ |
|     | fraisa   | faifrais       | ‘I tried’      |
|     | auka     | aiauk          | ‘I increased’  |
|     | falpan   | faifalp        | ‘I folded’     |
| (2) | ɖimurU   | ɖimuɖimurU     | ‘houses’       |
|     | gindalba | gindalgindalba | ‘lizards’      |

One might think that a possible way out of this dilemma would be to assume that copying of submorphemic, morphologically defined material in (1) and (2) is an illusion; rather, what is copied might be assumed to have minimally morpheme-size, with unfaithful phonological realization (cf. McCarthy & Prince 1995 vs. Frampton 2009). However, this would not really solve the problem; it would still imply movement of subword material that cannot undergo movement in other contexts.

1.2.2. *Copies without Movement*

More generally, there are many cases of syntactic copying for which it is implausible that a movement operation could be postulated. E.g., this holds for echo reduplication in Bengali, as in *kalo makorja* ('black spiders') → *kalo makorja talo makorja* ('black and such spiders') (Fitzpatrick-Cole 1996); for context-sensitive reduplication in Bambara, as in *wulunyinilafilèla o wulunyinilafilèla* ('whatever dog-searcher-watcher') (Culy 1985); for various kinds of copying in idioms, as in sequential noun reduplication (cf. German *Buch für Buch*, 'book for book' or Russian *den' za dnëm*, 'day by day'; Williams 1994, Fleischer 1982, Jackendoff 2008, Jacobs 2008, Müller 2011), in x-and-x constructions (cf. German (*naja*), *schön und schön ...* ('well, pretty and pretty'); Ghomeshi et al. 2004, Finkbeiner 2012); or in the German *hin-her* construction (cf. *Krieg hin, Krieg her ...* ('war here, war there'); Finkbeiner 2015); or for *right*-peripheral wh-doubling in Swiss German (Riemsdijk 2012). In all these cases, not only is there no evidence for movement – a movement approach would violate well-established constraints like the Strict Cycle Condition (Chomsky 1973) and Antilocality (Abels 2003, Grohmann 2003).

1.2.3. *Linearization*

Assuming the Copy Theory of Movement to underlie cases of actual copying implies that it is difficult to capture *overt* syntactic doubling, given that copy deletion is otherwise the default option (cf. Chomsky 1981: 89). In line with this, developing a PF realization algorithm for the copy theory has proven to be a far from trivial task (Gärtner 2002, Nunes 2004), and severe problems arise with multiple remnant movement as in (3) in German (cf. den Besten & Webelhuth 1990, Müller 2014): It is not really clear how to get from (3b) to (3a).

- (3) a. [<sub>VP</sub> t<sub>2</sub> Gerechnet ] hat da<sub>1</sub> wie immer t'<sub>3</sub> keiner t<sub>3</sub> [<sub>PP</sub> t<sub>1</sub> mit ]  
           counted has there as always no-one with  
     b. # [<sub>VP</sub> Da-mit gerechnet ] hat da<sub>1</sub> wie immer [<sub>VP</sub> da-mit  
           there-with counted has there as always there-with  
           gerechnet ] keiner [<sub>VP</sub> da-mit gerechnet ] [<sub>PP</sub> da<sub>1</sub>-mit ]  
           counted no-one there-with counted there-with

1.2.4. *Size Restrictions*

Syntactic copying typically cannot involve material of arbitrary size, as one would expect under the Copy Theory of Movement. Thus, Fanselow & Ćavar (2002), Fanselow & Féry (2013), Ott (2014), and Struckmeier (2015), among others, advance radical proposals based on the Copy Theory of Movement which postulate large copies that may reach the size of clauses. Crucially, however, these analyses are accompanied by massive PF deletion – in constructions involving *overt* copies, the size of the copied material is usually quite small.

For instance, *wh*-copy constructions in (substandard) German permit single *wh*-words like *wen* ('whom') to be copied, but not complex *wh*-expressions like *welchen alten Mann, der schläft* ('which old man who sleeps'); cf. Höhle (2000), Pafel (2000), Fanselow & Ćavar (2001), Nunes (2004), Pankau (2013), Murphy (this volume), and the examples in (4).

- (4) a. Wen<sub>1</sub> denkst du [<sub>CP</sub> wen<sub>1</sub> sie t<sub>1</sub> getroffen hat ] ?  
 whom<sub>acc</sub> think you whom<sub>acc</sub> she<sub>nom</sub> met has
- b. \* [<sub>DP<sub>1</sub></sub> Welchen alten Mann [<sub>CP</sub> der im Haus nebenan  
 which old man<sub>acc</sub> who in the house next door  
 wohnt ] ] denkst du [<sub>CP</sub> [<sub>DP<sub>1</sub></sub> welchen alten Mann [<sub>CP</sub> der  
 lives think you which old man<sub>acc</sub> who  
 im Haus nebenan wohnt ] ] sie getroffen hat ] ?  
 in the house next door lives she met has

Size restrictions of this type are typical of morpho-phonological reduplication but a priori mysterious in syntax.<sup>1</sup>

1.2.5. *Adjacency*

Copies often have to be adjacent, which is unexpected under the copy theory. This holds for all classic cases of morphological reduplication and for all replicative idioms; cf., e.g., the case of sequential noun reduplication in German in (5) as an illustration of the latter construction type.

<sup>1</sup>Note also that invoking the idea that *wh*-copies must be heads (Nunes 2004) is not compatible with the observation that some PPs (consisting of P and a minimal DP) can also participate in the construction (see Fanselow & Ćavar 2001, Nunes 2004, Pankau 2013).

- (5) a. Ich bin (\*veröffentliche) Seite auf (\*veröffentliche) Seite den  
 I am published page by published page the  
 Aufsatz durchgegangen  
 paper through gone
- b. Ich bin Jahr für Jahr nach Rügen gefahren  
 I am year for year to Rügen gone
- c. \*Jahr bin ich für Jahr nach Rügen gefahren  
 year am I for year to Rügen gone

Crucially, adjacency can be argued to also hold for syntactic copying. Here, the picture is blurred by the fact that subsequent operations can sometimes undo adjacency; cf. German *wh*-copy constructions like (6a). However, support for the hypothesis that syntactic copies can only arise under adjacency comes from the observation that intermediate positions cannot be skipped; cf. (6b) (see Pankau 2013).

- (6) a. Wen denkst du wen sie gesehen hat?  
 whom think you whom she seen has
- b. \*Wen denkst du dass sie wen gesehen hat?  
 whom think you that she whom seen has

The conclusion I would like to draw from these observations is that a filtering approach to syntactic copying in terms of the copy theory of movement should be abandoned in favour of a generation approach: The mechanisms required for reduplication can be held responsible for replicative processes involving linguistic objects more generally.

For concreteness, suppose that all instances of overt morphological and syntactic copying involve a replicative process associating phonological strings with some prosodic node  $\rho$  that acts as an affix (Saba Kirchner 2010, 2013, Bermúdez-Otero 2012, Bye & Svenonius 2012, and McCarthy et al. 2012).

In what follows; I would like to illustrate this approach to syntactic copying on the basis of verb doubling constructions. More specifically, I will address (i) predicate doubling in two varieties of German, and (ii) the intriguing pattern of verb doubling and *do* support with predicate fronting in Asante Twi that Hein this volume analyzes in a filtering approach based on the copy theory of movement. I will show that both phenomena can straightforwardly be analyzed

in a generation approach that relies on two possible orders of the elementary syntactic operations Move and Copy.

## 2. Predicate Doubling

### 2.1. Standard Cases of Predicate Doubling

In typical predicate doubling constructions, a verbal category of a clause must fulfill a dual function: On the one hand, it needs to undergo fronting to a clause-initial topic or focus (SpecC) position; and on the other hand, it must show up TP-internally, as (part of) a category that encodes finiteness. Given that these two contradictory requirements cannot be satisfied by a single item, predicate doubling may occur: A verbal category is fronted to SpecC (this may be a bare V or a VP, the latter potentially incomplete as a consequence of operations removing objects from the VP prior to fronting, e.g., via scrambling or object shift), and the same V is realized within TP as part of a V chain headed by a finite verb (either V itself, or an auxiliary), thereby giving rise to predicate doubling; see Cho & Nishiyama (2000), Abels (2001), Travis (2003), Kobele (2006), Landau (2006), Bayer (2008), Fleischer (2008), Kandybowicz (2008), Aboh & Dyakonova (2009), Trinh (2009), Vicente (2009), Müller (2009), and Hein (this volume), among others.

Some examples involving predicate doubling with bare V fronting from a variety of languages are given in (7).

- (7) a. *Lirkod* Gil lo *yirkod* ba-xayim  
 to.dance Gil not will.dance in.the.life  
 ‘As for dancing, Gil will never dance.’ (*Hebrew*; Landau 2006: 37)
- b. *Venir* me parece que ya no *vienes*  
 come.INF me.DAT seems that already not come.2SG  
 ‘As for coming, it seems to me that you aren’t coming in the end.’  
 (*Spanish*; Vicente 2009: 168)
- c. *Zingen* veln mir nisht *zingen*  
 sing.INF will we not sing.INF  
 ‘We will not sing.’ (*Yiddish*; Travis 2003: 244)
- d. Da *skrifi* mi de *skrifi*  
 COP write.1SG PROG write  
 ‘I am actually writing.’ (*Sranan Tongo*; Parkvall 2000: 89)

- e. *Wá wè Kòkú wá*  
 arrive it.is Koku arrive  
 ‘It is arrived that Koku has.’  
 (Fongbe; Lefebvre & Brousseau 2002: 503)
- f. *Yòùwó yá yóú ndú ní*  
 lend I lend him FOC  
 ‘It’s lending to him that I did.’ (Kisi; Childs 1995: 125 & 271)

In contrast, the sentences in (8) illustrate predicate doubling with complex VP fronting.

- (8) a. *Di kali manggi o manggitε ...*  
 the small run 3SG run.PRF  
 ‘When he had just run off a little way ...’  
 (Berbice Dutch Creole; Kouwenberg 1994: 442)
- b. *Dumat’ čto Xomskij genij on dumaet, no čitat’ ego knigi*  
 believe that Chomsky genius he believes but read his books  
*ne čitaet*  
 not reads  
 ‘He does think that Chomsky is a genius but he doesn’t read his books.’  
 (Russian; Abels 2001: 4f., Aboh & Dyakonova 2009: 1040)
- c. *Rira bata ni Olu o ra bata*  
 buying shoes FOC Olu AGR buy shoes  
 ‘Olu BOUGHT the shoes.’  
 (Yoruba; Cho & Nishiyama 2000: 39)
- d. *Rira adie ti Jimo o ra adie*  
 buying chicken TI Jimo HTS buy chicken  
 ‘the fact/way that Jimo bought a chicken.’  
 (Yoruba; Kobele 2006: 214)
- e. *Leer el libro, Juan lo ha leído*  
 read.INF the book Juan CL has read  
 ‘As for reading the book, Juan has indeed read it.’  
 (Spanish; Vicente 2009: 167)
- f. *Liknot et ha-praxim, hi kanta*  
 to.buy ACC the-flowers she bought  
 ‘As for buying the flowers, she bought.’

- g. *Liknot hi kanta et ha-praxim*  
 to.buy she bought ACC the-flowers.  
 ‘As for buying, she bought the flowers.’

(*Hebrew*; Landau 2006: 37)

In the existing literature on the phenomenon, there is disagreement as regards specific aspects of the analysis (concerning, e.g., whether only one verbal chain is present or two chains are involved, what the role of verb object order is, how cross-linguistic variation can be derived, whether bare V fronting to SpecC is truly an option, etc.). However, at least for those languages where a movement analysis can be empirically substantiated, there would seem to be a growing consensus that it is the Copy Theory of Movement that holds the key to the construction: Predicate doubling, on this view, involves the PF realization of two verbal copies created by multiple movement – either via successive-cyclic movement (one chain), or via two separate movement steps from a single base position (two chains).

In contrast, suppose now (in line with the reasoning in the previous section) that the copy theory either does not hold to begin with (Müller 1998, 2014), or that abstract copies resulting from displacement can never be used for overt copying (Chomsky 1981) – i.e., that a filtering approach to syntactic copy constructions is not available, and that overt syntactic copies have to be generated by the same mechanism that is responsible for reduplication in morphology – a designated operation Copy.<sup>2</sup> For concreteness, I assume that the problem posed by conflicting demands on V (information-structurally triggered displacement to a specifier in the left periphery and required presence as (part of) a V chain indicating finiteness in a head position) in a language can be solved by inserting a prosodic affix  $\rho$  on a head (e.g., C, T or v) as a local *repair mechanism* (see Heck & Müller 2013a) in the course of the derivation, in minimal violation of the No Tampering Condition (see Chomsky 2008, 2013);  $\rho$  then effects local phonological Copy in the same way that triggers for reduplication in morphology do. This essentially amounts to a combination of the analyses proposed in Müller (2011) for copying in German idioms, and Trommer (2011, 2014) for morphological affixation of empty prosodic

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<sup>2</sup>As a side remark, let me point out that a possible conceptual argument for abandoning the Copy Theory of Movement *in toto* (rather than just assuming that it cannot be the source of overt syntactic copies) is that copying of strings is much simpler than copying of structure from the point of view of grammatical complexity (Rogers 1998, Kobele 2015).

material. Thus, in predicate doubling constructions, a copy of V is created after  $\rho$  insertion, and the original verbal category (either V or VP) moves on to the left periphery.

An important prediction is that material that results from copying onto  $\rho$  is internally inaccessible for further syntactic operations: It is just a string of segments. This has potentially far-reaching consequences for structure-sensitive processes like extraction, binding, and scope assignment in other copy constructions (like *wh*-copying). For the case at hand, it implies that the copy of V left behind attached to a head position (C, T, or v) is not just syntactically but also *semantically inert*. As argued by Bayer (2008), this seems to be the case.<sup>3</sup>

Of course, such an approach that derives overt copies by generating phonological strings (rather than by non-deletion of syntactic subtrees) faces several interesting challenges. For instance, the approach needs to be able to account for *incomplete identity* of the copies, as it may arise from stem alternation (e.g., in Yiddish, German and Spanish) or from different root realizations in non-concatenative morphology (e.g., in Hebrew): Clearly, subsequent morpho-phonological modifications can occur in both copies. This can then be addressed by carrying out the relevant readjustments *after* the copy has been generated (cf. Halle & Marantz 1993). In addition, the possibility might also be envisaged that  $\rho$ -driven copying can also involve morpho-syntactic rather than phonological features in some cases (but still no structure, and no semantic features). A plausible hypothesis as to which of the two versions of the copy mechanism is chosen might then relate to the timing of operations in a cyclic spellout model: If PF realization of some item precedes copying, (only) phonological features will be copied; if PF realization follows copying, the copy operation can only target morpho-syntactic features. I will not address the two options in any more detail here, focussing exclusively on purely phonological copying in what follows.<sup>4</sup>

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<sup>3</sup> Also see Müller (2011) on syntactic inactivity of the first item in sequential noun reduplications like *Tag für Tag* ('day by day').

<sup>4</sup> However, it can be noted that an extension of the general approach that permits copying of morpho-syntactic features might ultimately also account for phenomena like determiner doubling, clitic doubling or resumption, where there is less, or no, phonological similarity of the two items involved. As it stands, these phenomena are outside the realm of the present approach.

## 2.2. Predicate Doubling and Do-Support in German

As is well known, there are languages in which predicate doubling constructions are not derived by actually having two copies of the verb, but rather by inserting a dummy verb, i.e., by carrying out *do* support. German is such a language. In standard varieties of German, (9a) is impossible but (9b) is fully grammatical; this, in fact, is the only context in which the auxiliary *tun* ('do') can be used in Standard German (the use in various dialects such as Hessian is much more widespread; see Erb 1995).

- (9) a. #*Schlafen schläft* er nicht  
           sleep    sleeps he not  
       b. *Schlafen tut*    er nicht  
           sleep    sleeps he not

However, as noted by Fleischer (2008) and Bayer (2008), certain (mostly Northern or Northeastern) German varieties also exhibit regular verb doubling; i.e., in these varieties, (9a) is well formed. In contrast to what is the case in, say, Yiddish (see (7c)), the doubled verb seems to obey strict adjacency; i.e., (10) is impossible in all varieties of German.<sup>5</sup>

- (10) \**Schlafen hat* er nicht *geschlafen*  
        sleep    has he not   slept

Here is a sketch of an analysis of the *do* support pattern in predicate doubling constructions in Standard German and the more regular doubling pattern in certain Northern varieties. Let me begin with the latter. First of all, there is a VP that needs to undergo topicalization, for information-structural reasons.<sup>6</sup> I assume that each phrase is a phase, not just vP and CP (see Müller 1998, 2014 and references cited there). Given the Phase Impenetrability Condition (PIC; Chomsky 2001), this implies that if a VP moves to SpecC, intermediate movement steps must target both Specv and, crucially, SpecT. Now, copying in Northern varieties is locally triggered on the CP cycle by  $\rho$  insertion as a last

<sup>5</sup>Fleischer 2008: 260 states, with reference to these varieties: 'Im Deutschen ist es fast nie der Fall, dass die verdoppelte Form des Verbs nicht an der 2. Stelle steht' (translation 'In German, it almost never the case that the doubled form of the verb is not in second position').

<sup>6</sup>This VP may be complete or incomplete, depending on whether some other movement operation has taken out material at an earlier stage. I contend that bare V topicalization is not an option in German, pace Fanselow 1985, 2001, 2002 and others; see Müller 2014.

resort operation, so as to provide both (a) a lexicalization of C (the verb-second property; see Bayer 2008) and (b) a verbal topic specifier for C (an instance of information structure-driven movement to SpecC). Note that at the point where  $\rho$  effects copying of V, the categories C and VP (in SpecT) are strictly adjacent; and so are V in C and VP after the phonological copy operation. (V in C is just a phonological string, hence syntactically and semantically inert from now on.) After Copy has applied to V, the VP is affected by Move, and placed in SpecC. The following derivation underlies (9a).<sup>7</sup>

- (11) *Predicate doubling via copying in varieties of German*
- a. *Structure after intermediate Move of VP to SpecT*  
 $[_{CP} C [_{TP} VP [_{T'} [_{vP} \dots t_{VP} ] T ] ] ]$
  - b. *Insertion of  $\rho$  as a last resort*  
 $[_{CP} \rho\text{-}C [_{TP} VP [_{T'} [_{vP} \dots t_{VP} ] T ] ] ]$
  - c. *Copy*  
 $[_{CP} [_{\rho} V]\text{-}C [_{TP} VP [_{T'} [_{vP} \dots t_{VP} ] T ] ] ]$
  - d. *Final Move of VP to SpecC*  
 $[_{CP} VP [_{C'} [_{\rho} V]\text{-}C [_{TP} t'_{VP} [_{T'} [_{vP} \dots t_{VP} ] T ] ] ] ]$

It follows from this approach that if there is no need for copying, it cannot apply. This accounts for the ill-formedness of an example like (12).

- (12) \*Er *schläft* nicht *schlafen*  
 he sleeps not sleep

Also, given that copying applies on the CP cycle, it can never create material in the c-command domain of v, due to the Strict Cycle Condition (cf. Chomsky 1973). This accounts for the ill-formedness of an example like (10).

As for Standard German, it employs a different repair strategy upon facing the dilemma created by conflicting demands of information structure (which requires VP topicalization) and purely syntactic requirements (root C requires lexicalization, the verb-second property). Instead of copying V onto a reduplicative affix  $\rho$  on C, a dummy verb *tun* ('do') is inserted. The choice between the two options might be taken to suggest an optimality-theoretic modelling (see Grimshaw 1997, Vikner 2001). I will adopt a version of this kind of approach

<sup>7</sup>Throughout this paper, traces are only present in derivations to simplify exposition.

here that relies on different orders of the two basic operations Merge and Copy.<sup>8</sup> Recall that the derivation in (11) relies on an order where Copy (of V) precedes Move (of VP from SpecT to SpecC). However, suppose now that Standard German differs from the varieties that employ copying in that the order of Copy and Move is reversed, such that Move precedes Copy. In this case, the V which is required for  $\rho$ -induced copying onto C is structurally too far removed from C to permit the successful application of a Copy operation, and *do* is inserted on T as a last resort: V copying is bled by intermediate VP fronting to SpecT. The derivation of (9b) is shown in (13).

- (13) *Predicate doubling via 'do' support in Standard German*
- a. *Structure after intermediate Move of VP to SpecT*  
 $[_{CP} C [_{TP} VP [_{T'} [_{VP} \dots t_{VP} ] T ] ] ] ]$
  - b. *Insertion of  $\rho$  as a last resort*  
 $[_{CP} \rho-C [_{TP} VP [_{T'} [_{VP} \dots t_{VP} ] T ] ] ] ]$
  - c. *Final Move of VP to SpecC*  
 $[_{CP} VP [_{C'} \rho-C [_{TP} t'_{VP} [_{T'} [_{VP} \dots t_{VP} ] T ] ] ] ] ]$
  - d. *No Copy possible  $\rightarrow$  'do' support*  
 $[_{CP} VP [_{C'} [\rho \text{ do}]-C [_{TP} t'_{VP} [_{T'} [_{VP} \dots t_{VP} ] T ] ] ] ] ]$

Thus, given this reasoning, whereas the interaction of Move and Copy in (13) is an instance of bleeding, the interaction of Move and Copy in (11) is an instance of counter-bleeding: In (11), Move comes too late to block copying of V.

At this point, what is still missing is a precise concept of locality that ensures that a  $\rho$ -driven Copy operation can be carried out if VP is in a lower position (as in (11)) but not if VP is in a higher position (as in (13)). For the case at hand, it would suffice to assume that Copy is only possible under c-command, as assumed by Chomsky (2001) for Agree:  $\rho$ -C c-commands V in (11c) (before final Move of VP to SpecC), but not in (13d) (after final Move of VP to SpecC). Still, in the next subsection I will present evidence that a slightly more liberal concept must be adopted: For two heads X and Y to participate in Copy, at least one of them has to c-command the other one. Thus, I would like to suggest the following locality constraint for Copy.

<sup>8</sup>See Heck & Müller (2013a,b), Georgi (2014), and Assmann, Georgi, Heck, Müller & Weisser (2015), among others, for this general type of approach, based on operations like (intermediate and final) Move, Merge, and Agree.

(14) *Locality of Copy*

A prosodic affix  $\rho$  on a head X can trigger copying of Y to X only if (a) or (b) holds.

- a. X c-commands Y.
- b. Y c-commands X.

Note that a V dominated by VP in SpecC does not c-command C; this ensures that *do* support always shows up in Standard German.<sup>9</sup>

In the next subsection, I would like to turn to predicate doubling in Asante Twi. Here, the two options for predicate doubling constructions just discussed are found within a single language, where they are in complementary distribution.

2.3. Predicate Doubling in Asante Twi

Hein (this volume) observes an interesting pattern in Asante Twi (based on data provided by Sampson Korsah (p.c.)). A language typically chooses either copying throughout in predicate doubling constructions (like, e.g., Hebrew) or it resorts to *do* support throughout in predicate doubling constructions (like Standard German; but recall footnote 9 for a possible qualification). However, Asante Twi employs both operations, depending on whether there is bare V fronting or complex VP fronting. Thus, focus movement of bare V to SpecC in Asante Twi triggers verb doubling; cf. (15a).<sup>10</sup> In contrast, focus movement of a complex VP in Asante Twi triggers *do*-support; see (15b).

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<sup>9</sup>Two remarks. First, the possibility that some variety of German permits *both* orders of operations – Copy before Move and Move before Copy – is not excluded in principle; it might indeed be conceivable that there are speakers who can use either option. And second, given that phrase structure is only created by Merge (or Move) operations it is clear that unergative intransitive verbs must be accompanied by some other item so that a fronted V is still part of a complex VP; something to this effect has often been proposed, for quite different reasons (see, e.g., Bobaljik 1993, Bittner & Hale 1996, among many others). Also, it is clear that a fronted VP from which all material except for V has been extracted (e.g., by scrambling) must still block c-command of V even if it is assumed that movement does not leave a trace or a copy.

<sup>10</sup>Hein this volume puts forward independent evidence that (15a) is to be analyzed as an instance of bare V fronting to SpecC (cf., e.g., Vicente 2009, among others), rather than as remnant VP movement fed by earlier object scrambling, as seems correct for analogous constructions in German.

- (15) a. *Si*-(e)            na    Kofi *a-si*/\**a-yɔ*            dan  
           build- NLZR FOC Kofi PRF-build/PRF-do house
- b. Dan *si*-e            na    Kofi \**a-si/a-yɔ*  
           house build- NLZR FOC Kofi PRF-build/ PRF-do

Hein's (this volume) analysis relies on the Copy Theory of Movement; it qualifies as a filtering approach (in the sense of section 1). Furthermore, two post-syntactic operations are postulated: On the one hand, Chain Reduction PF-deletes all non-initial copies in chains; on the other hand, head-to-head movement (unlike focus movement applying to a bare V) is assumed to be a PF operation that does not leave a trace (and that moves V to T in Asante Twi). Importantly, he further assumes that the derivational order of the two post-syntactic operations is parametrized from one language to the other. On this view, a language like Hebrew has head-to-head movement preceding chain reduction. Therefore, the non-overt copy that, by assumption, is left behind after syntactic V or VP fronting is the source of post-syntactic head-to-head movement, and subsequent Chain Reduction comes too late to block head-to-head movement (an instance of counter-bleeding). However, Asante Twi has the reverse order of post-syntactic operations: Chain Reduction applies before head-to-head movement. Consequently, the copy left by information structure-driven focus movement to SpecC is removed before head-to-head movement has a chance to apply (an instance of bleeding), and *do*-support takes place as a last resort operation to provide lexicalization of T. At least, this is what happens with focus movement applying to VP, as in (15b). Crucially, focus movement applying to a bare V, as in (15a), behaves differently: Here, Chain Reduction cannot apply (despite the order of operations that would favour it) because the fronted V and its trace do not in fact form part of a single chain (chain formation would violate the Chain Uniformity Condition given that the fronted item qualifies as maximal in SpecC whereas its copy does not). Therefore, nothing blocks post-syntactic head-to-head movement in (15a); and *do*-support is not available.

This analysis works well. Still, it depends on the assumption that head-to-head movement is post-syntactic (and does not leave a copy itself), which might be considered controversial. Also, it necessitates the assumption that a moved item and its copy trace do not always form a chain even though they are transparently related to one another by the movement operation.

In what follows, I outline an approach that reinterprets Hein's analysis: It does not rely on the copy theory (or on head movement at PF), and it fits into the picture drawn in the previous two subsections while maintaining Hein's fundamental insight that the relative order of two operations is responsible both for parametrization in general and for the asymmetric copying pattern of Asante Twi. However, instead of Chain Reduction at PF and head-to-head movement at PF, it is the syntactic operations of Move and Copy that are relevant. Thus, we move from a filtering analysis to a generation analysis.

Recall first that I have assumed that an item that needs to reach SpecC (as an instance of focus movement or topicalization) must pass through SpecT on its way to its ultimate landing site (because of the PIC, and because every XP is assumed to have phase status). Next, recall that in this approach, V copying is derived by insertion of a prosodic affix  $\rho$  that triggers reduplication. In German, the relevant head that is the target of  $\rho$  insertion is C; in Asante Twi, it is T. Now, if Copy precedes intermediate Move on the TP cycle, true doubling is expected throughout, as in Hebrew. Assuming that a focus-fronted verbal category (bare V or VP) first undergoes movement to Specv (and then to SpecT and, finally, SpecC), a  $\rho$ -induced copy of V on T is generated before the verbal category (V or VP) moves on to SpecT. As in Hein's (this volume) original analysis, this is a case of counter-bleeding; see (16), where this is illustrated for VP fronting (successive-cyclic V fronting works in exactly the same way).<sup>11</sup>

(16) *Predicate doubling via copying in Hebrew*

- a. *Structure after intermediate Move of VP to Specv*  
 $[_{TP} T [_{vP} VP [_{v'} DP_{subj} [_{v'} v t_{VP} ]]]]$
- b. *Insertion of  $\rho$  as a last resort*  
 $[_{TP} \rho-T [_{vP} VP [_{v'} DP_{subj} [_{v'} v t_{VP} ]]]]$
- c. *Copy*  
 $[_{TP} [\rho V]-T [_{vP} VP [_{v'} DP_{subj} [_{v'} v t_{VP} ]]]]$
- d. *Intermediate Move of VP to SpecT*  
 $[_{TP} VP [_{T'} [\rho V]-T [_{vP} t'_{VP} [_{v'} DP_{subj} [_{v'} v t_{VP} ]]]]]]$
- e. ...
- f. *Final Move of VP to SpecC*  
 $[_{CP} VP C [_{TP} t'_{VP} [_{T'} [\rho V]-T [_{vP} t'_{VP} [_{v'} DP_{subj} [_{v'} v t_{VP} ]]]]]]$

<sup>11</sup>Subject raising to SpecT is ignored for reasons of simplicity, here and in what follows. Also, this derivation is a simplification in that Landau argues that it is actually vP rather than VP that undergoes the movement.

Thus, this derivation closely mirrors the one given above for varieties of German that permit genuine copying; in fact, the only relevant difference is whether the interaction takes place on the CP cycle or on the TP cycle.

Consider next the scenario in which intermediate Move on the TP cycle precedes Copy (as in Asante Twi). Suppose first that it is a VP that undergoes the intermediate movement step to SpecT. In this case, Move of VP to SpecT bleeds Copy applying to V: V is embedded in a VP in SpecT, and hence does not c-command T. Since T also does not c-command V anymore at this point, Copy is blocked by the constraint *Locality of Copy* in (14), and *do* support is required. All this is shown by the derivation in (17).

- (17) *Predicate doubling via do-support in Asante Twi: VP*
- a. *Structure after intermediate Move of VP to Specv*  
 $[_{TP} T [_{vP} VP [_{v'} DP_{subj} [_{v'} v t_{VP} ]]]]$
  - b. *Insertion of  $\rho$  as a last resort*  
 $[_{TP} \rho-T [_{vP} VP [_{v'} DP_{subj} [_{v'} v t_{VP} ]]]]$
  - c. *Intermediate Move of VP to SpecT*  
 $[_{TP} [_{VP} V DP ] [_{T'} \rho-T [_{vP} t'_{VP} [_{v'} DP_{subj} [_{v'} v t_{VP} ]]]]]]$
  - d. *No Copy possible;  $\rightarrow$  'do' support*  
 $[_{TP} [_{VP} V DP ] [_{T'} [\rho do]-T [_{vP} t'_{VP} [_{v'} DP_{subj} [_{v'} v t_{VP} ]]]]]]$
  - e. ...
  - f. *Final Move of VP to SpecC*  
 $[_{CP} VP C [_{TP} t'_{VP} [_{T'} [\rho do]-T [_{vP} t'_{VP} [_{v'} DP_{subj} [_{v'} v t_{VP} ]]]]]]]]$

(17) mirrors the situation in Standard German, except for the fact that it is the TP cycle rather than the CP cycle that is involved here.

However, suppose now that it is a bare V that undergoes the intermediate movement step to SpecT. As argued by Hein this volume, this is an option in Asante Twi but not in German. In this case, V is *not* embedded by another category in SpecT, and it therefore qualifies as sufficiently close to  $\rho$  on T to permit copying: V in SpecT c-commands T, which implies that the fact that T does not c-command V anymore after the latter has undergone movement to SpecT is irrelevant. Thus, there is no bleeding of Copy applying to V by intermediate Move that fronts V to SpecT. This is illustrated in (18).

- (18) *Predicate doubling via copying in Asante Twi: V*
- a. *Structure after intermediate V movement to SpecV*  
 $[_{TP} T [_{VP} V [_{V'} DP_{subj} [_{v'} v t_V ]]]]$
  - b. *Insertion of  $\rho$  as a last resort*  
 $[_{TP} \rho-T [_{VP} V [_{V'} DP_{subj} [_{v'} v t_V ]]]]$
  - c. *Intermediate Move of V to SpecT*  
 $[_{TP} V [_{T'} \rho-T [_{VP} t'_V [_{V'} DP_{subj} [_{v'} v t_V ]]]]]]$
  - d. *Copy  $\rightarrow$  no do support*  
 $[_{TP} V [_{T'} [\rho V]-T [_{VP} t'_V [_{V'} DP_{subj} [_{v'} v t_V ]]]]]]$
  - e. ...
  - f. *Final Move of V to SpecC*  
 $[_{CP} V C [_{TP} t'_V [_{T'} [\rho V]-T [_{VP} t'_V [_{V'} DP_{subj} [_{v'} v t_V ]]]]]]]]$

More generally, it follows from *Locality of Copy* in (14) that Copy triggered by some  $\rho$  on a head (C or T, in the cases discussed here) is possible under c-command (see (11), (16)), and with a specifier (see (18)), but not with an item included in a specifier (see (13), (17)). Thus, as in Hein's approach, in the present analysis the generalization can be derived that there can be no language in which VP fronting triggers copying but bare V fronting does not.

At present, I take it to be an open question how (14) relates to the general tendency that copying presupposes adjacency (see above); for now, it may be assumed that adjacency is an additional requirement. It might also be worth pointing out that the (b) clause in (14) has the same function in the present reanalysis of Hein's (this volume) approach as the Chain Uniformity Condition in the original analysis (in that it distinguishes between V and VP fronting).

Needless to say, there are many further issues in the syntax of predicate doubling that will ultimately have to be clarified; but for now, I will leave it at that, concluding that a generation approach to predicate doubling constructions that does not rely on the copy theory of movement but on the two basic operations of Move and Copy looks like a viable alternative to the standard filtering approach.

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# What copying (doesn't) tell us about movement: Remarks on the derivation wh-copying in German

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## Abstract

There is now a considerable body of evidence supporting the idea that long wh-movement proceeds in a series of smaller, local steps. One widely cited piece of evidence is the fact that a number of languages can pronounce copies of a wh-phrase in positions through which movement is assumed to take place. Although the existence of wh-copying in languages such as German has been celebrated as robust support for the successive-cyclic nature of movement, I argue in this paper that the German wh-copy construction cannot be straightforwardly analyzed as the realization of an intermediate copy of long distance wh-movement. This will be shown on the basis of syntactic and semantic asymmetries between the copy construction and the extraction structures from which it supposedly derives.

## 1. Introduction

By now, it has almost become a kind of received wisdom in the discussion of long distance wh-movement that the wh-copy construction (CC), exemplified by German in (1), provides compelling evidence for the successive cyclic nature of movement (Chomsky 1977).

- (1) a. Wer glaubst du, wer Recht hat?  
who believe you who right has  
'Who do you think is right?'  
b. Wen meint Karl, wen wir gewählt haben?  
who thinks Karl who we elected have  
'Who does Karl think we have elected?'

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- c. Wie nimmt man an, wie der Prozess endet?  
 how assumes one PRT how the trial ends  
 ‘How do people think the trial will end?’ (Höhle 2000: 257)

As Schippers (2012a: 271) points out ‘this construction appears to be (almost) invariably analyzed as a surface variant of long-distance *wh*-movement, in which the *wh*-phrase in the embedded SpecCP is analyzed as a spelled out copy of the moved *wh*-phrase’, for example by Thornton & Crain (1994), Bayer (1996), Fanselow & Mahajan (2000), Höhle (2000), Fanselow & Ćavar (2001), Nunes (2004), Felser (2004), Rett (2006), Bošković & Nunes (2007), Barbiers et al. (2009), Schippers (2012a), Pankau (2009, 2013) and Baier (2014). Indeed, Boeckx (2008: 28) also remarks about the intermediate Spell-Out analysis that he is ‘not aware of any alternative analysis of the *wh*-copying data. It is indeed hard to think of one’. In this paper, I point out a number of problems with this view, while remaining somewhat ambivalent about the correct analysis of the CC. I will show that the view that the CC involves Spell-Out of an intermediate copy generated by successive-cyclic movement suffers from empirical problems, and is incompatible with observations about the constructions from which it supposedly derives. There are only two plausible structures for the embedded clause from which extraction is assumed to take place: an embedded *wh*-interrogative or an embedded declarative (V2) clause. The main empirical problem with extraction from embedded V2 is that it triggers obligatory T-to-C movement, which is not found in the CC. Furthermore, we will see a number of further asymmetries between long-distance extraction structures and *wh*-copy constructions that cast further doubt on the assumption that the CC is the result of Spell-Out of an intermediate copy in a long-distance movement chain.

The paper is structured as follows: Section 2 discusses the copy construction and some of its salient properties, pointing out that many aspects of the CC still remain problematic. Section 3 focuses on the precise derivation of *wh*-copying in German. In section 4, a number of further asymmetries between long-distance extraction and the CC will be presented. Finally, section 5 concludes.

## 2. The syntax of *wh*-copying

A number of languages evince the so-called ‘*wh*-copy construction’, in which it seems that more than one copy of a moved *wh*-phrase is spelled out:

- (2) *Wer* glauben Sie eigentlich, *wer* Sie sind?<sup>1</sup>  
 who think you actually who you are  
 ‘Who do you think you are?’ (German; Sternefeld 1991: 105)
- (3) *Wie* denk je *wie* ik gezien heb?  
 who think you who I seen have  
 ‘Who do you think I have seen?’ (Dutch; Barbiers et al. 2009: 2)
- (4) *Wer* tinke jo *wer*-t Jan wennet?  
 where think you where-that Jan lives  
 ‘Where do you think Jan lives?’ (Frisian; Hiemstra 1986: 99)
- (5) *Waar-voor* dink jullie *waar-voor* werk ons?  
 where-for think you where-for work we  
 ‘What do you think we work for?’ (Afrikaans; du Plessis 1977: 725)
- (6) *Kas* misline *kas* o Demiri dikhlâ?  
 who you.think who the Demiri saw  
 ‘Who do you think Demiri saw?’ (Romani; McDaniel 1986: 182)
- (7) *Tayuwe* kt-itom-ups *tayuwe* apc k-tol-i malsanikuwam-ok?  
 when 2-say-DUB when again 2-there-go store-LOC  
 ‘When did you say you’re going to go to the store?’  
 (Passamaquoddy; Bruening 2006: 26)
- (8) *Who* do you think *who* Grover wants to hug?  
 (Child English; Crain & Thornton 1998: 187)

Examples such as these have added to the growing body of evidence that has amassed in support of Chomsky’s (1977) idea that *wh*-movement proceeds successive-cyclically in a series of local steps (see Boeckx 2008, Lahne 2008, Georgi 2014, van Urk 2015 for recent overviews of the evidence for successive-cyclic movement). Under this view, inter-clausal or ‘long distance’

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<sup>1</sup>Note that not all speakers seem to fully accept the copy construction. For example, Sternefeld (2002) marks (i) with a question mark, whereas examples with nominative extraction such as (2) are deemed fully acceptable.

(i) *Wen* meinst du *wen* sie wirklich liebt?  
 who think you who she really loves  
 ‘Who do you think she really loves?’ (Höhle 1990)

wh-movement does not take place in ‘one fell-swoop’ but stops (at least) at the edge of each clause.

- (9) [CP Who do you think [CP ⟨who⟩ that Mary likes ⟨who⟩ ]]] ?
- 

Under the *Copy Theory of Movement* (Chomsky 1995, 2000, 2001), the theory of successive-cyclic movement predicts that there is a copy of a moved item at the edge of each clause. It seems that wh-copying structures would then offer compelling evidence in support of this idea. However, things are not quite as simple as this. Wh-copying, particularly in Germanic languages such as Dutch and German where it has been studied in the most detail, has been shown to be more restrictive than long distance movement (for discussion, see in particular Felser 2004, Haider 2010: §3.3, Schippers 2012a: §3, Pankau 2013: §2). One can identify three main challenging differences that have been addressed in the literature: (i) ban on complex material in the CC, (ii) trigger for multiple Spell-Out, (iii) only intermediate copies in Spec-CP can be pronounced.

### 2.1. Ban on complex material

Complex nominal wh-phrases are not possible in the copy construction, whereas long wh-movement is not subject to any such restriction (see section 4.4 for further discussion).

- (10) a. Welches Buch glaubst du, dass Maria gekauft hat?  
 which book believe you that Maria bought has
- b. \*Welches Buch glaubst du, welches Buch Maria gekauft hat?  
 which book believe you which book Maria bought has  
 ‘Which book do you think that Maria has bought?’

Following Fanselow & Mahajan (2000), a number of approaches appeal to some kind of morphological ‘fusion’ or reanalysis operation that combines the wh-phrase in Spec-CP with the C head. It is then assumed that complex wh-phrases cannot undergo this process (e.g. Nunes 2004). Aside from the problems of the location (PF/syntax) and trigger (repair/optional) of this operation, which are normally left unaccounted for, a considerable number of speakers allow for PPs of varying complexity in the CC, which poses a challenge to this kind of approach.



possible in all languages with long distance wh-movement (Schippers 2012b: 194 rejects this analysis in favour of an Indirect Dependency Approach; see section 4). In sum, there is still no clear explanation of what actually triggers multiple Spell-Out in the CC.

### 2.3. Intermediate copies only in Spec-CP

One final peculiar property of the CC is that it only allows putative intermediate copies to be realized in Spec-CP. The fact that the copy *in situ* cannot be pronounced is a long standing, and to my knowledge still unresolved, problem (see Haider 2010: 109f.). In addition, there is now also a considerable body of evidence supporting Chomsky's (2000, 2001) claim that, in addition to Spec-CP, Spec-*v*P is also a landing site for successive-cyclic movement under a phase-based approach (e.g. Saddy 1991, Fox 1999, Legate 2003, Rackowski & Richards 2005, Korsah & Murphy 2016). If this is the case, then it is unclear why wh-copying, assuming that it involves realization of an intermediate copy, cannot target the Spec-*v*P position (a point also made by Schippers 2012a: 273).

- (12) \*<sub>[CP</sub> Wen glaubt du, [<sub>CP</sub> wen [<sub>TP</sub> Maria [<sub>vP</sub> wen [<sub>VP</sub> ⟨wen⟩  
           who believe you     who     Maria     who  
           gesehen]] hat ]]] ?  
       seen        has

### 2.4. Intermediate conclusion

This section has discussed some of the salient characteristics of the CC and shown that there are still a number of unresolved issues. This paper will not attempt to resolve any of these issues, but rather exacerbate the situation by pointing out further problems with the long-distance extraction analysis of the CC that have either received little or no attention in the literature. The following section will discuss the precise derivation of an extraction account of the CC in German and show that none of the available options are plausible.

## 3. Two options for the derivation of the copy construction

This section discusses the derivation of the CC in German. Although the intermediate Spell-Out analysis is intuitively appealing, there are a number of problems with the actual derivation of the construction. This problem pertains

to the exact nature of the embedded clause in the CC. There are two plausible possibilities for the status of the embedded clause:

- (13) a. The CC is derived by extraction from an embedded *wh*-interrogative clause.  
 b. The CC is derived by extraction from an embedded declarative V2-clause.

I will discuss each option in turn and show that each is problematic when adopted for the derivation of the CC.

### 3.1. Extraction from an embedded interrogative clause

One fact that has not received much attention in the literature on *wh-copying* is the strict verb-finality of the CC (cf. Pankau 2013 and also Brandner 2000: 51 who identifies this restriction for *wh-scope marking constructions*):

- (14) a. *Wen glaubst du, wen sie liebt?*  
 who believe you who she loves  
 b. \**Wen glaubst du, wen liebt sie?*  
 who believe you who loves she  
 ‘Who do you think she loves?’ (Pankau 2013: 34)

Similarly, there is an asymmetry between German matrix and embedded *wh*-interrogatives in that the former are obligatorily V2 (15), whereas the latter must be verb-final (16):

- (15) a. [<sub>CP</sub> *wen*<sub>2</sub> *hat*<sub>1</sub> [<sub>TP</sub> *sie* [<sub>vP</sub> *t*<sub>2</sub> *eingeladen*] *t*<sub>1</sub>]] ?  
 who has she invited  
 b. \*[[<sub>CP</sub> *wen*<sub>2</sub> [<sub>TP</sub> *sie* [<sub>vP</sub> *t*<sub>2</sub> *eingeladen*] *hat*]] ?<sup>3</sup>  
 who she invited has  
 ‘Who did she invite?’
- (16) a. \**Es ist mir gleich, [CP wen<sub>2</sub> hat<sub>1</sub> [TP sie [vP t<sub>2</sub> eingeladen] t<sub>1</sub>]]*  
 it is me equal who has she invited  
 b. *Es ist mir gleich, [CP wen<sub>2</sub> [TP sie [vP t<sub>2</sub> eingeladen] hat]]*  
 it is me equal who she invited has  
 ‘I don’t care who she invited.’ (Brandner 2000: 52)

<sup>3</sup>Note that this order (albeit with a different intonation) is possible for matrix *wh*-exclamatives, but not genuine interrogatives (see d’Avis 1998, 2002).

Assuming that verb-second order in V2 languages such as German results from the verb moving from T in a head-final TP to the C position (see section 3.2 for further discussion), then it seems that T-to-C movement is blocked in both embedded *wh*-clauses and the embedded clause of the CC. Since both constructions evince obligatory verb-final order, one could assume that the CC involves extraction from an embedded *wh*-interrogative with the lower copy somehow spelled out:

- (17) [CP *wen* glaubst du [CP *wen* [TP sie liebt ]]]
- 

This is immediately problematic since it is clearly not possible to extract the *wh*-phrase from the edge of an embedded *wh*-question:<sup>4</sup>

- (18) a. I know [CP *who*<sub>1</sub> [TP John saw *t*<sub>1</sub> ]]  
 b. \**Who*<sub>1</sub> do you know [CP *t*<sub>1</sub> [TP John saw *t*<sub>1</sub> ]] ?
- (19) a. Ich weiß [CP *wen*<sub>1</sub> [TP sie [<sub>vP</sub> *t*<sub>1</sub> eingeladen] hat]]  
 I know who she invited has  
 'I know who she has invited.'  
 b. \**Wen*<sub>1</sub> weißt du [CP *t*<sub>1</sub> [TP sie [<sub>vP</sub> *t*<sub>1</sub> eingeladen] hat]] ?

Furthermore, there is another problem pertaining to selection. In the CC, the possible matrix predicates consist of only those predicates that select declarative clauses and not interrogative clauses. For example, predicates such as *meinen* 'think/say' (20) and *glauben* 'believe' (21) can embed declarative clauses, but not *wh*-interrogatives:<sup>5</sup>

<sup>4</sup>An independent problem here is that question embedding predicates such as *wissen* are not bridge verbs:

- (i) a. \**Wen*<sub>1</sub> weißt du, dass Maria *t*<sub>1</sub> gesehen hat?  
 who know you that Mary seen has  
 b. \**Wen*<sub>1</sub> weißt du, hat Maria *t*<sub>1</sub> gesehen?  
 who know you has Mary seen

<sup>5</sup>Pankau (2009: 200f.) discusses the fact that *glauben* cannot select a [+*wh*] complement, but can combine with the embedded clause of a CC. In particular, he says 'in *wh*-copying this selectional requirement seems to be overridden, as a clause introduced by a *wh*-element (*wen*) appears in the complement position of *glauben*. However, it's quite unlikely that selectional requirements can be overridden. What seems more likely is that the intermediate copy doesn't bear a [+*wh*]-feature'. His assumption here is that 'the [+*wh*]-marking of *wen* arises under a local relation with a relevant matrix C<sup>0</sup>-head', and as such the embedded clause does not

- (20) a. Ich meine, dass sie Martin liebt.  
 I think that she Martin loves  
 ‘I think that she loves Martin.’  
 b. \*Ich meine, wen sie liebt  
 I think who she loves
- (21) a. Ich glaube, dass Jakob Maria gesehen hat.  
 I believe that Jakob Maria seen has  
 ‘I think that Jakob saw Maria.’  
 b. \*Ich glaube, wen Jakob gesehen hat.  
 I believe who Jakob seen has

However, these predicates are entirely unproblematic in the CC, which would be unexpected if the CC were derived from an embedded *wh*-interrogative:

- (22) a. Wen meinst du, wen sie wirklich liebt?  
 who think you who she really loves  
 ‘Who do you think she really loves?’ (Höhle 1990)  
 b. Wen glaubt Hans, wen Jakob gesehen hat?  
 who believe Hans who Jakob seen has  
 ‘Who does Hans think that Jakob saw?’ (McDaniel 1989: 569)

Furthermore, predicates that can embed questions such as *sich fragen* ‘ask’ and *wissen* ‘know’ (23) are not possible in the CC (24).

- (23) a. Ich frage mich, wen sie liebt.  
 I ask REFL who she loves  
 ‘I wonder who she loves.’  
 b. Ich weiß, wer das war.  
 I know who that was  
 ‘I know who that was.’
- (24) a. \*Wen fragst du dich, wen sie liebt?  
 who ask you REFL who she loves  
 ‘Who do you wonder whether she loves?’ (Pankau 2014: 301)

---

constitute a [+wh] clause at the point at which it is selected by *glauben*. One of the problems with this is that, if the *wh*-phrase only becomes [+wh] when it reaches the matrix C head, then it is unclear what triggers the *wh*-phrase to move in the first place. The same objection would hold for embedded interrogatives.

- b. \*Wer weißt du, wer das war?  
 who know you who that was  
 ‘Who do you know that was?’

We can therefore conclude, as Pankau (2013: 25) also does, that the embedded clause of the CC should not be treated as an interrogative clause. The selection problem coupled with the general impossibility of extraction from such clauses are enough to disregard this option.

### 3.2. Extraction from an embedded V2-clause

Following the conclusions of the previous section, it seems we are forced to treat the embedded clause of the CC as a declarative clause from which extraction takes place. It is relatively uncontroversial that long distance wh-extraction in German is possible from embedded clauses headed by *dass* (‘that’) (25).<sup>6</sup> Furthermore, extraction from embedded verb-second clauses is generally also assumed to be possible (e.g. Thiersch 1978, Tappe 1981, Sternefeld 1989, Staudacher 1990, Haider 1993) (26).<sup>7</sup>

- (25) a. Niemand sagt, dass sie Pudding mag.  
 nobody says that she pudding likes  
 ‘Nobody says that she likes pudding.’  
 b. Was<sub>1</sub> sagt niemand, dass sie t<sub>1</sub> mag?  
 what says nobody that she likes  
 ‘What does nobody say that she likes?’
- (26) a. Niemand sagt, sie würde Pudding mögen.  
 nobody says she would pudding like  
 ‘Nobody says she would like pudding.’

<sup>6</sup> Although there is a dialectal variation regarding the acceptability of extraction from *dass*-clauses, see footnote 17.

<sup>7</sup> However, see Reis (1995a,b, 2002) and Steinbach (2007) for an analysis of extraction from embedded V2-clauses that derives ‘long movement’ from insertion of a ‘VIP’ (verb-first integrated parenthetical) into a monoclausal question (this is also similar to approaches to long-distance dependencies in Tree Adjoining Grammar; see e.g. Frank 2002). If this analysis turns out to be correct, then any analysis of the CC involving extraction from a V2-clause would become untenable. Despite the convincingness of Reis’ arguments, I will assume for the purposes of this discussion that extraction from V2 is possible.

- b. Welchen Pudding<sub>1</sub> sagt niemand, würde sie t<sub>1</sub> mögen?  
 which pudding says nobody would she like  
 ‘What pudding does nobody say she likes?’  
 (Müller & Sternefeld 1993: 465)

Reis (1995a) points out that extraction from embedded V2-clauses has two peculiar properties:

- (27) *Restrictions on putative extraction from V2-clauses* (Reis 1995a: 50, (18))
- a. Initial gap restriction: Regardless of the base position of the move, extraction leaves a gap in the initial position of the V2-clause.
  - b. V2 route restriction: Extraction may occur via V2-clauses and into V2-clauses only.

Let us focus on the first restriction for now. What we observe here is that extraction from a V2-clause triggers subject/verb inversion in the embedded clause. If we consider the embedded V2-clause in (28), extraction out of this clause requires the verb to precede the subject (29):

- (28) Er glaubt [CP sie wohnt in Berlin jetzt]  
 he believes she lives in Berlin now  
 ‘He thinks she lives in Berlin now.’
- (29) a. Wo<sub>1</sub> glaubt er [CP t<sub>1</sub> wohnt sie t<sub>1</sub> jetzt]?  
 where believes he lives she now  
 b. \*Wo<sub>1</sub> glaubt er [CP t<sub>1</sub> sie wohnt t<sub>1</sub> jetzt]?  
 where believes he she lives now  
 ‘Where does he believe she lives now?’ (Reis 1995a: 50)

This is immediately problematic for any analysis assuming that the CC is derived from extraction out of an embedded V2-clause, since we saw in example (14) (repeated below) that the CC is strictly verb final:

- (30) a. Wen glaubst du, wen sie liebt?  
 who believe you who she loves  
 b. \*Wen glaubst du wen liebt sie?  
 who believe you who loves she  
 ‘Who do you think she loves?’ (Pankau 2013: 34)

If the CC simply involved spelling out an intermediate copy of movement from an embedded V2-clause as in (31b), we would expect (31c) to be possible (angled brackets indicate a phonetically unrealized copy).

- (31) a. Ich glaube [<sub>CP</sub> Maria liebt Peter]  
 I believe Maria loves Peter  
 b. Wen glaubst du [<sub>CP</sub> ⟨wen⟩ liebt Maria ⟨wen⟩] ?  
 who believe you loves Maria  
 c. \*Wen glaubst du [<sub>CP</sub> wen liebt Maria ⟨wen⟩] ?  
 who believe you who loves Maria

Assuming auxiliary inversion targets the head of CP, we are faced with the puzzling asymmetry that T-to-C movement is blocked in the CC, whereas it is required in extraction from V2-clauses. Pankau (2013: 34) argues that ‘it is a general property of embedded clauses targeted by extraction that they disallow I-to-C movement in case something else already occupies the pre-subject position.’ In order to support this claim, he cites the following contrast:

- (32) a. Wen<sub>1</sub> glaubst du, dass sie t<sub>1</sub> liebt?  
 who believe you that she loves  
 b. \*Wen<sub>1</sub> glaubst du, dass liebt sie t<sub>1</sub>?  
 who believe you that she loves  
 ‘Who do you think she loves?’

However, this is a mischaracterization. It is a well-known fact of German syntax that embedded clauses introduced by an overt complementizer (e.g. *dass* ‘that’) are strictly verb-final, whereas main clauses are obligatorily verb-second. The now standard account of this fact is that German main clauses are CPs and what is traditionally referred to as the ‘left bracket’ (or the *linke Satzklammer* in traditional, topological approaches; see Höhle 1986 and Müller 2016: §1.8 for an overview) corresponds to the C<sup>0</sup> position. In V2-clauses, the finite verb or auxiliary moves to C<sup>0</sup> and the Spec-CP position is occupied by another constituent (cf. den Besten 1983).

- (33) [<sub>CP</sub> XP<sub>2</sub> [<sub>C'</sub> [<sub>C</sub> V<sub>1</sub>] [<sub>TP</sub> [<sub>vP</sub> ... t<sub>2</sub> ... ] t<sub>1</sub> ]]]

In embedded clauses, if the C<sup>0</sup> position is occupied by the complementizer *dass*, then movement of the verb to C<sup>0</sup> is blocked. Thus, the ungrammaticality

of (32b) does not stem from a restriction to one element in the pre-subject position, but instead from the fact that *dass* and verbs in second position compete for the same structural position and are therefore mutually exclusive.<sup>8</sup>

Consequently, the asymmetry between extraction from embedded V2-clauses and the CC cannot simply be explained away in this manner. The question still remains as to what triggers this inversion. Languages exhibiting the ‘V2 property’ require that the head of declarative CPs be filled if there is something occupying Spec-CP. As well as in main clauses, this property also holds for embedded V2 declarative clauses:

- (34) a. Peter behauptet [<sub>CP</sub> er<sub>1</sub> [<sub>C</sub> würde<sub>2</sub>] [<sub>TP</sub> t<sub>1</sub> [<sub>vP</sub> nie Fleisch  
Peter claims he would never eat  
essen ] t<sub>2</sub> ]]  
meat  
‘Peter claims he would never eat.’
- b. Peter behauptet [<sub>CP</sub> Fleisch<sub>1</sub> [<sub>C</sub> würde<sub>2</sub>] [<sub>TP</sub> er [<sub>vP</sub> nie t<sub>1</sub>  
Peter claims meat would he never  
essen ] t<sub>2</sub> ]]  
eat  
‘Peter claims that meat, he would never eat.’
- c. \*Peter behauptet [<sub>CP</sub> [<sub>C</sub> würde<sub>2</sub>] [<sub>TP</sub> er [<sub>vP</sub> nie Fleisch  
Peter claims would he meat never  
essen ] t<sub>2</sub> ]]  
eat  
‘Peter claims that meat, he would never eat.’

Regardless of whether the subject or object occupies Spec-CP, T-to-C movement is required. The inversion we see with extraction from embedded V2 is

<sup>8</sup>Further evidence against Pankau’s characterization comes from sentential adverbs. According to Frey (2004), sentential adverbs such as *wahrscheinlich* (‘probably’) are adjoined to TP. In (i), T-to-C movement is not blocked despite the sentential adverb occupying pre-subject position.

- (i) Wen glaubst du [<sub>CP</sub> hat [<sub>TP</sub> wahrscheinlich [<sub>TP</sub> MARIA gestern gesehen]]] ?  
who believe you has probably Maria yesterday seen  
‘Who do you think that MARY probably saw yesterday?’

The embedded subject is focused to block an interpretation in which *Maria* is topic. Frey (2004) shows that topics in German seem to occupy a position above sentential adverbs, but see Fanselow (2006a) for counter-arguments.

interesting since it seems that T-to-C is triggered despite there not being any overt element in Spec-CP of the embedded clause. This effect is also present in all embedded clauses with long-distance movement.<sup>9</sup> Here, despite the embedded Spec-CP position not being overtly filled, T-to-C movement has taken place.

- (35) [<sub>CP</sub> Wen<sub>I</sub> meinst du [<sub>CP</sub> t<sub>I</sub> hat Maria behauptet [<sub>CP</sub> t<sub>I</sub> wird Hans t<sub>I</sub>  
 who think you has Maria claimed will Hans  
 treffen]]] ?  
 meet  
 ‘Who do you think that Maria claimed that Hans will meet?’

This is an instance of syntactic opacity (cf. Müller 2013, Georgi 2014, Assmann et al. 2015) since, on the surface, the context for T-to-C movement (an element in Spec-CP) is not given. This is therefore a case of *overapplication* or *counterbleeding* (Kiparsky 1973). From a derivational perspective, this can be explained by assuming that T-to-C movement applies at the point at which the wh-phrase is present in the intermediate Spec-CP.<sup>10</sup> If subject/auxiliary inversion is a reflex of extraction from a V2-clause (also see Torrego 1984 for Spanish), then we would expect to find it with wh-copying if this were indeed derived by extraction.

Alternatively, one could pursue an argument along the lines of Fanselow & Mahajan (2000) and try to block T-to-C movement if the intermediate wh-copy is realized by appealing to the *Doubly Filled COMP Filter* (DFCF; Chomsky & Lasnik 1977), which (in a modern rendering) states that both the specifier and head of a CP cannot both be pronounced. As a result, spelling out the intermediate copy of the wh-phrase will block T-to-C movement since the resulting representation would violate the DFCF. This approach is immediately faced with the fact that not all varieties of German obey the DFCF (cf. Bayer 1984) and even allow DFCF violations in the CC (36).

<sup>9</sup>Note that this pattern has also been reported in unrelated V2 languages such as Dinka (Nilotic: South Sudan; van Urk 2015, van Urk & Richards 2015).

<sup>10</sup>An alternative would be to claim that a trace/copy can also trigger inversion, but this would amount to a ‘coding trick’ (Chomsky 1995: 224).

- (36) Wen denkst du [CP wen<sub>1</sub> [C' [C dass ] [TP sie t<sub>1</sub> ] liebt ] ?  
 who believe you who that she loves  
 'Who do you think she loves'

(Fanselow & Mahajan 2000: 221)

If the CC were linked to the DFCF, then we would expect dialects without it to permit examples such as (37), however no such dialect seems to exist.

- (37) \*Wer glaubst du [CP wer<sub>1</sub> [C' [C bist<sub>2</sub> ] [TP du t<sub>1</sub> ] t<sub>2</sub> ] ?  
 who believe you who are you

This approach also faces problems concerning the architecture of the grammar. If phonological realization of an intermediate *wh*-copy can bleed head movement in the CC, then head movement must presumably happen as late as PF (see e.g. Chomsky 1995, Merchant 2001, Schoorlemmer & Temmerman 2012, Platzack 2013, Hein this volume). Furthermore, the determination of which copies are pronounced, i.e. Chain Reduction (Nunes 2004), must precede head movement. However, the opacity facts are incompatible with this view since, if T-to-C movement at PF happens after the determination of which copies are pronounced (i.e. after Chain Reduction has deleted the copy in intermediate Spec-CP), it is unclear why T-to-C movement happens at all. By the time head movement applies, the configuration triggering it (an occupied Spec-CP) would no longer be given. We are therefore presented with a rule ordering paradox; the ban on T-to-C movement in the CC requires that Chain Reduction precede PF head movement so that T-to-C movement is bled, whereas subject/auxiliary inversion with extraction from V2 requires that head movement precede Chain Reduction (counterbleeding). Since both processes coexist in German, the DFCF approach is faced with an intractable ordering paradox at PF.

A final argument against an analysis of the CC as involving extraction from an embedded V2-clause pertains to the second restriction on extraction from embedded V2-clauses in (27) (repeated below):

- (38) *Restrictions on putative extraction from V2-clauses (Reis 1995a: 50, (18))*
- a. Initial gap restriction: Regardless of the base position of the movee, extraction leaves a gap in the initial position of the V2-clause.
  - b. V2 route restriction: Extraction may occur via V2-clauses and into V2-clauses only.

What the so-called *V2 route restriction* captures is the fact that extraction from V2-clauses cannot then pass through a *dass*-clause:

- (39) a. \* $[_{CP}$  Wo meint er  $[_{CP}$   $t_1$  dass Peter geglaubt hat  $[_{CP}$   $t_1$  wohnt  
 where thinks he that Peter believed has lives  
 sie  $t_1$ ]]] ?  
 she
- b.  $[_{CP}$  Wo meint er  $[_{CP}$   $t_1$  hat Peter geglaubt  $[_{CP}$   $t_1$  wohnt sie  
 where thinks he has Peter believed lives she  
 $t_1$ ]]] ?  
 ‘Where does he think Peter believed she lives?’ (Reis 1995a: 50)

Müller & Sternefeld (1996) claim (*contra* Dayal 1994) that the wh-scope marking constructions can violate the V2 route restriction (40):

- (40) Was glaubst du  $[_{CP}$  dass er gesagt hat  $[_{CP}$  wen er eingeladen hat]]]?  
 what believe you that he said has who he invited has  
 ‘Who do you believe that he said that he invited?’  
 (Müller & Sternefeld 1996: 509)

The key question is how the CC behaves in this regard. If wh-copying were derived from extraction from an embedded V2-clause, then we would expect it to obey the V2 route restriction. While there is reportedly some variation in this regard, a number of speakers accept wh-copying with extraction from a V2-clause via *dass*-clauses (Felser 2004: 552, Rett 2006: 365, Pankau 2013: 31):<sup>11</sup>

- (41)  $[_{CP}$  Wen glaubst du  $[_{CP}$  dass er meint  $[_{CP}$  wen sie gesehen hat]]] ?  
 who believe you that he thinks who she seen has  
 ‘Who do you think he believes she has seen?’  
 (Pankau 2013: 31)

This is of course completely unexpected since we would expect the CC and extraction from V2-clauses to behave alike regarding the V2 route restriction. Given the differences between the constructions, we can conclude that the assumption that the CC is derived from extraction from an embedded V2 declarative is not tenable.

<sup>11</sup>Reis (2000: 395) judges a similar example as ungrammatical, however she seems to also find wh-scope marking examples with an intervening *dass*-clause ungrammatical (p. 380). In general, there seems to be a considerable degree of speaker variability in this regard.

#### 4. Asymmetries between *wh*-copying and long distance extraction

In the previous section, we saw that the assumption that the CC simply consists of spelling out an intermediate copy of long-distance movement faces a number of technical problems regarding the exact derivation one has to assume. However, there are also a number of empirical differences between the CC and long-distance extraction discussed in the literature that are unexpected *a priori* if the CC is derived from long-distance extraction.<sup>12</sup> Much of the discussion from which the following data are drawn centres around the correct analysis of *wh*-scope marking constructions such as (42a) and, to a lesser extent, *wh*-copying (42b).

- (42) a. Was glaubt Maria, wen Hans mag?  
 what believes Maria who Hans likes  
 b. Wen glaubt Maria, wen Hans mag?  
 who believes Maria who Hans likes  
 ‘Who does Mara think Hans likes?’ (Beck & Berman 2000: 31)

There are two different approaches to the *wh*-scope marking construction in particular (see Fanselow 2006*b* for an overview). The first approach suggests that there is a direct relation between *was* and the lower *wh*-phrase (i.e. movement). This approach is referred to as the *Direct Dependency Approach* (e.g. van Riemsdijk 1983, McDaniel 1989, Beck & Berman 2000, Cheng 2000). The alternative approach is the so-called *Indirect Dependency Approach* (e.g. Dayal 1994, Horvath 1997, Felser 2001, Klepp 2002, Stepanov & Stateva 2006), in which no direct link between the *wh*-phrases is assumed. Instead, *was* in (42a) is assumed to be related only indirectly, i.e. via co-indexation, to the lower interrogative clause. In order to choose between these approaches, researchers have tried to ascertain to what extent *wh*-scope marking and long-distance extraction pattern alike. If they do, then one has good evidence for the Direct Dependency Approach. Any significant differences, however, would support

<sup>12</sup>Note that many of the differences proposed here are controversial in that the complete opposite judgements have also been reported. There is a striking tendency for those researchers whose analyses require that the CC be derived from long-distance extraction to oppose judgements that would contradict this conclusion (in particular Rett 2006 and Pankau 2013). This highlights the pitfalls of pure introspection as well as the need for serious empirical study and corroboration of the often subtle contrasts identified in the literature. As such, many of the asymmetries discussed here remain more controversial than conclusive.

the Indirect Dependency Approach. As for *wh*-copying, it is mostly assumed that the Direct Dependency Approach is correct (although see den Dikken 2009, Koster 2009, Schippers 2010, 2012*b* for Indirect Dependency approaches), i.e. the CC is derived from long-distance movement. If this were the case, we would not expect to find any significant differences between the two constructions. As the following discussion will show, there are a number of ways in which the CC does not pattern like long-distance *wh*-movement, which proves problematic for accounts that posit successive-cyclic movement as the source for the CC.

#### 4.1. Interpretive differences

##### 4.1.1. *Quantifier scope*

If the CC were derived from long-distance movement, we would not expect differences with regard to scope-taking properties. Pafel (2005: 146f.) discusses the following data. With long-distance extraction (43), the *wh*-phrase can scope above the universal quantifier in the matrix clause, as well as below it (yielding a pair-list interpretation).

- (43) *Wo glaubt jeder, dass die besten Weine wachsen?*  
 where believe everyone that the best wines grow  
 ‘Where does everyone think the best wines grow?’ (*wh* >  $\forall$ ,  $\forall$  > *wh*)

However, he claims that while the CC variant of (43) certainly has a pair-list reading, the reading with wide scope of the *wh*-phrase is notably less accessible than with (43) (also see Felser 2004: 557, who corroborates this claim, but Rett 2006: 356, fn. 2, who disputes it).

- (44) *Wo glaubt jeder, wo die besten Weine wachsen?*  
 where believe everyone where the best wines grow  
 ‘Where does everyone think the best wines grow?’ (?*wh* >  $\forall$ ,  $\forall$  > *wh*)

Furthermore, consider the following minimal pair from Pafel (2000: 348):

- (45) a. *Wo wird nicht einer vermuten, dass sie sich versteckt hält?*  
 where will nobody assume that she REFL hidden keeps  
 ‘Where will nobody assume that she is hiding?’  
 b. *%Wo wird nicht einer vermuten, wo sie sich versteckt hält?*  
 where will nobody assume that she REFL hidden keeps

‘Where will nobody assume that she is hiding?’

Here, Pafel claims that wide scope of the negative quantifier *nicht einer* yields a ‘strange interpretation’ (there is no person  $x$  such that for the location  $y$ ,  $x$  would assume she is hiding at  $y$ ). In order to get the natural interpretation, we need the *wh*-phrase to outscope the negative quantifier. While this is unproblematic for the long-distance extraction in (45a), Pafel claims that *wh*-copying patterns with scope-marking constructions in that the wide scope interpretation of the *wh*-phrase is less accessible (although he admits there is some variation in the judgements).<sup>13</sup> If these observations hold water, then it would be puzzling to find such a discrepancy between long-distance extraction structures and the CC if these were supposedly derived from the same source.

#### 4.1.2. (In)consistent readings

Another discrepancy that has been discussed in the literature involves what Reis (2000: 383) calls ‘(in)consistent readings’. Reis illustrates the distinction with the following examples:

- (46) a. Wo glaubt Maria, dass Fox populärer ist als er ist?  
 where believes she that Fox more.popular is than he is  
 ‘Where does Maria think that Fox is more popular here than he is?’  
 b. #Wo ist Fox populärer als er ist?  
 where is Fox more.popular than he is  
 ‘Where is Fox more popular than he is?’

Whereas (46b) necessarily involves a contradiction, (46a) is ambiguous due to two possible sources of belief to the degree to which Fox is popular; the degree to which Fox is popular can be evaluated either relative to the belief state of an individual (e.g. their doxastic alternatives; Hintikka 1962) or the actual world of evaluation. This is then essentially a case of the familiar *de*

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<sup>13</sup>Pafel claims that the wide scope reading of the *wh*-phrase is definitely out with scope-marking or ‘partial movement’ constructions such as (i):

- (i) ??Was wird nicht einer vermuten, wo sie sich versteckt hält?  
 what will nobody assume that she REFL hidden keeps  
 ‘Where will nobody assume that she is hiding?’

*re/de dicto* ambiguity (see e.g. Lechner 2013: 24).<sup>14</sup> The ‘consistent’ or *de dicto* reading can be summarized as follows:

(47) *Consistent reading (de dicto)*:

For which place  $x$ , is Fox popular to degree  $d$  in  $x$  in Maria’s belief worlds ( $w'$ ) and popular to degree  $d'$  in the world of evaluation ( $w$ )  
 $\lambda w \lambda p. \exists x. \forall w' \in \text{Dox-Alt}_{\text{Maria}, w'}. \exists d. \text{Fox is } d\text{-popular at } x \text{ in } w' \wedge \exists d'. \text{Fox is } d'\text{-popular at } x \text{ in } w$

The sentence in (46a) has this reading and therefore allows for Maria to be mistaken about Fox’ popularity in a given place. For example, she could

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<sup>14</sup>There is another *de re/de dicto* ambiguity often discussed in the literature on wh-scope marking constructions. Herburger (1994) claims that there is a distinction between the scope marking construction in (ia) and the long-distance extraction in (ib) (also see Stepanov & Stateva 2006: 2145):

- (i) a. Was glaubt der Georg, wen die Rosa geküsst hat?  
 what believes the Georg who the Rosa kissed has  
 b. Wen glaubt der Georg, dass die Rosa geküsst hat?  
 who believes the Georg that the Rosa kissed has  
 ‘Who does Georg believe that Rosa kissed?’

Here, the claim is that with the scope marking construction, the proposition that Georg kissed someone has to be understood as being part of the speaker’s belief state rather than Georg’s (i.e. *de re*). According to Herburger, a *de dicto* interpretation for (ia) in which Georg mistakenly believes that Rosa kissed someone is impossible. Interestingly, this does not seem to be the case for long-distance movement constructions such as (ib). Here, a *de dicto* interpretation seems possible. The important question at this point is whether the CC patterns with scope marking or long-distance extraction structures. Rett (2006: 357) and Pankau (2013: 23) claim that the CC can have a *de dicto* reading, thereby suggesting that it patterns with long movement. The availability of this reading can be tested using the following context suggested by Andreas Haida (p.c.):

- (ii) Ich verstehe, warum du sauer bist auf mich. Ich war gestern den ganzen Tag alleine, aber ich weiß, ...  
 (‘I understand why you are angry at me. I was alone all day yesterday, but I know ...’)
- a. wen du glaubst, dass ich gestern getroffen habe.  
 who you believe that I yesterday met have  
 b. #was du glaubst, wen ich gestern getroffen habe.  
 what you think who I yesterday met have  
 c. %wen du glaubst, wen ich gestern getroffen habe.  
 who you believe who I yesterday met have  
 ‘... who you think I met yesterday.’

believe that Fox is incredibly popular in Bielefeld, when in fact he is not. There is another perhaps less salient reading, which involves Maria holding a contradictory belief state in which she believes that there is some place, where Fox is popular to two differing (and therefore contradictory) degrees there:

(48) *Contradictory reading (de re):*

For which place  $x$ , is Fox popular to degree  $d$  in  $x$  in Maria's belief worlds ( $w$ ) and popular to degree  $d'$  in the (same) world of evaluation ( $w$ )

$\lambda p. \exists x. \forall w \in \text{DoX-Alt}_{\text{Maria}, w} \exists d. \text{Fox is } d\text{-popular at } x \text{ in } w \wedge \exists d'. \text{Fox is } d'\text{-popular at } x \text{ in } w$

Crucially, the monoclausal interrogative in (46b) is reported to only have the contradictory *de re* reading (since only the speaker's belief state can be taken into account). Since long-distance extraction allows for a consistent reading, we would expect the CC to also allow one if the CC derives from it. However, according to Reis (2000: 395) and Felser (2004: 558) only the contradictory *de re* reading is possible:<sup>15</sup>

(49) #Wo glaubt sie, wo Fox populärer ist als er ist?  
 where believes she where Fox more.popular is than he is  
 'Where does she believe that Fox is more popular than he is?'

This interpretive difference between long-distance and the CC is then surprising if the CC were derived from long-distance extraction (in fact it seems to pattern with scope marking constructions in this regard).

#### 4.1.3. *Single identity readings*

A further interpretive difference between long-distance extraction and the CC is discussed by Felser (2004: 560). It is possible to ATB-extract out of conjoined embedded clauses:

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Although this judgement is less clear for some speakers, the CC does seem to pattern with long-distance extraction in this respect. However, this probably tells us more about *wh*-scope marking than it does about the CC.

<sup>15</sup>In familiar fashion, divergent claims are made by Rett (2006: 357) and Pankau (2013: 32).

- (50) Wen<sub>1</sub> glaubst du [<sub>CP</sub> t<sub>1</sub> dass sie t<sub>1</sub> getroffen hat] und [<sub>CP</sub> t<sub>1</sub> dass sie  
 who believe you that she met has and that she  
 t<sub>1</sub> liebt] ?  
 loves  
 ‘Who do you think that she met and that she loves?’

It is well-known that ATB movement forces a so-called ‘single identity reading’, that is, the answer to a question like (50) must be a single individual that she both met and loves (see Citko 2005: 489; Citko 2011: 58; Blümel 2014: 20 and Hein & Murphy this volume). It is not possible for the gaps in the conjuncts in (50) to refer to different individuals. However, Felser points out that with wh-copying it is possible, if not preferred, to have a reading in which the ‘copy’ in each conjunct refers to a different individual.

- (51) Wen glaubst du [<sub>CP</sub> wen<sub>k</sub> sie getroffen hat] und [<sub>CP</sub> wen<sub>j</sub> sie liebt]?  
 who believe you who she met has and who she loves  
 ‘Who do you think that she met and that she loves?’

Again, this distinction would not be expected if the CC simply involved the phonological realization of intermediate copies in a structure like (50).

#### 4.1.4. *Variable binding*

Another apparent interpretive difference between the CC and long-distance extraction structures pertains to cross-clausal variable binding. In a long-distance extraction structure, it is uncontroversially possible for a quantifier in the matrix clause to bind a variable in the embedded clause:

- (52) a. Was<sub>1</sub> glaubt jeder Student<sub>i</sub>, dass er<sub>i</sub> t<sub>1</sub> kaufen soll?  
 what believes every student that he buy should  
 ‘What does every student<sub>i</sub> think he<sub>i</sub> should buy?’  
 b. Mit wem<sub>1</sub> glaubt jeder Student<sub>i</sub>, dass er<sub>i</sub> t<sub>1</sub> gesprochen hat?  
 with who believes every student that he spoken has  
 ‘With whom does every student<sub>i</sub> think he<sub>i</sub> has spoken?’

(Dayal 1994: 151)

Dayal (1994) contrasts this with the wh-scope marking construction where she claims that no binding between the matrix subject and embedded pronoun is possible:

- (53) \*Was glaubt jeder Student<sub>i</sub>, mit wem<sub>1</sub> er<sub>i</sub> t<sub>1</sub> gesprochen hat?  
 what believes every student with whom he spoken has  
 ‘With whom does every student<sub>i</sub> think he<sub>i</sub> has spoken?’

(Dayal 1994: 152)

The question now is whether the CC behaves like long extraction (52) or scope marking (53). Rett (2006: 356) simply asserts that the CC allows cross-clausal binding, but does not provide any supporting data. A number of the speakers I consulted seemed to suggest the reverse.<sup>16</sup> As (54) shows, there does seem to be a contrast between long-distance extraction and the CC:

- (54) a. Wo glaubt jeder Fußballspieler<sub>i</sub>, dass er<sub>i</sub> nächstes Jahr  
 where believes every footballer that he next year  
 spielen wird?  
 play will  
 ‘Where does every footballer<sub>i</sub> believe he<sub>i</sub> will play next year?’  
 b. ?Wo glaubt jeder Fußballspieler<sub>i</sub>, wo er<sub>i</sub> nächstes Jahr  
 where believes every footballer where he next year  
 spielen wird?  
 play will  
 ‘Where does every footballer<sub>i</sub> believe he<sub>i</sub> will play next year?’

One immediate conclusion that could be drawn from the contrast in (54) is that the quantifier between the *wh*-phrases triggers an intervention effect (Beck 1996, Beck & Kim 1997). While some researchers seem to detect an intervention effect in the CC (Fanselow & Mahajan 2000, Fanselow & Ćavar 2001), others do not (Pafel 2000, Reis 2000, Felser 2004, Rett 2006, Pankau 2013). It is relatively straightforward to test whether the source of deviance is the cross-clausal binding or an intervention effect. If we remove the binding in (54b), the example is reported to improve (55).

- (55) Wo glaubt jeder Fußballspieler, wo Messi nächstes Jahr  
 where believes every footballer where Messi next year  
 spielen wird?  
 play will  
 ‘Where does every footballer<sub>i</sub> believe he<sub>i</sub> will play next year?’

<sup>16</sup>Particular thanks go to Andreas Haida for discussion of the following examples.

This suggests that it is actually the binding that is responsible for the contrast in (55). If the CC were in fact derived from long-distance extraction, we would not expect the CC to show any differences with regard to cross-clausal binding.

#### 4.2. Predicate restrictions

Another well-known difference between the CC and long extraction is that the set of permissible predicates in the CC is more restricted than those allowed in long-distance movement structures.

##### 4.2.1. *Volitional predicates*

The first difference concerns so-called ‘volitional predicates’ such as *mögen* (‘like’) *hoffen* (‘hope’) and *wollen* (‘want’), which are reported to be possible in long-distance extraction structures (56a), but impossible in the CC (56b) (see Reis 2000: 395, Fanselow & Mahajan 2000: 220, Haider 2010: 108).

- (56) a. Wen möchtest du, dass ich befrage?  
           who want you that I question  
       b. \*Wen möchtest du, wen ich befrage?  
           who want you who I question  
           ‘Who do you want me to question?’ (Haider 2010: 108)

As discussed by Pankau (2013: 14), there is some variation with regard to *wollen* (‘want’). Some researchers have claimed that the CC is acceptable with *wollen* (McDaniel 1986, Simpson 2000, Pankau 2013):

- (57) Wen willst du, wen Hans besticht?  
       who want you who Hans bribes  
       ‘Who do you want Hans to bribe?’ (Simpson 2000: 162f.)

However, these volitional predicates have another peculiar property, namely they are bridge verbs that allow extraction from *dass*-clauses, but do not embed V2-clauses (the same holds for *wollen*; see Pankau 2013: 15):

- (58) a. \*Er möchte, ich rufe sie an.  
           he wants I call her PRT  
       b. Er möchte, dass ich sie anrufe.  
           he wants that I her call  
           ‘He wants me to call her.’ (Haider 2010: 108, fn.25)

Furthermore, cases of putative extraction from V2-clauses embedded under volitional predicates are also judged to be deviant:

- (59) \*Wen<sub>1</sub> willst du [CP soll sie t<sub>1</sub> einladen] ?  
 who want you should she invite  
 ‘Who do you want her to invite?’ (Pankau 2013: 15)

If the CC were to be analyzed as involving the Spell-Out of the intermediate copy in (59), then the contrast between (57) and (59) would be puzzling.

#### 4.2.2. *Negated predicates*

Another class of predicates that show different distributions in long-distance extraction and the CC are ‘negated predicates’ including negators such as *nicht* (‘not’) and *keiner* (‘nobody’), as well as inherently negative predicates such as *bezweifeln* (‘doubt’). Whereas long extraction from clauses embedded under negated predicates is generally regarded to be unproblematic (60a), such predicates are disallowed in the CC (60b).<sup>17</sup>

- (60) a. Wen glaubst du nicht, dass sie liebt?  
 who believe you not that she loves  
 ‘Who don’t you think she loves?’ (Felser 2004: 555)
- b. \*Wen glaubst du nicht, wen sie liebt?  
 who believe you not who she loves  
 ‘Who don’t you think she loves?’ (Reis 2002: 34)

#### 4.2.3. *Preference predicates*

Reis (1995a: 64ff.) shows that long-distance extraction is possible with a set of predicates she calls ‘preference predicates’ (*Präferenzprädikate*) (61), however this is not true of the CC (62).

- (61) Dorthin<sub>1</sub> ist (es) besser, dass du zu Fuß gehst.  
 to.there is it better that you to foot go  
 ‘It would be better if you go there on foot.’ (Reis 1995a: 65)

<sup>17</sup>Pankau (2013: 18) cites a number of cases in the literature where extraction from *dass*-clauses embedded under a negated predicate is judged as marginal. It is worth noting, however, that most of the cited researchers give this extraction an intermediate status (? or ??) (see Cheng 2000: 95, for example). This is most likely related to the fact that there is considerable variation regarding the acceptability of extraction from *dass*-clauses to begin with (Kiziak 2010: 42ff.).

- (62) \*Wen ist besser, wen Petra heiratet?  
 who is better who Petra marries  
 ‘Who would it be better for Petra to marry?’ (Reis 2002: 34)

Interestingly, this is the same restriction that putative cases of extraction from embedded V2-clauses are subject to:

- (63) \*Dorthin<sub>1</sub> ist (es) besser, gehst du zu Fuß.  
 to.there is it better go you to foot  
 ‘It would be better if you go there on foot.’ (Reis 1995a: 65)

Reis (1995a,b, 2000) argues that this and other asymmetries between extraction from *dass*-clauses and extraction from embedded V2 support an analysis in which what looks like long-distance extraction from embedded V2 actually involves the insertion of a V1 parenthetical (see Murphy 2014 for an analysis of the CC along these lines).

#### 4.3. Superiority effects

Another putative, albeit more controversial, asymmetry regards the status of superiority effects with long-distance *wh*-movement. Felser (2004: 555) provides the following minimal pair:

- (64) a. Wen<sub>1</sub> hat Peter wann gesagt, dass er t<sub>1</sub> besuchen wird?  
 who has Peter when said that he visit will  
 b. \*Wen hat Peter wann gesagt, wen er besuchen wird?  
 who has Peter when said who he visit will  
 ‘When did Peter say who he was going to visit?’

In (64a), we have long *wh*-movement that violates superiority, that is, it crosses the *in situ* *wh*-phrase *wann* in the matrix clause. While German does not exhibit superiority effects in main clauses (65), long distance *wh*-movement has been typically reported to be ungrammatical (Büring & Hartmann 1994, Grewendorf 2002, Heck & Müller 2003, Müller 2004).

- (65) a. Wer t<sub>1</sub> liebt wen?  
 who loves whom  
 b. Wen<sub>1</sub> liebt wer t<sub>1</sub>?  
 whom loves who  
 ‘Who loves who(m)?’

However, Fanselow & Féry (2008) present experimental evidence suggesting that this effect is not due to superiority, but is rather a general processing effect. The important point here pertains to the examples in (64). Regardless of the strength or cause of the contrast that some speakers feel with the superiority violations with long-distance *wh*-movement, if there does turn out to be a contrast between (64a) and (64b) (Felsler 2004: 555 deems (64a) grammatical, Pankau 2013: 34 does not), then this would be entirely unexpected under the view that these are surface variants of the same underlying construction.

#### 4.4. Size restrictions

One final difference between the CC and long-distance extraction structures is the fact that repeated material in the CC is subject to what we might call ‘size restrictions’, see Müller (this volume). Whereas copying of ‘simplex’ or ‘monolexical’ (Haider 2010: 108) *wh*-material is unproblematic (66), copying complex *wh*-phrases is not possible (67).

- (66) a. Was glaubst du, was Hans kauft?  
 what believe you what Hans buys  
 ‘What do you think Hans will buy?’  
 b. Wo glaubst du, wo die besten Weine wachsen?  
 where believe you where the best wines grow  
 ‘Where do you think the best wines grow?’  
 (Pafel 2005: 146)  
 c. Warum glaubst du, warum sie das getan hat?  
 why believe you why she that done has  
 ‘Why do you think she did that?’  
 (Fanselow & Mahajan 2000: 220)
- (67) a. \*Welchen Mann glaubst du, welchen Mann sie liebt?  
 which man believe you which man she loves  
 ‘Which man do you think she loves?’  
 (Fanselow & Mahajan 2000: 220)  
 b. \*Wieviele Studenten denkst du, wieviele Studenten wir  
 how.many students think you how.many students we  
 kennen?  
 know  
 ‘How many students do you think we know?’  
 (Fanselow & Čavar 2001: 122)

- c. \*Auf wen hat sie gesagt, auf wen er warten soll?<sup>18</sup>  
 on who has she said on who he wait should  
 ‘Who did she say he should wait for?’

(McDaniel 1986: 247)

On the surface, this restriction is puzzling and still seems to be lacking a satisfactory explanation.<sup>19</sup> If we can find similar size restrictions in a different corner of the grammar, then this might give us an insight into the nature of the

<sup>18</sup>Note that there is apparently some speaker variability with regard to acceptability of PPs, see (Pankau 2013: 9ff.).

<sup>19</sup>There have of course been a number of proposals attempting to derive this. The most prominent approach assumes that intermediate wh-copies either cliticize onto or are ‘reanalyzed’ as C heads (see Fanselow & Mahajan 2000, Nunes 2004, Bošković & Nunes 2007). It is then stipulated that only morphologically ‘simplex’ elements can fuse with C since they are heads (see Bošković & Nunes 2007 for a head adjunction approach). One problem here is that a number of speakers do in fact permit PPs such as *auf wen* in (67c) in the CC. Bošković & Nunes (2007: 54) conjecture that this variability stems from ‘the degree of morphological complexity a given dialect or idiolect tolerates under fusion’. However, so-called pronominal adverbs such as *wovon* seem to be acceptable in the CC even for speakers who reject putatively more complex PPs such as *auf wen*. Furthermore, pronominal adverbs such as *wovon* should probably be analyzed as a full PP since they are known to permit preposition stranding and are therefore probably not any less structurally complex than other PPs (Müller 2000, Abels 2003, Barnickel & Hein this volume). Rett (2006) tries to derive the distinction between (66a) and (67a) by claiming that ‘wh-phrases quantify over an individual variable when they occur with an NP complement and introduce a free individual variable when they do not occur with an NP complement’ (p. 371). Crucially for her, bare wh-words such as *what* do not introduce existential quantification, but rather free variables. However, what she calls wh-determiners such as *which* introduce existential quantification. According to Rett, the reason why complex NPs are excluded from the CC is that the variable corresponding to the ‘trace’ would be quantified over by the intermediate copy, leading to vacuous quantification by the higher copy. Since wh-pronominals such as *was* in (66a) only introduce free variables, no such problems arise. This approach suffers from a number of empirical problems. For example, this approach will never allow for complex NPs to occur in the ‘intermediate position’ since these bind the trace ‘too early’. Examples from Fanselow & Ćavar (2001: 123) clearly show this to be an incorrect prediction.

- (i) Wieviel sagt ihr wieviel Schweine ihr habt?  
 how.many say you.PL how.many pigs you.PL have  
 ‘How many pigs did you say you have?’

Addressing this same issue, Fanselow & Ćavar (2001: 130) themselves propose an OT constraint CONTIGUITYIN SYNTAX stating that ‘the phonetic material corresponding to a constituent must be spelled out in one position only’. It is unclear what independent motivation, if any, such a constraint has. Furthermore, van Craenenbroek (2012: 49) cites this restriction as evidence for his sluicing analysis that presupposes that complex wh-phrases are base-generated

CC. As first pointed out by Fanselow (1987: 57), long topicalization in German has been argued not to be sensitive to *wh*-islands (Müller & Sternefeld 1993, d'Avis 1995, Müller 2011, Grewendorf 2012).

- (68) a. Ich weiß nicht [<sub>CP</sub> wie [<sub>TP</sub> man t<sub>1</sub> Radios repariert ]]  
 I know not how one radios repairs  
 'I don't know how to repair radios.'
- b. ?Radios<sub>2</sub> weiß ich nicht [<sub>CP</sub> wie<sub>1</sub> [<sub>TP</sub> man t<sub>1</sub> t<sub>2</sub> repariert ]]  
 radios know I not how one repairs  
 'As for radios, I don't know how to repair them.'
- (Fanselow 1987: 57)

Example (68b) shows that it is possible to have long topicalization out of what would normally constitute an island for movement (a *wh*-island). Interestingly, Bayer (2014) provides data that seem to suggest that this topicalization out of *wh*-islands is sensitive to 'size restrictions' in a similar way to the CC. Like Fanselow, Bayer finds topicalization out of interrogative clauses with simplex *wh*-phrases such as *was* ('what'), *wo* ('where') and *warum* ('why') grammatical:

- (69) a. Den Opa<sub>1</sub> weiß ich nicht [<sub>CP</sub> was t<sub>1</sub> geärgert haben  
 the grandfather know I not what annoyed have  
 könnte]  
 could  
 'As for grandfather, I don't know what could have annoyed him.'
- b. Den Präsidenten<sub>1</sub> sage ich euch gleich [<sub>CP</sub> wo ihr  
 the president tell I you immediately where you.PL  
 t<sub>1</sub> abholen sollt]  
 pick.up should  
 'As for the president, I will tell you in a minute where you should pick him up.'
- c. Der Regierung<sub>1</sub> weiß ich schon [<sub>CP</sub> warum niemand  
 the government know I already why nobody  
 mehr t<sub>1</sub> vertraut]  
 anymore trusts  
 'As for the government, I know why nobody trusts them anymore.'
- (Bayer 2014: 34f.)

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in the left periphery. Since they do not move, he argues, 'their non-occurrence in *wh*-copying follows straightforwardly'.

However, Bayer claims that comparable examples with topicalization out of an embedded interrogative clause with a complex *wh*-phrase are not possible.<sup>20</sup>

- (70) a. ?\*Den Opa<sub>1</sub> weiß ich nicht [<sub>CP</sub> welches Benehmen t<sub>1</sub>  
the grandfather know I not which behaviour  
geärgert haben könnte]  
annoyed have could
- b. ?\*Den Präsidenten<sub>1</sub> sage ich euch gleich [<sub>CP</sub> von welchem  
the president tell I you immediately from which  
Flughafen ihr t<sub>1</sub> abholen sollt]  
airport you.PL pick.up should
- c. ?\*Der Regierung<sub>1</sub> weiß ich schon [<sub>CP</sub> aus welchem Grund  
the government know I already for which reason  
niemand mehr t<sub>1</sub> vertraut]  
nobody anymore trusts

(Bayer 2014: 35f.)

These observations, if they turn out to be robust, open up an interesting analytical possibility. It can be sketched as follows: We know that extraction of the copy of the *wh*-phrase in embedded Spec-CP is impossible, so perhaps it is somehow possible to ‘topicalize’ the lower copy of the *wh*-phrase across the other copy of itself in a similar way to the previous examples (71). Since we would have two distinct movement chains, the fact that both (highest) copies would be pronounced receives a plausible explanation.<sup>21</sup>

- (71) [<sub>CP</sub> was glaubst du [<sub>CP</sub> was Hans ⟨was⟩ kauft ]]
- 

<sup>20</sup>But cf. divergent judgements in Grewendorf (2012). Note that Bayer, unlike Grewendorf, supports his findings with an empirical study, however this may ultimately be a dialectal issue.

<sup>21</sup>There is also another (albeit less plausible) possible analysis one could pursue since similar ‘size restrictions’ are also found with free relatives:

- (i) a. Ich esse, was du willst.  
I eat what you want  
‘I’ll eat what(ever) you want.’
- b. \*Ich esse, welches Essen du willst.  
I eat which food you want

However, it is unclear how the free relative analysis could be made to work given the predicate restrictions discussed in section 4.2. Permissible CC-predicates such as *meinen* select for CP complements rather than DPs.

This *wh*-island-violating movement to derive the CC would of course be subject to the same restrictions as long topicalization, that is, movement across embedded interrogatives with a complex *wh*-phrase should be deviant:

- (72) [<sub>CP</sub> Welchen Mann glaubst du [<sub>CP</sub> welchen Mann sie (welchen Mann) liebt ]] 

Although this approach could potentially give us an explanation for the puzzling ‘size restrictions’ that the CC seems to be subject to, it is not without its problems. The main problem is that it has been known since Fanselow (1987) that long *wh*-movement is not impervious to *wh*-islands in the same way long topicalization seems to be:

- (73) \*Welches Radio<sub>2</sub> weißt du nicht [<sub>CP</sub> wie<sub>1</sub> [<sub>TP</sub> man t<sub>1</sub> t<sub>2</sub> repariert ]] ?  
 which radio know you not how one repairs  
 ‘Which radio do you not know how to repair?’  
 (Müller & Sternefeld 1993: 494)

At this point, one could appeal to an operation such as *wh*-topicalization (Boeckx & Grohmann 2004, Grewendorf 2012). While this has been proposed, we would expect ‘*wh*-topics’, if they even exist, to be D-linked *wh*-phrases such as *which*-NPs (Pesetsky 1987, 2000).<sup>22</sup> This seems to be incompatible with the analysis sketched above since we would expect *wh*-topics, above all complex *wh*-phrases, to be able to be extracted, however it is precisely these which are not possible in the CC. As such, any explanation along these lines will have to contend with these problems as well as the fact that it is far from clear that *wh*-topicalization even exists (see e.g. Müller 1995: 345ff.).

<sup>22</sup>Felser (2004: 566) suggests that D-linked *wh*-phrases are impossible in the CC since these do not undergo successive-cyclic movement. Under her assumptions, if *wh*-phrases do not stop in the specifier of CP, then they cannot be pronounced there to form the CC. Her evidence in support of this is the well-known observation that D-linked *wh*-phrases are less sensitive to weak islands (e.g. *wh*-islands) than movement of non D-linked *wh*-phrases (this claim has also been made for German, see Grewendorf 2012: 58). While this is an intriguing possibility, it is unclear how D-linked phrases could possibly move in ‘one fell-swoop’ if phrases are to be taken seriously. Furthermore, if *how many*-NPs can also count as D-linked (see Cinque 1990: 16) then it is unclear how example (i) in footnote 19 could be derived.

## 5. Conclusion

The goal of this paper was to point out a number of problems with the commonly held assumption that wh-copying provides straightforward evidence for successive-cyclic movement. Given the Copy Theory of Movement, it is tempting to immediately conclude from wh-copying that languages are simply pronouncing copies that go otherwise unpronounced, however, we have seen a number of problems with this view that indicate that things are not quite so straightforward. If the CC is derived by extraction from an embedded V2, which seems by far the most (if not only) plausible analysis, then the fact that the subject/auxiliary inversion that we ordinarily find with this kind of extraction is not triggered, is something that requires an explanation. Furthermore, a number of additional asymmetries between the CC and long distance movement have been reported in the literature, however, the need for serious empirical work on this domain becomes apparent due to the multitude of contradictory claims in the literature.

However, one fundamental question has not been addressed in this paper: If the CC is not the overt realization of an intermediate copy in a movement chain, then what is it? The general skepticism in this paper regarding the standard view of wh-copying would seem to be in line with the Indirect Dependency Approach to wh-copying, whereby the intermediate and highest copies do not actually share a 'direct' link (created by movement, for example). While this view is a relatively marginal one in literature on the CC (but see den Dikken 2009, Koster 2009, Schippers 2010, 2012*b*), it is a widely adopted approach for wh-scope marking. The general reluctance to pursue an Indirect Dependency Approach for the CC presumably stems, on the one hand, from the fact that in the CC, unlike in scope marking constructions, the copied elements perfectly match in form (however, there are a numerous arguments for partial copying in Dutch: see Barbiers et al. 2009, Schippers 2010), which has the hallmarks of a direct, movement dependency. Furthermore, it is difficult to pursue the same analysis for wh-scope marking and the CC, as these are known to exhibit a number of crucial differences. As this paper has shown, there are a number of differences between long distance movement and the CC as well, so the task for future research is to identify which of these are non-trivial.

From the point of view of replicative processes, the status of the 'copying' involved in the CC remains an open issue. If our theory of movement gives us copies for free, then the mechanism for replication is already given. However,

we would then expect to find many more examples of replication of this kind. Instead, the CC manifests itself only in a relatively restricted number of contexts and in a surprisingly small number of languages, given the assumption that the Copy Theory of Movement is universal. For this reason, it is desirable to countenance alternative approaches to copying that are not inherently linked to movement (see Müller this volume). In sum, despite being widely cited as evidence for the Copy Theory of Movement, the exact nature of *wh*-copying still remains one of the many unsolved puzzles in syntax.

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# Replication of R-pronouns in German dialects

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## Abstract

A considerable number of German dialects exhibit doubled R-pronouns with pronominal adverbs (*dadamit*, *dadafür*, *dadagegen*). At first sight, this type of *in situ* replication seems to be completely redundant since its occurrence is independent of R-pronoun-extraction/movement. The main purpose of this paper is to account for (i) the difference between dialects with regard to replication of R-pronouns and (ii) why an (apparently redundant) process of replication occurs. Following Müller (2000a), who considers R-pronouns to be a repair phenomenon, we present an analysis in the framework of Optimality Theory. We argue that replication of R-pronouns is a consequence of different rankings of universal requirements like e.g. the *Inclusiveness Condition*, the *Lexical Integrity Hypothesis* and *Antilocality* and that the interaction of these constraints results in the occurrence of replication.

## 1. Introduction

German has two different kinds of pronouns in prepositional phrases. Either a regular personal pronoun follows the preposition (1), or the R-pronoun *da* appears in front of the preposition (2).

- (1) a. Fritz hat gestern [PP an [NP sie ]] gedacht.  
Fritz has yesterday at her thought  
'Fritz thought of her yesterday.'
- b. Maria hat damals [PP für [NP ihn ]] gestimmt.  
Maria has back.then for him voted  
'Maria voted for him back then.'

(Müller 2000a: 139)

- (2) a. Fritz hat gestern [PP da-r-an ] gedacht.  
Fritz has yesterday *da-r-at* thought  
'Fritz thought of that yesterday.'

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\*We are grateful to Gereon Müller, Fabian Heck, and Andrew Murphy for helpful discussion and suggestions.

- b. Maria hat damals [pp da-für ] gestimmt.  
 Maria has back.then da-for voted  
 'Maria voted for that back then.' (Müller 2000a: 140)

The term *R-pronoun* (originally coined by van Riemsdijk 1978 for similar elements in Dutch) refers to the elements *da* 'there' and the interrogative counterpart *wo* 'where'. In combination with a preposition, these form what is called a *pronominal adverb* or alternatively a *prepositional adverb*. *Da* and *wo* are termed R-pronouns since an epenthetic *r* is inserted if the adjacent preposition starts with a vowel (e.g. *da/wo-r-an*), see (3a) and (3b). There is also a distributionally more restricted form with the deictic *hier* 'here' (3c).

- (3) a. Fritz hat gestern da-r-an gedacht.  
 Fritz has yesterday da-r-at thought  
 'Fritz thought of that yesterday.'
- b. Wo-r-an hat Fritz gestern gedacht?  
 wo-r-at has Fritz yesterday thought  
 'What did Fritz think of yesterday?'
- c. Maria hat damals hier-für gestimmt.  
 Maria has back.then here-for voted  
 'Maria voted for this back then.'

For the most part, regular pronouns and R-pronouns are in complementary distribution. Wherever a regular pronoun can occur, an R-pronoun cannot (4) and vice versa (5).

- (4) a. Fritz hat gestern [pp an [NP sie ]] gedacht.  
 Fritz has yesterday at her though  
 'Fritz thought of her, yesterday.'  
 (sie = Maria)
- b. \*Fritz hat gestern [pp da-r-an ] gedacht.  
 (da = Maria)
- (5) a. \*Fritz hat gestern [pp an [NP es ]] gedacht.  
 Fritz has yesterday at it thought  
 'Fritz thought of it, yesterday.'  
 (es das Spiel 'the game')
- b. Fritz hat gestern [pp da-r-an ] gedacht.  
 (da = das Spiel 'the game')



- (8) a. Maria musste noch oft [PP da-r-an ] denken.  
 Maria must.PST still often da-r-at think  
 'Maria had to still often think of it.'  
 (*da* = *der Vorschlag* 'the proposal',  
 \**der Hausmeister* 'the caretaker',  
 ?*der Esel* 'the donkey')
- b. Maria musste noch oft [PP an ihn ] denken.  
 Maria must.PST still often at 3SG.MASC think  
 'Maria had to still often think of him.'  
 (*ihn* = *der Vorschlag* 'the proposal',  
*der Hausmeister* 'the caretaker',  
*der Esel* 'the donkey')
- (9) a. Ich bin [PP da-mit ] nicht richtig zufrieden.  
 I am da-with not right satisfied  
 'I am not really content with it.'  
 (*da* = *der Vorschlag* 'the proposal',  
 \**der Hausmeister* 'the caretaker',  
 ?*der Esel* 'the donkey')
- b. Ich bin [PP mit ihm ] nicht richtig zufrieden.  
 I am with 3SG.MASC not right satisfied  
 'I am not really content with him'  
 (*da* = *der Vorschlag* 'the proposal',  
*der Hausmeister* 'the caretaker',  
*der Esel* 'the donkey')
- (10) a. Maria musste noch oft [PP da-r-an ] denken.  
 Maria must.PST still often da-r-at think  
 'Maria had to still often think of it.'  
 (*da* = *die Ausstellung* 'the exhibition',  
 \**die Frau* 'the woman',  
 ?*die Katze* 'the cat')
- b. Maria musste noch oft [PP an sie ] denken.  
 Maria must.PST still often at 3SG.FEM think  
 'Maria had to still often think of her.'  
 (*sie* = *die Ausstellung* 'the exhibition',  
*die Frau* 'the woman',  
*die Katze* 'the cat')

- (11) a. Alle waren [PP da-von ] sehr beeindruckt.  
 all were *da*-by very impressed  
 ‘Everyone was very impressed by it.’  
 (*da* = *die Ausstellung* ‘the exhibition’,  
 \**die Frau* ‘the woman’,  
 ?*die Katze* ‘the cat’)
- b. Alle waren [PP von ihr ] sehr beeindruckt.  
 all were by 3SG.FEM very impressed  
 ‘Everyone was very impressed by her.’  
 (*ihr* = *die Ausstellung* ‘the exhibition’,  
*die Frau* ‘the woman’,  
*die Katze* ‘the cat’)

The overall generalisation in Müller (2000a) is the following:

- (12) In a PP there is
- obligatorily an NP pronoun with animate referents,
  - optionally an NP pronoun or an R-pronoun with inanimate non-neuter referents,
  - obligatorily an R-pronoun with *es*.

The important difference between regular NP pronouns and R-pronouns is that, while the former can never be dislocated out of the embedding PP (13), the latter are freely extractable and can therefore strand the preposition (14).

- (13) a. \*Fritz hat sie<sub>1</sub> gestern [PP an t<sub>1</sub> ] gedacht.  
 Fritz has her yesterday at thought  
 ‘Fritz thought of her yesterday.’
- b. \*Ihn<sub>1</sub> hat Maria damals [PP für t<sub>1</sub> ] gestimmt.  
 him has Maria back.then for voted  
 ‘For him Maria voted back then.’
- c. \*Wen<sub>1</sub> hat Maria damals [PP für t<sub>1</sub> ] gestimmt?  
 Whom has Maria back.then for voted  
 ‘Whom did Maria vote for back then?’ (Müller 2000a: 3)
- (14) a. Fritz hat da<sub>1</sub> gestern [PP t<sub>1</sub> (dr)-an ] gedacht.  
 Fritz has *da* yesterday *dr*-at thought  
 ‘Fritz thought of it yesterday.’

- b. Da<sub>1</sub> hat Maria damals [PP t<sub>1</sub> für ] gestimmt.  
*da* has Maria back.then for voted  
 ‘Maria voted for it back then.’
- c. Wo<sub>1</sub> hat Maria damals [PP t<sub>1</sub> für ] gestimmt?  
*wo* has Maria back.then for voted  
 ‘What did Maria vote for back then?’ (Müller 2000a: 3)

This phenomenon has already been discussed extensively in the literature, see e.g. Fanselow (1983, 1991), Koster (1987), Grewendorf (1989), Bayer (1990, 1991), Oppenrieder (1990), Trissler (1993, 1999) and Müller (1991, 2000a).<sup>1</sup>

## 2. R-pronoun replication

There is a related observation, however, that has not yet received much attention in the theoretical literature. In numerous varieties of German, we find that extraction of the R-pronoun does not strand the preposition. Instead, there are two exponents of the R-pronoun present, one inside the PP and another in the *Mittelfeld* (15a) or in the *Vorfeld* (15b, c).<sup>2</sup>

- (15) a. Fritz hat da nicht [PP da-mit ] gerechnet.  
 Fritz has *da* not *da*-with reckoned  
 ‘Fritz did not reckon with that.’
- b. Da hat Maria damals [PP da-für ] gestimmt.  
*da* has Maria back.then *da*-for voted  
 ‘Maria voted for it back then.’
- c. Da wusste Karl nichts [PP da-von ]  
*da* knew Karl nothing *da*-of  
 ‘Karl did not know anything of that.’ (Swabian German)

These doubling structures are considered colloquial in the first edition of the Duden Grammar (Duden 1959). While still mentioned in the third edition (Duden 1973), they no longer appear in subsequent editions. However, they are briefly described in the more theoretically oriented grammar of Eisenberg (1999) and in the diachronic literature, where they are often discussed in

<sup>1</sup>For discussion of the analogous phenomenon in Dutch see van Riemsdijk (1978).

<sup>2</sup>All examples tagged *Swabian German* are my own (K.B.). For the sake of convenience and since the examples are representative for many more German varieties, they have been adapted to Standard German orthography.

conjunction with stranding (see e.g. Paul 1919, Behaghel 1899, 1932, Dal 1966, Lockwood 1968).<sup>3</sup> Fleischer (2002) calls the construction exemplified by (15) *Distanzverdopplung* ‘distance doubling’. It has been reported for Westphalian, Rhenish Franconian, Middle Bavarian, Swabian, Thuringian, Upper Saxonian, Berlin, High Alemmanic, Lower Alemannic, North Bavarian, East Franconian, Lower Franconian, Silesian, Central Hessian, Moselle Franconian and numerous other dialects (for an even finer-grained areal distribution, see Fleischer 2002).

In most of these varieties, the R-pronoun is also doubled if it is not extracted. The two tokens then appear adjacent to each other and the preposition. The prepositional phrase can either stay *in situ* (26a) or be dislocated as a whole constituent (16b, c). Fleischer (2002) calls this construction *Kurze Verdopplung* ‘short doubling’. Extraction of both tokens while stranding the preposition is ungrammatical in all dialects (16d).

- (16) a. Fritz hat nicht [<sub>PP</sub> da-da-mit ] gerechnet.  
 Fritz has not        *da-da*-with    reckoned  
 ‘Fritz did not reckon with that.’
- b. [<sub>PP</sub> Da-da-für ] hat Maria damals    gestimmt.  
       *da-da*-for    has Maria back.then voted  
 ‘Maria voted for it back then.’
- c. [<sub>PP</sub> Da-da-von ] wusste Karl nichts.  
       *da-da*-of    knew    Karl nothing  
 ‘Karl did not know anything of that.’
- d. \*Da<sub>2</sub> da<sub>1</sub> wusste Karl nichts    [<sub>PP</sub> t<sub>2</sub> t<sub>1</sub> von ].  
       *da da* knew    Karl nothing            of  
 ‘Karl did not know anything of that.’                    (Swabian German)

This short doubling structure is very rarely discussed in German grammars.<sup>4</sup> It is briefly mentioned in Paul (1919) and Curme (1922) and also in the Duden (2009). However, they only consider pronominal adverbs built from vowel initial prepositions which besides the usual *r*-epenthesis (e.g. *da-r-auf*) often also show a second *d* before the *r* (i.e. *da-dr-auf*) that might be interpreted as a contracted copy of the R-pronoun (i.e. *da-d(a)-r-auf*). However, forms with *-dr-* are generally also possible in dialects that do not allow R-pronoun doubling.

<sup>3</sup> An overview over more descriptions of this construction in the dialectology literature is given by Fleischer (2002).

<sup>4</sup> In the dialectology literature, the short doubling structure is described more often, for references see Fleischer (2002).

The *d* in *-dr-* is therefore most likely not a reduced copy of the R-pronoun. Only Oppenrieder (1990) includes examples like the ones in (16) with consonant initial prepositions.

Doubling (short and distance) does not only apply to declarative pronominal adverbs with *da*, but also to their interrogative counterparts with *wo* 'where'. The examples in (17) show that *wo* behaves like *da* concerning extraction out of PP (stranding the preposition without any doubling) and pied-piping.

- (17) a.  $Wo_1$  hat Fritz nicht [<sub>PP</sub>  $t_1$  mit ] gerechnet?  
*wo* has Fritz not with reckoned  
 'What did Fritz not reckon with?'  
 b.  $Womit_1$  hat Fritz nicht  $t_1$  gerechnet?  
 c.  $Wo_1$  hat Maria damals [<sub>PP</sub>  $t_1$  für ] gestimmt?  
*wo* has Maria back.then for voted  
 'What did Maria vote for back then?'  
 d.  $Wofür_1$  hat Maria damals  $t_1$  gestimmt?  
 e.  $Wo$  wusste Karl nichts [<sub>PP</sub>  $t_1$  von ] ?  
*wo* knew Karl nothing of  
 'What did Karl know nothing of?'  
 f.  $Wovon_1$  wusste Karl nichts?

In the case of interrogative R-pronouns, however, *doubling* does not mean that there are two tokens of *wo* in the sentence, but that *wo* and *da* appear together. The examples in (18) illustrate distance doubling, those in (19) short doubling.

- (18) a.  $Wo$  hat Fritz nicht [<sub>PP</sub> *da*-mit ] gerechnet?  
*wo* has Fritz not *da*-with reckoned  
 'What did Fritz not reckon with?'  
 b.  $Wo$  hat Maria damals [<sub>PP</sub> *da*-für ] gestimmt?  
*wo* has Maria back.then *da*-for voted  
 'What did Maria vote for back then?'  
 c.  $Wo$  wusste Karl nichts [<sub>PP</sub> *da*-von ] ?  
*wo* knew Karl nothing *da*-of  
 'What did Karl know nothing of?' (Swabian German)
- (19) a. [<sub>PP</sub>  $Wo$ -*da*-mit ] hat Fritz nicht gerechnet?  
*wo-da*-with has Fritz not reckoned  
 'With what did Fritz not reckon?'

- b. [PP *Wo-da-für* ] hat Maria damals gestimmt?  
*wo-da-for* has Maria back.then voted  
 ‘For what did Maria vote back then?’
- c. [PP *Wo-da-von* ] wusste Karl nichts?  
*wo-da-of* knew Karl nothing of  
 ‘Of what did Karl nothing?’ (Swabian German)

Instead, sentences that contain two copies of *wo* are ungrammatical (20b, d) (independent of extraction of *wo*).

- (20) a. *Wo* ist Fritz allergisch [PP *da-gegen* ] ?  
*wo* is Fritz allergic *da-against*  
 ‘What is Fritz allergic to?’
- b. \**Wo* ist Fritz allergisch [PP *wo-gegen* ] ?  
*wo* is Fritz allergic *wo-against*  
 ‘What is Fritz allergic to?’
- c. [PP *Wo-da-gegen* ] ist Fritz allergisch?  
*wo-da-against* is Fritz allergic  
 ‘To what is Fritz allergic?’
- d. \*[PP *Wo-wo-gegen* ] ist Fritz allergisch?  
*wo-wo-against* is Fritz allergic  
 ‘To what is Fritz allergic?’ (Swabian German)

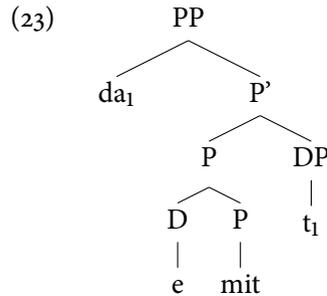
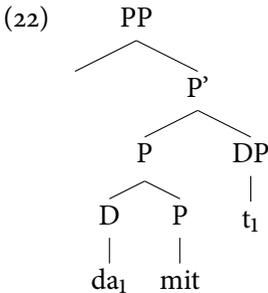
Pronominal adverbs with *hier* ‘here’ behave like those with *wo*. Doubling occurs regardless of whether there is extraction of *hier* (21a) or not (21c). However, the copy in base position is *da* and never a second *hier* (21b, d).

- (21) a. *Hier* möchte Fritz [PP *da-für* ] bezahlen.  
 here wants Fritz *da-for* pay  
 ‘Fritz wants to pay for that.’
- b. \**Hier* möchte Fritz [PP *hier-für* ] bezahlen.  
 here wants Fritz here-for pay  
 ‘Fritz wants to pay for that.’
- c. Fritz möchte [PP *hier-da-für* ] bezahlen.  
 Fritz wants here-*da-for* pay  
 ‘Fritz wants to pay for that.’
- d. \*Fritz möchte [PP *hier-hier-für* ] bezahlen.  
 Fritz wants here-here-for pay  
 ‘Fritz wants to pay for that.’ (Swabian German)

### 3. Analysis

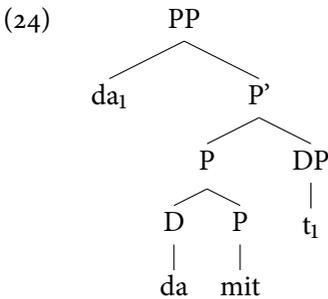
#### 3.1. The structure of R-pronouns and the doubling puzzle

Before we turn to our analysis we want to address the structure of pronominal adverbs. We follow Gallmann (1997), Müller (2000a) and Fleischer (2002) in assuming that R-pronouns are base-generated in the complement position of the preposition (for a different stance on the issue see Oppenrieder 1990, Trissler 1993 and Abels 2003). Since the R-pronoun is never spelled out in this position, it inevitably has to move out of there. Gallmann (1997) proposes that the R-pronoun has two options. It can either incorporate into the preposition (see Baker 1988 for incorporation) or move into the specifier position of the PP. In (22), the R-pronoun *da* has vacated the complement position and incorporated into the preposition resulting in a complex P-head. In (23) *da* has moved up into SpecPP while an empty element has been incorporated into P.



What is the benefit of having these two different structures? First, the stranding option can be easily explained. In the cases where *da* appears in the *Mittelfeld* or in the *Vorfeld*, the structure in (23) is the underlying one. *Da* is simply moved on from its position in SpecPP. This is an advantage compared to previous analyses which are based on incorporation of *da* into the verb (Abraham 1995) or on the concept of direct selection (Trissler 1993). These analyses presuppose verb adjacency of the stranded preposition. This presupposition poses serious problems for data where the preposition appears in the *Mittelfeld* but not at the left edge of the verb complex (for a detailed discussion of these proposals and its theoretical and empirical problems see Fleischer 2002). A desirable consequence of Gallmann's (1997) analysis is that extraction out of SpecPP is completely independent from the position of the verb. The second benefit

that Gallmann (1997) and Fleischer (2002) point out is, that short doubling (*dadamit*) directly follows from the structure proposed in (23). According to Gallmann (1997) and Fleischer (2002), the short doubling structure corresponds to the one in (23) with the difference that there is no empty element incorporated into P, 'sondern noch einmal ein *da*' (Fleischer 2002: 398) (translation: 'but yet another *da* again'). A few pages later, Fleischer (2002) describes the short doubling structure as follows: 'Hier ist neben Inkorporation in P<sup>0</sup> auch SpecPP besetzt' (Fleischer 2002: 405) (translation: 'As well as incorporation into P<sup>0</sup>, SpecPP is also occupied'). In this description, it seems that the underlying structure is the one in (22) plus *da* in the specifier of PP. Both descriptions lead to the structure in (24).



We agree that the structure in (24), assumed by Gallmann (1997) and Fleischer (2002), is a suitable representation of the short doubling construction. However, we do not agree with the statement that it follows directly or automatically from the possibility of two different movement types (incorporation into P and movement to SpecPP). As far as we understand, Gallmann (1997) and Fleischer (2002) argue in favour of these two different movement types *because* doubling can be derived under this assumption (see Fleischer 2002: 404). To independently justify the existence of two different positions for R-pronouns, Fleischer (2002) offers the argument that only clitic or proclitic pronouns can be incorporated into P<sup>0</sup> (he regards *dr* in e.g. *da-dr-auf* as a proclitic version of *da* with a reduced vowel). In contrast, full pronouns (like unreduced *da* in e.g. *da-r-auf*) cannot be incorporated into P<sup>0</sup> and therefore move to SpecPP. We do not see the reason why this should be the case. Furthermore, the distinction between full *da* and clitic *d(a)* seems somewhat *ad hoc* and the status of *d* in *dr* as a reduced second syntactic token of *da* is at least debatable as already mentioned in section 2 above. But even if this account were right, it

does not provide an answer to the question of why doubling emerges. Under Fleischer's (2002) assumptions, reduced clitic pronouns are always expected to be incorporated into P<sup>0</sup> and full pronouns are expected to move to SpecPP. If we find both positions occupied, then there must have been two R-pronouns to start with, one clitic and one full version. The doubling itself thus remains unexplained. What Fleischer (2002) does not discuss at all is *why* incorporation and Comp-to-Spec movement should both apply to one R-pronoun in one structure and, if they did, how this leads to a doubling of the R-pronoun. The advantage or benefit of having *da* in SpecPP obviously is the fact that it can (still) be extracted out of this position. This is needed for the cases of stranding and for distance doubling. But in the case of short doubling both *da*-elements stay in situ next to the preposition. The proposed structure (24) thus raises the following questions:

- (25) a. If *da* does not appear in the *Mittel*- or the *Vorfeld* (i.e. is not extracted out of PP), why should it leave the complement position and move into SpecPP/incorporate into P at all?
- b. If there is an independent reason for *da* to leave the complement position (see e.g. Müller 2000a) and move up to SpecPP, why is incorporation of an additional *da* required or desirable?  
Or to put it differently: If extraction of *da* out of the complement position is required, why is incorporation of *da* into P not enough to satisfy this requirement?

Gallmann (1997) and Fleischer (2002) do not address these questions, but at first sight the application of *both* movement types, incorporation and Comp-to-Spec movement, seems to be completely redundant. In our opinion, an analysis of German R-pronouns should ideally account for (i) the difference between the distribution of R-pronouns and regular NP pronouns with regard to their movement properties, (ii) the difference between dialects with regard to replication of R-pronouns and (iii) it should explain why an (apparently redundant) replication process occurs. Issue (i) is addressed by Müller (2000a), which is briefly summarized in section 3.2. Concerning issue (ii), Gallmann (1997) and Fleischer (2002) simply restate the facts: dialects with doubling incorporate 'noch einmal ein *da*' (Fleischer 2002: 398) ('yet another *da* again'), while this option is not available in dialects without doubling. In section 3.3, we will provide an account of the phenomenon of R-pronoun replication which is

in line with Müller's (2000a) account for the distribution of R-pronouns and corroborates the proposed structure for short doubling of Gallmann (1997) and Fleischer (2002). In addition, it will provide an explanation for replication of R-pronouns based on the interaction of conflicting constraints in OT. Dialectal differences will be accounted for in a principled way by rerankings of these constraints.

### 3.2. R-pronouns vs. regular NP pronouns (Müller 2000a)

In Müller (2000a), R-pronouns are analysed as a repair to what is called the 'Wackernagel-Ross dilemma'. The basic insight is that two well-established constraints of German syntax lead to a dilemma in the case of PP-internal NP pronouns because they cannot both be respected by one and the same pronoun at the same time. The first constraint states that weak NP pronouns need to be in a position at the left periphery of the *Mittelfeld*, an observation that goes back to Wackernagel (1892). That position is consequently called the 'Wackernagel position'. PP-internal weak NP pronouns would thus have to move out of PP into that position. Such a movement, however, is foreclosed by the second constraint that PPs are islands in German. Therefore, nothing that receives case from the preposition can be extracted out of a PP. A weak NP pronoun that starts out as the complement of a PP will inevitably violate one of the two constraints. Such a conflict can be resolved by attributing a greater importance to one of the constraints as implemented by ranking the constraints in an Optimality Theoretic framework (Prince & Smolensky 1993/2004), which is what is done in Müller (2000a). However, as one can easily see from the data above, neither does the NP pronoun move to the Wackernagel position in violation of the PP-island, nor does it stay in the PP in violation of the Wackernagel requirement. What actually happens is that a repair form *da*, the R-pronoun, is substituted. In OT terms, this means that replacing the NP pronoun satisfies both of the two constraints. There must, however, be an even lower ranked constraint, like the Inclusiveness Condition, that punishes *da*-insertion. Since the R-pronoun is by definition not a regular NP pronoun, it is not subject to the Wackernagel constraint and satisfies it vacuously. Additionally, it does not receive case from the preposition and can thus be extracted out of the PP, which explains why displacement of *da* is possible. The kind of NP pronouns that can/must be replaced by the R-pronoun is regulated by a hierarchy of NP pronoun classes which is encoded as a set of

inherently ranked subconstraints. Thus, Müller's (2000a) analysis elegantly derives the distribution of the R-pronoun and its differences compared to the NP pronouns.

### 3.3. An account of R-pronoun replication

From a very intuitive point of view, one might attribute the existence of *da*-replication to the fact that German disallows preposition stranding (at least Standard German and all German varieties that do not have the stranding option). It seems to be obvious that a second *da* is inserted to prevent the preposition from being stranded in the cases where *da* moves out of the PP due to topicalisation or scrambling. This explanation works well for the distance doubling construction. However, it does not account for short doubling, the case of replication where both copies of the R-pronoun stay inside the PP, see the examples in (16), repeated in (26) below for the reader's convenience.

- (26) a. Fritz hat nicht [<sub>PP</sub> da-da-mit ] gerechnet.  
 Fritz has not *da-da*-with reckoned  
 'Fritz did not reckon with that.'
- b. [<sub>PP</sub> Da-da-für ] hat Maria damals gestimmt.  
*da-da*-for has Maria back.then voted  
 'Maria voted for it back then.'
- c. [<sub>PP</sub> Da-da-von ] wusste Karl nichts.  
*da-da*-of knew Karl nothing  
 'Karl did not know anything of that.' (Swabian German)

In these cases, the preposition is never stranded and it is not possible, given the explanation above, to insert a second *da* or rather make a copy of it. Thus, as (26) shows, whatever the reason for replication is, it cannot be dependent on the R-pronoun leaving the PP, i.e. stranding the preposition. We propose that all previous analyses were right to at least some degree and that what actually happens can be explained by a melange of these analyses. Following Müller (2000a), we regard the R-pronoun as a repair form that is not selected by the preposition. It is inserted to avoid a violation of the requirement that elements in the complement position of a head be selected by that head, an assumption rooted in Chomsky's (1981) *Projection Principle*. The R-pronoun therefore cannot stay in its position.

In order to rectify this situation, the R-pronoun can undergo two possible types of movement (following Gallmann 1997 and Fleischer 2002): It can move from its complement position into the specifier of PP or it can incorporate into the P-head. However, we will argue that both possibilities do not come for free but rather conflict with different requirements on R-pronouns and movement operations in general. Concerning Comp-to-Spec movement, the ban on ‘antilocal’ movement (see Grohmann 2003, Abels 2003 and Ticio 2005) forbids movement from complement position into the specifier position within the same phrase. Incorporation, on the other hand, is also costly since, as a consequence, *da* is no longer accessible for further processes like extraction out of the PP (see Lapointe 1981, more detailed explanation below). In sum, we claim that in the case of the derivation of a pronominal adverb conflicting requirements have to be fulfilled. In Optimality Theory (OT), conflicting requirements can be modeled straightforwardly as ranked and violable constraints. Thus, OT is well suited to tackle parts (ii) and (iii) of the aforementioned requirements for an analysis of doubling. Cross-linguistic, or for that matter cross-dialectal, differences can be accounted for by simply reranking universal constraints. Our analysis of R-pronoun replication will thus be formulated in Optimality Theory. In (27) and (28) the already mentioned requirements *complement selection* and *antilocality* are reformulated as violable OT-constraints:

- (27) CO(MPLEMENT)-SEL(ECTION)  
Assign a violation for every element in a complement position of a head that is not selected by that head.
- (28) ANTILOCALITY (A-LOC)  
Assign a violation for every movement from complement position into specifier position of the same head.

A further requirement we want to consider is the *Lexical Integrity Hypothesis*, first proposed by Lapointe (1981). It states that syntactic operations do not have access to the internal structure of words. It has been reformulated in a number of different ways, e.g. as part of *Revised Lexical Integrity* stating that ‘syntactic rules have no access to the internal structure of X<sup>0</sup> categories’ (Spencer 2005: 81). According to this principle, extraction out of complex heads (excorporation) is not allowed. We reformulate this principle as a violable constraint against traces in complex heads (29).

(29) \* $[_{X^0} t]$ 

Assign a violation for every trace inside a complex head.

The fourth constraint that influences the derivation is one against the creation of copies, \*COPY. It can be understood as a more specific version of the Inclusiveness Condition (Chomsky 1995) prohibiting the introduction of material not present in the numeration.

(30) \*COPY

Assign a violation for every copy of an element.

Crucially, we assume that copies are not created as a consequence of movement, as is the case in the Copy Theory of Movement. Rather, GEN consists of the basic minimalist operations Merge and Agree, plus a dedicated operation Copy, as argued for by Müller (this volume).

The last constraint we introduce concerns the status of incorporated elements with respect to their referential properties. R-pronouns within pronominal adverbs always refer either deictically or anaphorically/cataphorically, see examples in (31) (taken from Duden 2009: 581).

- (31) a. Leg(e) die Decke bitte darauf!  
 lay the blanket please thereon  
 ‘Please put the blanket on there.’ (deictic)
- b. Das Thema ist noch nicht erschöpft; darüber müssen wir  
 the topic is yet not tired.out; there.over must we  
 nochmal sprechen.  
 again speak  
 ‘The topic isn’t exhausted yet; we have to talk about it again some  
 time.’ (anaphoric)
- c. Sie dachte nicht daran, aufzuräumen.  
 she thought not there.on tidy.up-INF  
 ‘She refused to tidy up.’ (cataphoric)

An R-pronoun can refer to different categories. Anaphoric reference is possible to nouns, noun phrases or whole clauses. In the case of cataphoric reference, the pronominal adverb can be the correlate of a subordinate clause, a main clause or of a group of infinitivals (for examples see Duden 2009: 581). In the literature, it has already been observed that anaphoric reference to incorporated

nouns is strongly disfavoured (Mithun 2010). For the Austronesian language of the Philippines, Kapamganpam, Mithun notes that ‘there is no evidence that the incorporated nominal ever serves as an antecedent for subsequent reference. When speakers wish to refer to an entity evoked in this construction, the noun is repeated’ (Mithun 2010: 11). The same observation holds for Mohawk, the Iroquoian language of northeastern North America and for Central Alaskan Yup’ik, an Eskimo-Aleut language of Alaska. Note that these three languages are genetically and areally unrelated.

Krifka et al. (1995) provide evidence that this generalization also holds for German. They describe German as ‘a language in which noun incorporation is not infrequent. Here we find that with the incorporated nouns, anaphoric reference to objects *is* blocked indeed [...]’. They give the following example (our glosses).

- (32) Hans fuhr Mercedes<sub>i</sub>. \*Er<sub>i</sub> war grau.  
 Hans drove Mercedes. He was grey.  
 ‘Hans always drove Mercedes cars. It was grey.’

Krifka et al. (1995: 88) claim the following about the above example:

The noun *Mercedes* [...] is incorporated, even though this is not reflected in the orthography. (For example, it is a bare word stem which cannot be extended to a phrase – e.g. \**Hans fuhr schnellen Mercedes*; this is a clear sign of incorporation [...]).

It seems that the failure to establish a reference relation into incorporation structures is a common property of language. Furthermore, it seems plausible to attribute this to a more general referential non-accessibility of incorporated elements. Hence, it also holds for pronominal elements like R-pronouns. Consequently, we assume that incorporated (pro)nominal elements can neither refer nor be referred to by other elements. The resulting demand that anaphorically, cataphorically or deictically referring elements need to be outside of a complex head in order to be referential is formulated as the constraint \*PRONOUN-INCORPORATION.

- (33) \*PR(ONOUN)-INC(ORPORATION)  
 Assign a violation for every anaphorically or cataphorically referring element that is entirely included in a complex head.

In contrast to standard global optimization processes, which assume that optimization applies to complete structures (see Grimshaw 1997, Pesetsky 1998, Legendre et al. 1998 among others), the optimization which is assumed here, is more local in the sense that it applies iteratively to small portions of structures. We assume that evaluation takes place at every phrase (see Müller 2000*b*, Heck & Müller 2000, 2013*a,b*, Fischer 2004 and Heck 2008). Replication of R-pronouns is then the result of the following ranking of the above-mentioned constraints:

- (34) CO-SEL  $\gg$  A-LOC  $\gg$  \* $[_{X^0} t]$   $\gg$  \*PR-INC  $\gg$  \*COPY

The competition for the evaluation at PP looks as in (35) for the cases where the pronominal adverb stays inside the PP.

- (35) *Optimization of the PP in short doubling*

[ <sub>PP</sub> mit da ]	CO-SEL	A-LOC	* $[_{X^0} t]$	*PR-INC	*COPY
a. [ <sub>PP</sub> mit da ]	*!				
b. [ <sub>PP</sub> da <sub>1</sub> [ <sub>P'</sub> mit t <sub>1</sub> ] ]		*!			
c. [ <sub>PP</sub> [ <sub>P</sub> da <sub>1</sub> mit ] t <sub>1</sub> ] ]				*!	
d. [ <sub>PP</sub> da <sub>1</sub> [ <sub>P'</sub> [ <sub>P</sub> t <sub>1</sub> mit ] t <sub>1</sub> ] ] ]			*!		
 e. [ <sub>PP</sub> da <sub>1</sub> [ <sub>P'</sub> [ <sub>P</sub> da <sub>1</sub> mit ] t <sub>1</sub> ] ] ]					*

Candidate (a) is completely faithful and therefore violates CO-SEL because the R-pronoun in the complement position of the preposition is not selected by it. In candidate (b) the R-pronoun has undergone movement from the complement to the specifier of the preposition in violation of A-LOC. Candidate (c) is out because the pronoun *da* has incorporated into the preposition and is now fully included in the complex P head, i.e. there is no part or token of the R-pronoun that is outside of that complex head and thereby accessible to the syntax. Furthermore, in candidate (d) the R-pronoun has first incorporated into the preposition and then excorporated into the specifier of PP leaving a trace inside the complex head in violation of \* $[_{X^0} t]$ . This leaves candidate (e) as the optimal candidate, where incorporation is followed by excorporation with the latter leaving behind a copy rather than a trace. This candidate satisfies CO-SEL because the unselected element is no longer in P's complement position

and A-LOC because there is no direct movement from complement to specifier. In order to satisfy \*PR-INC, it leaves behind a copy rather than a trace which violates only the lower ranked constraint \*COPY.

When there is movement of the R-pronoun such as scrambling or topicalisation, there is a general optionality between movement of the R-pronoun alone or movement of the whole PP (pied-piping). Following Heck (2008), this optionality goes back to an optionality of feature percolation. The movement-triggering feature that is present on the R-pronoun may or may not percolate up to the PP-level. If it percolates up, the whole PP is displaced. If it does not percolate, only the R-pronoun is moved out of SpecPP. A high-ranked constraint such as TOP(IC)-CRIT(ERION) ensures that elements that bear movement-triggering features actually move to a position where they are licensed. This movement crucially has to take place via intermediate movement steps (i.e. specifiers of intervening phase heads) due to the Phase Impenetrability Condition (Chomsky 2000, 2001). Direct movement out of the complement of a preposition without going via its specifier is thus not possible even though it would satisfy CO-SEL without incurring any violations of the other four constraints. Also, since evaluation takes place at every phrase, the PP undergoes optimization anyway, before anything is extracted from it. Any movement-requiring constraints like the Topic Criterion will be violated by all candidates at this point (36). Therefore, topicalisation and scrambling movements do not interfere with any of the five constraints that regulate PP-internal affairs. Hence, whether the R-pronoun leaves the PP or the whole PP moves has no effect on whether a copy is made or not.

(36) *Optimization of the PP in distance doubling/pied-piping*

	TOP-CRIT	CO-SEL	A-LOC	*[X <sup>0</sup> t]	*PR-INC	*COPY
[ <sub>PP</sub> mit da <sup>[+top]</sup> ]						
a. [ <sub>PP</sub> mit da <sup>[+top]</sup> ]	*	*!				
b. [ <sub>PP</sub> da <sub>1</sub> <sup>[+top]</sup> [ <sub>P'</sub> mit t <sub>1</sub> ] ]	*		*!			
c. [ <sub>PP</sub> [ <sub>P</sub> da <sub>1</sub> <sup>[+top]</sup> mit ] t <sub>1</sub> ]	*				*!	
d. [ <sub>PP</sub> da <sub>1</sub> <sup>[+top]</sup> [ <sub>P'</sub> [ <sub>P</sub> t <sub>1</sub> mit ] t <sub>1</sub> ] ]	*			*!		
 e. [ <sub>PP</sub> da <sub>1</sub> <sup>[+top]</sup> [ <sub>P'</sub> [ <sub>P</sub> da <sub>1</sub> mit ] t <sub>1</sub> ] ]	*					*

Another crucial point of our analysis can be observed in candidate (e): copying of an element does not affect structure-building or movement-triggering features. If it did, we would expect the lower copy of the R-pronoun to move into a position where a [+topic] feature is licensed just as the original does. This, however, never happens as shown by the ungrammaticality of (37).

- (37) \*Da<sub>1</sub> hat Fritz da<sub>1</sub> nicht [<sub>PP</sub> t<sub>1</sub> mit ] gerechnet.  
*da* has Fritz *da* not with reckoned  
 ‘Fritz did not reckon with that.’

This assumption is further corroborated by doubling data of interrogative R-pronouns like (38). Here, the copy of the wh-R-pronoun that stays low does not show any overt exponence of the [+wh] feature which leads us to conclude that it does not bear such a feature at all.

- (38) Wo ist Fritz allergisch [<sub>PP</sub> da-gegen ] ?  
 where is Fritz allergic *da*-to  
 ‘What is Fritz allergic to?’

In other words, *wo* is just *da* with a [+wh] feature.<sup>5</sup> The derivation evaluation of the PP of (38) would thus be (39).

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<sup>5</sup> Gallmann (1997) presents a similar proposal concerning interrogatives: in order to account for the identity of R-pronouns in the doubling cases he assumes spec-head-agreement between the R-pronoun that has moved to SpecPP and the element that has incorporated into the complex P-head. However, as we have already seen, if SpecPP is filled by the interrogative *wo*, in the complex P-head it is always *da* that appears, never *wo*. He concludes: ‘Als Kongruenzmorpheme sind *da-*, *dar-*, *dr-* offenbar hinsichtlich Interrogativität unterspezifiziert’ (Gallmann 1997: 46) (translation: As agreement morphemes *da-*, *dar-*, *dr-* are obviously underspecified with regard to interrogativity).

(39) Optimization of the PP in doubling of an interrogative R-pronoun

[ <sub>PP</sub> gegen da <sup>[+wh]</sup> ]	WH-CRIT	CO-SEL	A-LOC	*[ <sub>X<sup>0</sup></sub> t ]	*PR-INC	*COPY
a. [ <sub>PP</sub> gegen da <sup>[+wh]</sup> ]	*	*!				
b. [ <sub>PP</sub> da <sub>1</sub> <sup>[+wh]</sup> [ <sub>P'</sub> gegen t <sub>1</sub> ]	*		*!			
c. [ <sub>PP</sub> [ <sub>P</sub> da <sub>1</sub> <sup>[+wh]</sup> gegen ] t <sub>1</sub> ]	*				*!	
d. [ <sub>PP</sub> da <sub>1</sub> <sup>[+wh]</sup> [ <sub>P'</sub> [ <sub>P</sub> t <sub>1</sub> gegen ] t <sub>1</sub> ]]	*			*!		
 e. [ <sub>PP</sub> da <sub>1</sub> <sup>[+wh]</sup> [ <sub>P'</sub> [ <sub>P</sub> da <sub>1</sub> gegen ] t <sub>1</sub> ]]	*					*

3.4. Dialects without replication

As already pointed out above, many (mainly northern) dialects do not show R-pronoun replication. Instead, they display preposition stranding in the cases where the R-pronoun moves out of the PP. In the present analysis this can be easily accounted for by reranking \*COPY and \*[<sub>X<sup>0</sup></sub> t ]. In order to satisfy CO-SEL, A-LOC, and \*PR-INC it is not allowed to make a copy, but it is allowed to excorporate by leaving a trace.

(40) Optimization of the PP in non-doubling dialects

[ <sub>PP</sub> mit da ]	CO-SEL	A-LOC	*COPY	*PR-INC	*[ <sub>X<sup>0</sup></sub> t ]
a. [ <sub>PP</sub> mit da ]	*!				
b. [ <sub>PP</sub> da <sub>1</sub> [ <sub>P'</sub> mit t <sub>1</sub> ]		*!			
c. [ <sub>PP</sub> [ <sub>P</sub> da <sub>1</sub> mit ] t <sub>1</sub> ]				*!	
 d. [ <sub>PP</sub> da <sub>1</sub> [ <sub>P'</sub> [ <sub>P</sub> t <sub>1</sub> mit ] t <sub>1</sub> ]]					*
e. [ <sub>PP</sub> da <sub>1</sub> [ <sub>P'</sub> [ <sub>P</sub> da <sub>1</sub> mit ] t <sub>1</sub> ]]			*!		

In those dialects, candidate (d) with a single R-pronoun in SpecPP, wins the competition. Further extraction of the R-pronoun and hence stranding of the preposition is unproblematic since it already resides in the specifier of the phrase (this is analogous to what Gallmann 1997 and Fleischer 2002 propose). Again, as mentioned for the dialects with replication, movement of the R-pronoun or the whole PP does not interfere with PP-internal evaluation.

## (41) Optimization of the PP in non-doubling dialects (P-stranding/pied-piping)

	TOP-CRIT	CO-SEL	A-LOC	*COPY	*PR-INC	*[X <sup>0</sup> t]
[ <sub>PP</sub> mit da <sup>[+top]</sup> ]						
a. [ <sub>PP</sub> mit da <sup>[+top]</sup> ]	*	*!				
b. [ <sub>PP</sub> da <sub>1</sub> <sup>[+top]</sup> [ <sub>P'</sub> mit t <sub>1</sub> ]	*		*!			
c. [ <sub>PP</sub> [ <sub>P</sub> da <sub>1</sub> <sup>[+top]</sup> mit ] t <sub>1</sub> ]	*				*!	
 d. [ <sub>PP</sub> da <sub>1</sub> <sup>[+top]</sup> [ <sub>P'</sub> [ <sub>P</sub> t <sub>1</sub> mit ] t <sub>1</sub> ]]	*					*
e. [ <sub>PP</sub> da <sub>1</sub> <sup>[+top]</sup> [ <sub>P'</sub> [ <sub>P</sub> da <sub>1</sub> mit ] t <sub>1</sub> ]]	*			*!		

Thus, as long as there is no higher ranked constraint against preposition stranding that might be violated by extraction of the R-pronoun, splitting the pronominal adverb is possible in those dialects.

#### 4. Typological predictions

A central aspect of Optimality Theory is that all natural languages can be described by different rankings of a set of universal constraints. Hence, an OT analysis always entails a prediction about possible languages that come about by a reranking of the proposed constraints. In our case, there are five constraint and therefore  $5! = 120$  different rankings which give rise to a factorial typology of five different surface patterns (dialects) represented by the five candidates in (40) (calculated in OTWorkplace\_X\_66, Prince et al. 2014). Each dialect is the common result of 24 different rankings. However, one of these predicted dialects does not seem to exist: An R-pronoun following its preposition as in candidate (a) is ungrammatical in any dialect of German. Since this candidate is ruled out by CO-SEL, we are forced to assume that this constraint is undominated. Of the remaining four dialect types, those represented by candidates (b) and (d) are not easily distinguishable on the surface. Both show no replication of the R-pronoun and both allow for splitting of the pronominal adverb and thus stranding of the preposition. The difference between them is that movement of the R-pronoun into the specifier proceeds via incorporation into P followed by excorporation in the dialect represented by candidate (d), while there is direct antilocal Comp-to-Spec movement in the dialect illustrated by candidate (b). In any case, those patterns are instantiated

by many northern dialects that show pronominal adverb splitting. The dialect type represented by candidate (c) could be manifested by Standard German that is usually claimed to not allow split pronominal adverbs. In this type, the R-pronoun incorporates into the preposition forming a complex P-head with no possibility of excorporating it again. Hence, it is not accessible for separate movement in syntax anymore. However, in this position, *da* should also not be able to refer in Standard German, contrary to fact. Therefore, dialect type C seems not to be instantiated by an existing dialect of German. As a further consequence, there is now apparently no candidate representing so-called Standard German, where allegedly neither R-pronoun doubling nor pronominal adverb splitting is possible. However, the status of Standard German is somewhat unclear to us. Usually, the German spoken in the area of Hannover in Lower Saxony is regarded as standard. Splitting of a pronominal adverb, nonetheless seems to be available to speakers from that region, albeit to a lesser degree. We thus conclude that the ban on split pronominal adverbs in Standard German is prescriptive in nature rather than a *bona fide* grammatical constraint. What is termed Standard German is therefore well represented by candidate (b) or candidate (d). The last dialect type which is exemplified by candidate (e) is, of course, instantiated by all those dialects that show doubling of the R-pronoun. Crucially, the analysis predicts that whenever there is doubling in a dialect there also is the possibility of extracting one copy of the R-pronoun from the PP. A prediction that is borne out to our knowledge.

## 5. Conclusions

While the exceptional extractability of German R-pronouns out of PPs, which usually constitute islands, has hitherto received a lot of attention, an equally interesting fact, replication of R-pronouns in some dialects has, to the extent it has been noticed at all, been largely neglected in the theoretical literature. The few analyses that there are either remain rather descriptive or provide only superficial representational analyses of the structure of the doubling construction. In this paper, we presented an analysis in the framework of Optimality Theory that explains the different distribution of R-pronouns and NP pronouns with regard to their movement properties as a consequence of their status as a repair, the difference between dialects as a consequence of different constraint rankings, and the occurrence of an apparently redundant

replication as a consequence of an interaction of constraints that force the R-pronoun to move to the specifier via incorporation leading to the creation of a copy. Under this analysis, the replication of an R-pronoun emerges not as a quirk of grammar, but as an expected result of expected rankings of universal constraints.

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# Noun formation by verb reduplication in Italian

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## Abstract

This paper presents novel data from a construction in Italian, the V-V N-compound (VVn), where agentive nouns are formed by doubling the base form of a verb. The VVn will be shown to be restricted by both syntactic and phonological restrictions. On the basis of these, a syntactic account will be given, where the VVn is a particular subtype of normal agentive VN-compounds, namely one which takes a non-lexical item as its internal argument. The conflicting morphological structure will lead to replication of the verb root to ultimately form the VVn.

## 1. Introduction

In Italian, nouns can be formed by reduplicating a verb, what I will call V-V N-compounds (VVn). A famous example was provided by former Italian prime minister Silvio Berlusconi's parties, also called the *bunga-bunga*, a scandal widely reported on Italian and European media in 2010. *Bunga*, or *bungare* as a verb, does not really exist. Regardless, the general meaning of such nominals is one of intense repetition so that there was a lot of *bunga*-ing going on at those parties. The VVn is formed by doubling the base form of a verb, which coincides with the 2nd singular imperative form.<sup>1,2</sup>

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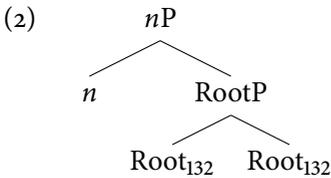
<sup>1</sup> I am a native speaker of Italian (southern Tuscan regional standard); the judgements are my own and were checked with two further native speakers.

<sup>2</sup> A remark should be made that this is somewhat playful language. The most productive environment is the exclamative introduced by *è tutto un* 'it's all a' as in (1a), which may be uttered at low level football matches, where the lack of skills leads the players to be exaggeratedly physical. When a VVn is not part of the exclamative, my feeling is that they need to be previously introduced so that they become 'a thing' to refer to. (1b), e.g., could be introduced by a sentence like *muoh, ogni volta che andiamo a quel bar beviamo il mondo... lo voglio chiamare il trinka-trinka sto bar* 'wow, every time we go to that bar, we drink A LOT... I want to call this place the *trinka-trinka*.'

(1) *V-V N-compounds*

- a. *É tutto un tonfa-tonfa qua!*  
 it's all a hit-hit here  
 'There's a lot of hitting going on here.'
- b. *Oh, ma si vole anda' al trinka-trinka?*  
 hey but REFL want.3SG go.INF to.the drink-drink  
 'Shall we go to the 'drink-a-lot' (bar)?'

The reason why I think this construction is interesting, is that two obvious analyses one can give to this construction both face serious challenges. One idea is that the root is multiply merged in the syntax to express a multitude of events and another that the verb is simply copied by phonology. Let us consider first the simple syntactic approach. Taking an approach based on Distributed Morphology (Halle & Marantz 1993),<sup>3</sup> one could posit the structure in (2). Two instances of the same verbal root are merged together and then the result is merged with the nominalising head *n*.<sup>4</sup> If it mattered that the verbal roots be verbs, the roots may first be merged with the category *v*.



The challenge, however, is that V-V compounds generally do not exist in Italian in the same way as they do in other languages and neither does (V-) reduplication, i.e. V-V compounding and reduplication are not productive processes in Italian. For one, even though verbs are doubled to form a noun, the same doubling cannot be used to express verbal morphology, cf. Italian (3a) vs. Haitian (3b) (Harbour 2008: 854).

<sup>3</sup>For a general overview see Harley & Noyer (1999), Embick & Noyer (2007), Bank et al. (2012).

<sup>4</sup>I will largely ignore the difference between analytical and synthetic compounds and the related issues of head movement, here, and limit myself to considerations about the structure that is base-generated for these nouns. For discussion of synthetic vs. analytical N-N compounds in DM see e.g. Harley (2008).

- (3) a. \*Il giocatore tonfa tonfa.  
           the player hits hits  
           (Intended) ‘The player plays very physically.’  
       b. Bouki ap kouri kouri  
           Bouki PROG run run

In addition, phonological restrictions exist concerning the number of syllables of the verb. This makes a pure syntactic approach dubious if phonological information is not present in syntax and not able to influence merge. This seems to suggest that some kind of replicative process that can be restricted by phonological constraints must be at work here. However, treating the doubling as the result of a purely morpho-phonological operation also faces a serious problem: there are syntactic restrictions on the kind of verbal roots that may participate in this process. This leads back to the syntactic approach and to an apparent paradox. I will propose to solve this paradox by showing that the construction exhibits an interesting parallel to another process of noun formation in Italian, which consists in compounding a transitive verb with an object – the Romance equivalent of English *truck driver* compounds.<sup>5</sup>

## 2. Properties of VVn formation

There are mainly two restrictions on VVn formation: a syntactic one and a phonological one, both restricting the set of possible verbal roots to be used for this construction.<sup>6</sup>

### 2.1. Metrics

The phonological restriction regards the metrics of the root. Only bisyllabic verbs can participate in the process. This is shown by the ungrammaticality of the examples in (4).

- (4) a. \*uno sgranocchia-sgranocchia [zgra.nək.kja-zgra.nək.kja]  
           a crunch-crunch

<sup>5</sup>See Snyder (in press: chap. 6.1) for a selective review.

<sup>6</sup>In addition, the fact whether the verb inflects regularly or not plays a role: as far as I could think, there is no irregular verb that can be used in this construction.

- b. \*un trasporta-trasporta [tras.pɔr.ta-tras.pɔr.ta]  
 a transport-transport
- c. \*un raccatta-raccatta [rak.kat.ta-rak.kat.ta]  
 a pick.up-pick.up

In addition, this restriction does not seem to be lexical but rather the outcome of some form of repair. In fact, trisyllabic verbs that begin with a vowel that can be deleted by hiatus – or assimilated to [a], though somewhat more marginally – can be successfully employed to form VVn compounds. This is shown in (5). If this is the correct analysis, this also indicates that the left form is the base and the right one is the reduplicant: it is the right form which is reduced to a bisyllabic form, complying with the requirement.

- (5) a. un ingolla-ingolla [iŋ.gol.laŋ.gol.la]  
 a swallow-swallow
- b. ?un arreda-arreda [ar.re:.dar.re:.da]  
 a furnish-furnish

## 2.2. Argument structure

The syntactic restriction is on the verb's argument structure. In fact, only transitive and unergative verbs can be used in this process. The unaccusative *cascare* in (6a) and the true ditransitive *mostrare* in (6d) lead to ungrammatical results; the unergative *correre* in (6b) and the transitive *mangiare* in (6c) are fine.

- (6) a. \*un casca-casca  
 a fall-fall
- b. un corri-corri  
 a run-run
- c. un mangia-mangia  
 an eat-eat
- d. \*un mostra-mostra  
 a show-show

For homophonous causative/anti-causative pairings, only the causative but not the unaccusative reading is available when used in the VVn. In (7), the verb

*schiantare* ‘explode/make explode’ can only be interpreted as ‘make explode’ (7a), not as ‘explode’ (or its idiomatic meaning ‘die’) (7b).<sup>7</sup>

- (7) a. uno schianta-schianta  
       a make.explode-make.explode  
       b. \*uno schianta-schianta  
       a die-die

Especially the syntactic restriction seems peculiar at first. What differentiates transitive and unergative verbs from unaccusative verbs is that they both have an external argument. What differentiates them from a true ditransitive is a bit less obvious. For one, transitive verbs take only one internal argument. In parallel, many unergative verbs can be viewed as taking one implicit internal argument – a cognate object. Daniel Harbour (p.c.) notes that unergative motion verbs with an implicit specific goal may contrast with unergative motion verbs lacking this goal or telicity. The former might then pattern with transitive verbs in having both an external and an internal argument, while the latter are simple unergatives lacking an internal argument. VVns seem to make a case for exactly such a divide: The unergative *volare* ‘fly’ can be interpreted either as having or as not having an implicit cognate object. In the former case it contains a goal/telicity, while in the latter it means more something like ‘float’. When *volare* is used in a VVn, only the telic meaning is available, i.e. one where there is a lot of (intentional) flying from A to B involved. So, e.g., (8) can only describe a scenario where a lot of spaceships are (quickly) flying around the speaker, but not one where a lot of spaceships are steadily surrounding the speaker (intentionally) floating in mid-air.

- (8) È tutto un vola-vola.  
       it’s all a fly-fly  
       ‘There’s a lot of flying/#floating going on.’

### 2.3. A conclusion

On its own, the syntactic restriction on VVn formation seems rather odd. Here, I would like to argue that it makes sense if the parallel to another connection is

<sup>7</sup>As a remark to further strengthen this point, I believe that when a VVn is formed creatively from pseudo-words, the immediate reading of the invented verb is that of a transitive predicate.

drawn, namely what I will call the V-N N-compound (VNm) for parallelism's sake. This is the Romance version of an agentive *-er* compound. An example is given in (9).

- (9) un tira-petard-i  
 a throw-firecracker-PL  
 'Someone/something that throws firecrackers'

The obvious similarity is that the VNm also involves compounding a verb in its singular imperative form to create a noun. The obvious difference is that, here, it is compounded with a generic plural object. An interesting parallel is that in both constructions the verbs have the argument structure of a transitive. This has a straightforward reason for the VNm as you need a transitive verb to license an object, but not so much for the VVn, where no object is expressed. I take this similarity to be telling and propose that the two complex nouns should be collapsed to share one and the same basic structure. Such an approach gives an immediate explanation for the syntactic restriction on the VVn compound if the base structure is one containing an internal argument. Daniel Harbour (p.c.) points out that one prediction of this approach is that it should not be possible to express the internal argument of a VVn. The prediction is borne out:

- (10) a. \*È tutto un mangia-mangia di banane.  
 it's all a eat-eat of bananas  
 'There's a lot of eating of bananas going on.'
- b. \*È tutto un trinka-trinka di grappini.  
 it's all a drink.much-drink.much of grappa.DIM  
 'There's a lot of heavy drinking of grappa shots going on.'

The approach is further supported by the contrast with the examples in (11), which have the same meaning as the one in (10), but where the nouns are formed on the basis of an infinitive. Now, expressing the internal element is again possible.<sup>8</sup>

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<sup>8</sup>Also, with the infinitive, there are no syntactic restrictions with regard to the verbs argument structure. For example, the unaccusative in (i) is grammatical.

- (i) È tutto un casca-re per terra.  
 it's all a fall-INF for ground  
 'There's a lot of falling on the ground.'

- (11) a. È tutto un mangia-re di banane.  
 it's all a eat-INF of bananas  
 'There's a lot of eating of bananas going on.'
- b. È tutto un trinka-re di grappini.  
 it's all a drink.much-INF of grappa.DIM  
 'There's a lot of heavy drinking of grappa shots going on.'

I conclude that the doubling of the verb happens to fill the empty object position. In addition, I take the fact that the metrical restriction on VVns can be satisfied by repairing the second instance of the verb through regular phonological operations as further evidence that the syntax of the compound does not have any lexical restrictions at all and that the doubling happens post-syntactically.<sup>9</sup>

### 3. Analysis

#### 3.1. Derivation

In the following, I will assume that words are constructed in syntax, along the lines of Distributed Morphology. I will assume that both the VVn and the VNn involve merging a verbal root with a nominal object. The core difference between a VVn and a VNn lies in the kind of object that is merged.

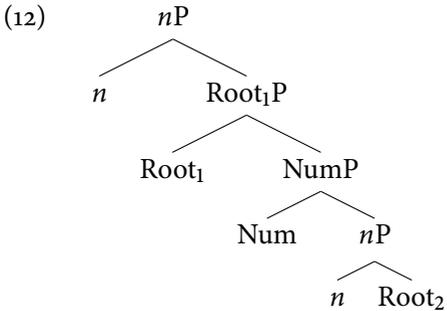
##### 3.1.1. VNn

In the case of the VNn, a specific root is chosen. This noun will have a generic reference. Also, because the nouns are plural in this construction, I assume that

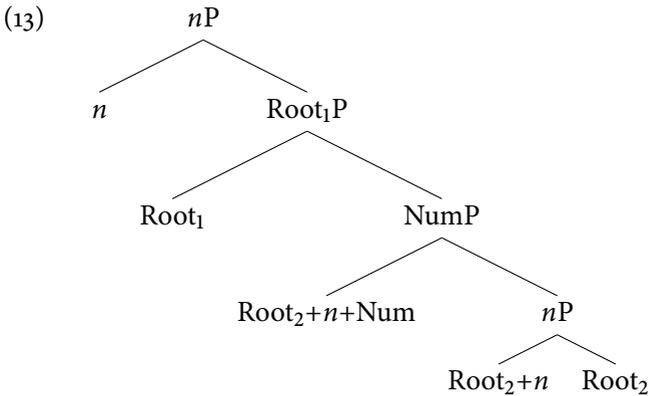
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<sup>9</sup>As Johannes Hein (p.c.) notes, the above data is also coherent with an analysis where the verb is de-transitivized. On such a view, the verb would be either merged with an object and then with a de-transitivizing morpheme, or directly with the de-transitivizing morpheme to occupy the object position (similar to Baker et al. 1989 on passive). This morpheme would then be spelled out by replicating the verbs PF. I will leave this approach open as I cannot see any clear advantage or more precise prediction that this approach would make over the one following in section 3, apart from being a more construction-internal stipulation. In fact, on the one hand, the de-transitivizing approach will stipulate an irregularity, namely to have a de-transitivizing morpheme in Italian, at the same point where the analysis following in section 3 will stipulate an impossibility for regular VI. On the other hand, the precise implementation of the metrical restriction will suffer from similar problems. Note again, that just merging the same root twice, once as a predicate and once as a cognate object, will avoid initial stipulations, but also give less of an angle to explain how regular phonology can influence the grammaticality of the construction.

they merge with *n* and Num, successively, before they merge with the verbal root, cf. (12). The whole structure will then merge with *n* to form a noun.

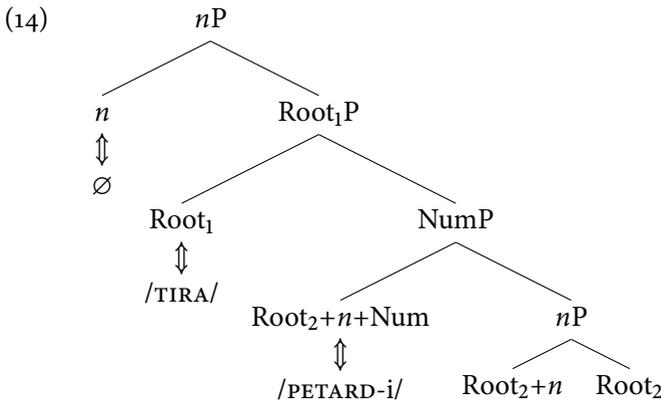


The nominal root then head-moves to *n* and Num, successively, resulting in the structure in (13).<sup>10</sup>



<sup>10</sup>Two remarks on the structure in (13): (i) Since this is not of primary interest in this paper, I will omit the internal structure of the adjunction sites as more steps of head movement and fusion must occur, e.g. fusion of *n* and Num (and potentially Gen if gender is assumed to be its own functional projection in Italian). I will therefore adopt the notation X+Y instead. (ii) I assume that the verbal root and the nominal complex do not undergo any further steps of head movement to *n*. For one, it would be vacuous because *n* is not spelled out in these constructions. Furthermore, maintaining the desired word order V-N-*n* is problematic because head-movement of the N+*n* complex to *n* must apply prior to head-movement of the V+*v* complex. Such a derivation would violate the Head Movement Constraint (HMC; Travis 1984, Baker 1988) as the N+*n* complex would skip V+*v*. A derivation obeying the HMC would lead to the incorrect order N-V-*n* instead.

Vocabulary Insertion (VI) for the noun *tira-petardi* ‘throw-firecrackers’ will yield the following result, exemplified on the structure in (14).<sup>11</sup>

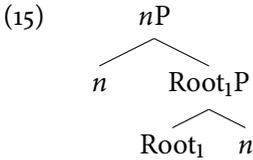


### 3.1.2. *VVn*

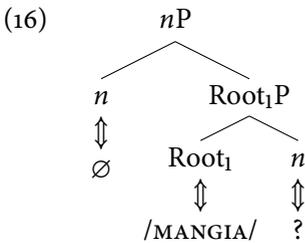
As a general view, in the case of the *VVn*, a generic non-lexical item is chosen and directly merged with the verbal root. This element can be viewed as a kind of variable whose sole purpose is to satisfy the verbal root’s need to merge with an object and allow the right interpretation at LF. Crucially, I will assume that this element lacks a corresponding entry in the phonological domain and that this ‘phonological emptiness’ will be both the trigger and the carrier of the reduplication at PF. Specifically, since the verbal root selects for a noun, I will further assume that this element is just an *n* head. The resulting structure is given in (15).<sup>12</sup>

<sup>11</sup>I give an empty VI for the higher *n* in (14). This can be also viewed as a silent equivalent of the agentive nominalizer */-er/* in English. I will ignore why it is silent here and the possibly connected question whether the verb root moves to the agentivizing suffix (cf. the brief review in Snyder in press).

<sup>12</sup>An immediate question here is why the root projects and not *n*. I will assume here that *n* is vacuously satisfied. This gives the desired effect of it being a noun with no particular lexical meaning. I assume that this will be interpreted as a variable at LF. This is similar to proposals where a *D* (Landau 2010, van Urk 2013, Legate 2011), or a  $\phi$  (Roberts 2010) enter the derivation without a complement and function as arguments.



Parallel to the derivation of the VNs, I assume that there are no instances of head movement at this point. Vocabulary Insertion can now proceed. I assume that the VI module does not know how to spell out *n* in this configuration, where it is the sister of a projecting root. The VI for the noun *mangia-mangia* ‘eat-eat’ is shown in (16).



To repair this output, the PF of /MANGIA/ is copied to its sister, yielding /MANGIA/-/MANGIA/. This can be viewed as a morpho-phonological readjustment rule, post-syntactic operation, or morphotactic constraint, of the kind that have been proposed in the DM literature (cf. e.g. Halle & Marantz 1993, Embick & Noyer 2001, Arregi & Nevins 2012). This structure is then sent to the PF module, where regular phonological constraints of Italian apply. This includes hiatus resolution, which can be fed by copying, e.g. with tri-syllabic verb roots that begin with a reducible vowel, as discussed above.

At this point, I can envisage two ways in which the derivation can proceed, one being a purely phonological route, the other a morpho-phonological constraint on copies. They are both aimed at explaining the ungrammaticality of VVns where the form on the right has more than two syllables.

*Solution 1 – Pure metrics:* One possibility is that the source of ungrammaticality of VVns which are formed on the basis of tri-syllabic and larger verb roots which cannot be reduced, is a purely phonological one. For example, the metrics may be responsible: the ungrammatical examples listed in section 2.1 lead to a structure where there are two adjacent unstressed syllables word-internally.

This is an often suboptimal structure. This account makes an immediately testable prediction, namely that pluri-syllabic verb roots which do not lead to a clash (or better a lapse) lead to grammatical VVns. Unfortunately, this prediction is not borne out. The verb *saltarellare* ‘to hop’, has four syllables with alternating stress in its base form, cf. (17a). The resulting VVn in (17b) does not contain any two adjacent unstressed word-internal syllables. Nonetheless, the form is ungrammatical.

- (17) a. [sal.ta.'rɛl.la]  
 b. \*un [sal.ta.,rɛl.la.,sal.ta.'rɛl.la]

*Solution 2 – Copying is costly:* The second approach is based on the somewhat stipulative assumption that copying is costly, in some sense, with the consequence that copies are preferably avoided. One particular instantiation of this could go as follows: (i) the PF module recognizes the copy as such, (ii) there is a constraint in Italian, which bans copies from being larger than a foot, (iii) rule (ii) cannot be repaired. If (ii) applies after or simultaneously with hiatus resolution, it follows that VVns such as *ingolla-ingolla* are ungrammatical. For clarity, the derivation would go as follows: the root *ingolla* is merged with an *n* which was vacuously satisfied, i.e. did not select for anything itself. At VI, the root receives the phonological representation /INGOLLA/, but *n* cannot be spelled out. As a repair, the verb root’s PF /INGOLLA/ is copied to its sister node. At PF, the second instantiation of *ingolla* is recognized as a copy and should therefore not exceed the size of a foot. Hiatus resolution, however, can apply and save the final output so that *un ingolla-ingolla* ([iŋ.gol.laŋ.gol.la]) is grammatical. Again, this approach is basically a reformulation of the facts. It makes some predictions, too, however. For instance, it would make the prediction that, in Italian, processes which involve copying on a morpho-phonological level are restricted to outputs which are no bigger than one foot.

#### 4. Conclusions

In this paper, novel data from a construction in Italian, the VVn, were proposed, where nouns are formed by doubling the base form of a verb. The investigation of these nouns showed that both syntactic and phonological restrictions on the range of verb roots which can participate in this process exist. The syntactic restriction requires the verb to be either a transitive verb or an unergative verb

with an implicit object. The phonological restrictions requires the doubled verb to have no more than two syllables. This latter restriction can be fed by regular phonology, such as vowel deletion to resolve a hiatus. It was argued that the former restriction speaks against a purely morpho-phonological treatment of the phenomenon, and that the latter speaks against a purely syntactic treatment. As a consequence, and to account for the restrictions on the one hand, and the productivity of the construction on the other hand, it was proposed that the VVn has the same syntax as agentive V-N compounds: a verb root selecting for a nominal object. The difference was proposed to lie in the choice of object. The verb root in a V-N compound selects for a structure [Num [n Root]]. In the VVn, it selects for a vacuously satisfied *n*, which was further proposed to be a generic, non-lexical nominal element interpreted as variable. The doubling was proposed to be the result of a repair: there is no plausible VI for an *n* which is immediately dominated by a root node so that the node is filled by copying the PF of its sister.

The present paper also raises a number of empirical and theoretical questions. On the empirical side, more verb classes need to be tested: the experiencer verb *temere* 'fear', e.g., seems to be unable to form a VVn (*\*temi-temi*) to me, in spite of it being bisyllabic and transitive. Also, it seems reasonable to expect speaker variation in the domain of unergatives. Speakers may vary wrt. whether they analyse a given verb root as having a basic meaning containing an internal argument or not during acquisition. A broader inquiry is required here, ideally employing questionnaires where the VVns are presented against contexts controlling for transitivity. On the theoretical side, the gist of the present proposal hinges on two connected ideas. First, it was proposed that the nominalizing head *n* can be satisfied vacuously, i.e. it can function as an argument without previously combining with a root. Second, and more importantly, it was assumed that the syntax can generate structures which are not interpretable by the VI module without leading to a crash. Basically, the VI module was assumed to be fallible, with the consequence that such failures can be repaired by morpho-phonological operations, one being copying. This has very broad consequences which will need to be evaluated in future research.

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# Vowel raising in Mayak as compound opacity

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## Abstract

The Western Nilotic language Mayak seems to exhibit a purely morphologically triggered phonological chain shift in vowel height (Andersen 1999) which raises problems for a restrictive approach to the morphology-phonology interface based on the concatenation of morphemes and limited access of phonological constraints to morphosyntactic information. Here, I show that the Mayak vowel raising data actually instantiate a doubly opaque form of vowel harmony: The chain shift itself follows from two partially underapplying harmony processes naturally captured in the generalized markedness constraints of Colored Containment Theory (Trommer 2011, 2014, 2015), and the restriction of vowel raising to certain affixes from assigning it to the stem level of Stratal Optimality Theory (Kiparsky 2003, Bermúdez-Otero 2013).

## 1. Introduction

Andersen (1999) argues that Mayak (Western-Nilotic) has besides different patterns of [ATR]-harmony (cf. past **-u** in (1a)/the dashed arrows in (1b)) a morphological vowel raising process (VR) triggered by specific affixes which shifts high/low [-ATR] vowels to [+ATR], but mid [-ATR] vowels to high (cf. Antipassive, AP, **-ir** (1a)/the solid arrows in (1b)).

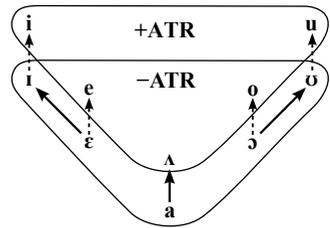
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(1) *[ATR]-harmony and mutation (Andersen 1999:16)*

		Past	AP	
	[ɪ]	ʔit̩	ʔið̩-u	ʔit̩-ir ‘shape’
	[ɛ]	dɛc	dɛj-u	dij-ir ‘grind’
[-ATR]	[a]	ʔam	ʔam-u	ʔΛm-ir ‘eat’
	[ɔ]	kɔc	koj-u	kɔj-ir ‘take’
	[ʊ]	ɡʊt̩	ɡuð̩-u	ɡʊt̩-ir ‘untie’
	[i]	tiŋ	tiŋ-u	tiŋ-ir ‘hear’
[+ATR]	[Λ]	nΛk	nΛɣ-u	nΛk-ir ‘beat’
	[u]	t̩uc	t̩uj-u	t̩uc-ir ‘send’

b.



If Andersen's claim is correct, Mayak vowel raising instantiates a striking case of chain-shifting and 'quirky' (phonologically non-uniform) mutation. This phenomenon – if existent – would be a major piece of evidence for the stipulation of mutation-specific rules/constraints (Lieber 1992, Zoll 1996, Wolf 2005) or the assumption of a basically unrestricted morphology component (Green 2006, Iosad 2008) and against the restrictive research program that limits morphological exponence to the concatenation of phonological representations and general processes of phonological alternations. I will call this research program, which implicitly underlies Classical Autosegmental Morphology (Goldsmith 1976, McCarthy 1979, Marantz 1982), is explicitly formulated under different names in Stonham (1994), Lieber (1992), Wolf (2005, 2007), Bye & Svenonius (2012), Bermúdez-Otero (2012), and which I will adopt here, the 'Concatenativist Hypothesis' (Trommer 2011, 2014, 2015, Zimmermann & Trommer 2014, 2015):

(2) *The Concatenativist Hypothesis:*

morphology = concatenation + phonological alternations

What makes a phonological alternation analysis of Vowel Raising especially problematic is not only that it involves two distinct changes, raising along the [high] dimension and along [ATR], but that these two changes are in complementary distribution – vowels which become [+ATR] ([a] → [Λ]) do not change to [+high], whereas mid vowels which are turned into [+high] vowels refrain from becoming [+ATR] (e.g. [ɛ] → [ɪ] → \*[i]). An analysis in terms of vowel ([ATR]) harmony seems to be excluded not only because VR

changes are not strictly predictable ([a] does not always become [ʌ] before high vowels), but also because the affixes triggering VR do not consistently exhibit [+ATR]. Thus it is hard to claim that the affixal [i] in present AP forms (1) is [+ATR] because it shows up as [-ATR] [i] after underlying mid vowels and Mayak does not have general assimilation of [+ATR] to [-ATR] Vs (see section 3). However, if an analysis via phonological alternation is untenable, the only alternative given the Concatenativist Hypothesis is to view it as the result of affixing (possibly segmentally defective) phonological material such as floating vocalic features. Again this leads to an obvious problem since the changes triggered by VR are not uniform: Affixing floating [+ATR] would predict tensing across the board, and floating [+high] consistent raising to high vowels, and positing an affix specified as [+ATR +high] the raising of all stem vowels to high tensed vowels. Finally, Mayak VR can also *not* be captured as affixation of floating sonority grid marks (Trommer 2009, 2011) since it makes vowels *less*, not more sonorous.

In this paper, I argue that against all odds the Mayak data *are* compatible with the concatenativist hypothesis and follow in fact from the interaction of phonological alternations with floating affixal material, obscured by two factors inducing opacity: First, a chain shift in vowel harmony strictly parallel to better-studied patterns in varieties of Romance (Calabrese 2011, Walker 2005, 2011) and, second, the stratal organization of phonology (Kiparsky 2003, Bermúdez-Otero 2013), which restricts chain-shifting harmony to stem-level affixes such as antipassive *-ir* in (2) in contrast to word-level affixes as past tense *-u* that trigger only [ATR]-harmony.

The rest of the paper is structured as follows: Section 2 introduces the theoretical framework I will assume here, Autosegmental Colored Containment Theory (Trommer 2011). Section 3 and section 4 provide detailed analyses of the vowel-alternation processes at the word level and the stem level respectively. Section 5 summarizes my conclusions.

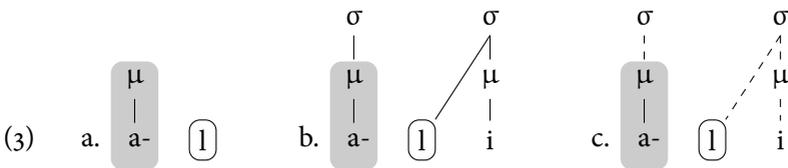
## 2. The framework: Autosegmental Colored Containment Theory

My analysis is based on a version of Optimality Theory which is close to the original implementation of the theory proposed by Prince & Smolensky (1993) in adopting hierarchical autosegmental representations and the Containment restriction on candidate generation, but which adopts the representation

of epenthesis by morphological colors from Colored Containment Theory (van Oostendorp 2006, Revithiadou 2007), and generalizes the Containment assumption to association lines (Radical Containment).

### 2.1. Morphological colors and epenthesis

Following van Oostendorp (2006) and Revithiadou (2007), I assume that morphological structure is minimally reflected in phonological representations by coloring. At the interface of morphology and phonology, every morpheme  $M$  of an underlying representation  $UR$  is assigned a unique color  $C$  (i.e., a color which is distinct from all other colors  $C'$  in  $UR$ ), and every phonological component (i.e. every node and every association line) of  $M$  is also assigned  $C$ . The hypothetical representations in (3) illustrate coloring with two hypothetical morphemes  $a$  and  $l$ . Color is notated here and in the following by background boxes with distinctive (possibly white) shading. The representation in (3a) is an input form, hence all of its components have morphological colors (grey for the affix  $\mu$ -a-, and white for the root morpheme  $l$ ). Representation (3b) is a candidate based on (3a) which adds epenthetic  $[i]$ , syllables, a mora, and epenthetic association lines; these consequently lack background boxes. Representation (3c) shows the same candidate in a slightly different notation which highlights the epenthetic character of association lines by dashing.



Colors have two consequences for phonological computation. First, they allow us to distinguish underlying material from epenthetic material: Epenthetic material is colorless (in (3): black), and by the Containment Assumption GEN does not license to change or remove the color of underlying material. Second, they make it possible to determine whether two phonological elements belong to the same morpheme or not. Crucially, colors do permit phonological constraints to distinguish morphemes, but not to identify them. Thus via coloring phonology cannot assess whether the segment  $l$  in (3) is a 3SG affix or a noun root, it just ‘knows’ that it is a morpheme which is distinct from the one realized by  $a$ .

2.2. Containment and possible operations of GEN

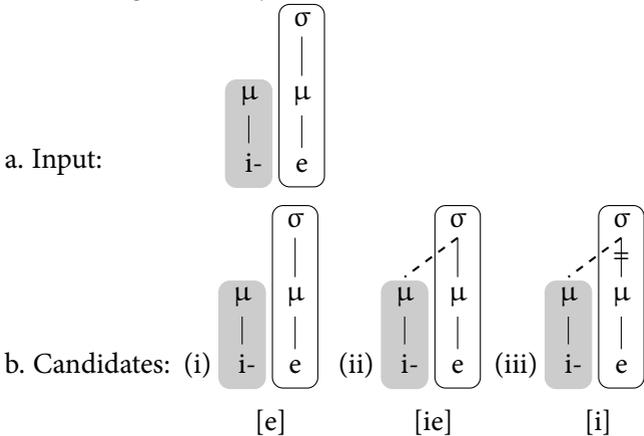
By the Radical Containment Assumption, phonological material can never be literally removed from phonological input representations in the course of phonological computation (Prince & Smolensky 1993, van Oostendorp 2008: 1365). The candidate-generating function GEN is thus restricted to the following changes it may perform on underlying forms (phonetic visibility is conceived as an elementary attribute of association lines, but not of phonological nodes):

(4) Possible operations of GEN

- a. Insert epenthetic nodes (prosodic nodes, feature nodes, segmental root nodes) or phonetically visible association lines between nodes
- b. Mark a colored association line as phonetically invisible

(4a) implements the slightly implicit assumptions held on Containment and GEN in the earliest version of Optimality Theory (Prince & Smolensky 1993), whereas (4b) replaces deletion of association lines by a less invasive operation: marking for phonetic invisibility (indicated in the following by ‘=’). Example (5b) shows some representative candidates generated by GEN for the input in (5a). Example (5b-i) is identical to the input. The examples (5b-ii,iii) contain epenthetic association lines licensed by (4a). In (5b-iii), the association line between the second  $\mu$  and [e] is marked as phonetically invisible according to (4b).

(5) Candidates generated by GEN



## 2.3. Deletion as phonetic non-realization

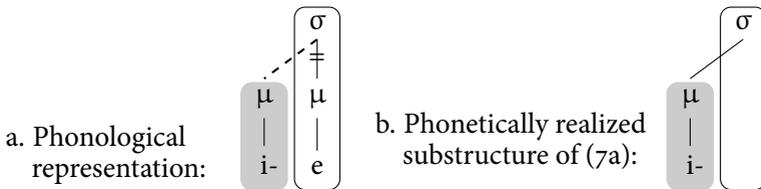
(Non-)pronunciation of underlying material is implemented as phonetic non-interpretation of phonological material following the axioms in (6):

(6) *Axioms of phonetic realization*

- a. A phonological node is phonetically realized iff it is dominated by the highest prosodic node of the candidate through a path of phonetically visible association lines
- b. An association line is phonetically realized iff it is marked as phonetically visible and connects two phonetically realized nodes

Thus the highest prosodic node in all examples of (5b) is the  $\sigma$ -node because the representations do not contain foot or word nodes. Example (7b) shows the part of (5b-iii) repeated as (7a) which is spelled out by phonetic interpretation. [e] and the second  $\mu$  of (7a) are not in (7b) because the upper association line through which they are dominated by  $\sigma$  is phonetically invisible. Example (5b-i) instantiates a slightly different way of deletion: [i] and the first  $\mu$  are not phonetically interpreted because they are not dominated by  $\sigma$  at all.

(7)



For convenience, I will abbreviate the term ‘phonetically realized’ in the following simply by ‘phonetic’ and will call colored (i.e., underlying) phonological material ‘morphological’ since it is interpreted by morphology as part of specific morphemes.

## 2.4. Markedness constraints and the Cloning Hypothesis

Following Trommer (2011), markedness constraints are subject to the hypothesis in (8):

(8) *The Cloning Hypothesis:*

Every markedness constraint has two incarnations, a phonetic clone and a general clone: The general clone refers to complete phonological

representations. The phonetic clone refers to the phonetically realized substructure of phonological representations.

Phonetic clones are standard markedness constraints, whereas general clones evaluate input and output representations on a par (i.e., the combination of all input and output structure). Whereas these constraints are structurally identical, they refer to different sub-representations of candidates (or more exactly of input-candidate mappings), but can be ranked independently in individual grammars.

I illustrate the Cloning Hypothesis with a constraint which plays a crucial role in the analysis of Mayak developed in this paper, the ban on [-ATR] mid vowels. The phonetic clone of the constraint in (9b) is a constraint which is reflected in many vowel systems across the world's languages which have a [±ATR] contrast and the mid vowels [ɛ] and [ɔ] but lack [o] and [e] (Archangeli & Pulleyblank 1994, Casali 2003). The general clone in (9a) generalizes this constraint to the full phonological structure. The phonetic clone is marked here, as throughout the paper by underlining,<sup>1</sup> whereas the general clone does not have any explicit marking.

- (9) a. \*E: Assign \* to every • which dominates [-h], [-l] and [-]
- b. \*E: Assign \* to every • which **phonetically** dominates [-h], [-l] and [-]

To see where (9a) and (9b) substantially differ, consider the case of an underlying input mid vowel in (10a) which associates to floating vocalic features of an affix. The structure in (10b) which results from straightforward association of the vowel to both floating features (and concomitant phonetic invisibility of the respective underlying association lines), violates \*E and \*E, since all nodes and association lines here are phonetically interpreted (they are dominated by the highest prosodic node,  $\sigma$ ). On the other hand, (10c) does not violate \*E because in the subrepresentation of the structure which is phonetically interpreted, (10c'), the vowel is not associated to [-h] (due to Radical Containment, (10c') itself is not a licit output candidate for (10a)). On the other hand, (10c) still violates \*E because in its overall structure the V is associated to [-h], [-h] and

<sup>1</sup>In a slight departure from this convention, phonetic constraints on autosegmental association are marked by double arrows.

[−]. Thus the general version \*E<sub>±</sub> effectively blocks association of the underlying mid vowel to [−] even under deassociation of its other height features, a point which will become crucial for the derivation of the vowel chain shift in section 4.

(10) *Constraint violations incurred by \*E<sub>±</sub> and \*E<sub>±</sub>*

Input: = a.	*E <sub>±</sub>	*E <sub>±</sub>	*E <sub>±</sub>	*E <sub>±</sub>
<p>a.</p>				
<p>c.</p>				*
<p>b.</p>	*	*		
<p>c'.</p>				

3. **Mayak word-level harmony**

Mayak shows both regressive and progressive vowel harmony for [ATR]. Before high [+ATR] affix vowels, non-low [−ATR] root vowels get [+ATR]. The low vowel [a] remains unaffected:

(11) *Regressive [ATR] harmony (Andersen 1999:6)*

	Underlying Root Vowel	Present Tense	Past Tense	
	[i]	ʔit̩	ʔið̩-u	‘shape’
	[ε]	ɖɛc	ɖej̩-u	‘grind’
[−]	[ɔ]	kɔc	koj̩-u	‘take’
	[ʊ]	gʊt̩	guð̩-u	‘untie’
	[a]	ʔam	ʔam-u	‘eat’
	[i]	tiŋ	tiŋ-u	‘hear’
[−]	[ʌ]	nʌk	nʌɣ̩-u	‘beat’
	[u]	t̩uc	t̩uj̩-u	‘send’

Low suffixal [ʌ] as in the 1SG suffix -ʌr does not trigger [ATR] harmony (12):

- (12) *Regressive non-harmony with [ʌ] (Andersen 1999:8)*  
*(past tense forms with subject suffixes)*

	Underlying Root Vowel	1SG	2SG	3SG	
	[i]	ḍi:m-b-ʌr	ḍi:m-b-ir	ḍi:m-b-ɛr	'weed'
	[ɛ]	tɛ:g-ʌr	tɛ:g-ir	tɛ:g-ɛr	'spear'
[-]	[ɔ]	pɔ:g-ʌr	pɔ:g-ir	pɔ:g-ɛr	'wash'
	[ʊ]	ʃʊ:ʃ-ʌr	ʃʊ:ʃ-ir	ʃʊ:ʃ-ɛr	'find'
	[a]	ca:b-ʌr	ca:b-ir	ca:b-ɛr	'cook'
	[i]	wi:n-ɖ-ʌr	wi:n-ɖ-ir	wi:n-ɖ-ɛr	'cook'
[-]	[ʌ]	ʔʌ:b-ʌr	ʔʌ:b-ir	ʔʌ:b-ɛr	'catch in the air'
	[u]	pu:r-ɖ-ʌr	pu:r-ɖ-ir	pu:r-ɖ-ɛr	'hoe'

After high [+ATR] root vowels, high [-ATR] suffix vowels such as 1SG -i get also [+ATR]. Suffixal mid and low vowels remain in this context unaffected (cf. the 3SG suffix -ɛ):

- (13) *Progressive [ATR] harmony on high vowels (Andersen 1999:10)*  
*(Non-possessed and singular possessive forms of nouns)*

	Underlying Root Vowel	Non poss.	1SG	2SG	3SG	
	[i]	ɲin	ɲin-i-k	ɲin-u-k	ɲin-ɛ-k	'eyes'
	[ɛ]	lɛk	lɛk-i-k	lɛk-u-k	lɛk-ɛ-k	'teeth'
[-]	[a]	pal	pal-i	pal-u	pal-ɛ	'navel'
	[ɔ]	wɔŋ	wɔŋ-i	wɔŋ-u	wɔŋ-ɛ	'eye'
	[ʊ]	tʊk	tʊɣ-i	tʊɣ-u	tʊɣ-ɛ	'outer mouth'
	[i]	ʔic	ʔid-i	ʔid-u	ʔid-ɛ	'ear'
[-]	[u]	ʔuŋ	ʔuŋ-i	ʔuŋ-u	ʔuŋ-ɛ	'knee'
	[ʌ]	ʔʌm	ʔʌm-i	ʔʌm-u	ʔʌm-ɛ	'thigh'

There is however one suffix with a low vowel which also undergoes progressive [+ATR] harmony, the singulative affix *-at* (Andersen assumes that this is due to a different process which he calls ‘progressive ATR’ spreading):

(14) Exceptional progressive [ATR] harmony on sing. *-at* (Andersen 1999:10)

	Singular	Plural	
a.	[ɪ] rɪm-at <sub>ṽ</sub>	rɪm	‘blood’
b.	[a] da:l-at <sub>ṽ</sub>	da:l	‘flower’
c.	[ʊ] kʊm-at <sub>ṽ</sub>	kʊm	‘egg’
d.	[i] ʔin-ʌt <sub>ṽ</sub>	ʔin	‘intestine’
e.	[ʌ] ʔʌ:w-ʌt <sub>ṽ</sub>	ʔʌ:p	‘bone’
f.	[uu] ru:j-ʌt <sub>ṽ</sub>	ru:c	‘worm’

Taken together, Andersen identifies three distinct VH processes in Mayak: 1. regressive [+ATR]-harmony triggered by high vowels and undergone by non-low vowels, 2. progressive [+ATR]-harmony triggered and undergone by high vowels, and 3. [+ATR]-spreading from peripheral (high or low) vowels to singulative *-at* (note that Andersen does not discuss whether Mayak exhibits iterative harmony and provides few potentially relevant examples, hence I will also refrain from addressing this possibility here). In the following, I will develop a unified OT-analysis for all three processes. A crucial observation before we start is that, in the terms of Andersen, Mayak does not have underlying [+ATR] mid vowels. The crucial evidence for this is that [+ATR] mid vowels at the word level occur only if they precede a high [+ATR] vowel. For the time being, I assume that stem- and root-level phonology ensure that all morphological elements which enter the word-level evaluation have only [-ATR] mid vowel, the concrete implementation of this claim will be taken up in section 4.

The three crucial constraints which capture the dependence of [ATR]-harmony on vowel height are formulated in (15).  $*[-h]_{-}$  formalizes the generalization inherent in both Mayak progressive and regressive vowel harmony that the suffixal vowel involved is [+high], and  $*(V_{-h}^{\circ})_{-}$  captures the fact that in both processes, [+ATR] spreads from a [+h] vowel (a *sponsor* of a span for the feature *F* is the  $\bullet$  which is associated morphologically to *F*, cf. Cassimjee & Kisseberth 1998).  $[-l] \rightarrow [-]$  restricts the targets of [ATR]-harmony to non-low Vs:

(15) *Markedness constraints*

- a.  $*[-h]_{-i}$  Assign \* to every non-unary [+ATR] span whose rightmost • is not [+hi] in I
- b.  $*(V_{-h}^{\otimes})_{-i}$  Assign \* to every non-unary [+ATR] span whose sponsor is not [+hi] in I
- c.  $\begin{array}{l} [-l] \\ \downarrow \\ [-] \end{array}$  Assign \* to every [-low] vowel which does not dominate [+ATR] in I

While all three constraints in (15) hold without exceptions in progressive and regressive [ATR]-harmony, they are violated (or irrelevant in the case of (16c)) for [+ATR]-spreading to singulative -at. See below for further discussion.

The constraints in (15) interact with the basic constraints on faithfulness and basic feature association in (16):

(16) *Constraints on faithfulness and basic feature association*

- a. DEP  $[-i]$  Assign \* to every [-] and [-] node which is in P, but not in M
- b.  $MAX_{[-i]}^{\downarrow}$  Assign \* to every morphological association line linking a •-node and a [-] or [-] node which is in M, but not in P
- c.  $\begin{array}{l} V \\ \downarrow \\ [-i] \end{array}$  Assign \* to every vocalic root node which does not dominate a [-] or [-] node

The tableau in (17) shows the ranking I assume for the Mayak word level, and illustrates regressive [ATR]-harmony of a non-low stem V with a high suffix-V. The constraints DEP  $[-i]$  and  $V \rightarrow [-i]$  at the top of the ranking ensure that  $[-l] \rightarrow [-]$  has no effects in the absence of underlying [-] and that all output vowels are specified either [-] or [-].  $MAX_{[-i]}^{\downarrow}$  is dominated by all other relevant constraints.

Spreading of [+ATR] is driven by the desire of the non-low stem vowel to be specified as [-] – due to  $[-l] \rightarrow [-]$  which crucially dominates  $MAX_{[-i]}^{\downarrow}$ . Since both, the rightmost vowel and the sponsor of the resulting [-]-span, are [+h], spreading is unproblematic for higher-ranked  $*[-h]_{-i}$  and  $*(V_{-h}^{\otimes})_{-i}$ :

(17) *Regressive [ATR]-harmony with non-low stem Vs*

Input: = b.	DEP [-]	V ↓ [-]	*[-h] <sub>-</sub>	*( $V_{-h}^{\otimes}$ ) <sub>-</sub>	[-] ↓ [-]	MAX <sub>-</sub>
a. $\begin{array}{ c } \hline [-] \\ \hline \neq \\ \hline \text{lep} \\ \hline \end{array}$ <span style="margin-left: 20px;"> <math>\begin{array}{ c } \hline [-] \\ \hline   \\ \hline \text{u} \\ \hline \end{array}</math> </span>						*
b. $\begin{array}{ c } \hline [-] \\ \hline   \\ \hline \text{lep} \\ \hline \end{array}$ <span style="margin-left: 20px;"> <math>\begin{array}{ c } \hline [-] \\ \hline   \\ \hline \text{u} \\ \hline \end{array}</math> </span>					*!	

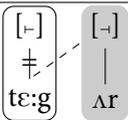
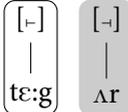
The low stem vowel [a] vacuously satisfies [-] → [-], hence regressive spreading/harmony is excluded by MAX<sub>-</sub>:

(18) *Regressive [ATR] non-harmony with low stem V ([a])*

Input: = b.	DEP [-]	V ↓ [-]	*[-h] <sub>-</sub>	*( $V_{-h}^{\otimes}$ ) <sub>-</sub>	[-] ↓ [-]	MAX <sub>-</sub>
a. $\begin{array}{ c } \hline [-] \\ \hline \neq \\ \hline \Delta\text{m} \\ \hline \end{array}$ <span style="margin-left: 20px;"> <math>\begin{array}{ c } \hline [-] \\ \hline   \\ \hline \text{u} \\ \hline \end{array}</math> </span>						*!
b. $\begin{array}{ c } \hline [-] \\ \hline   \\ \hline \text{am} \\ \hline \end{array}$ <span style="margin-left: 20px;"> <math>\begin{array}{ c } \hline [-] \\ \hline   \\ \hline \text{u} \\ \hline \end{array}</math> </span>						

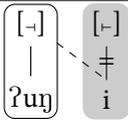
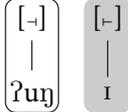
Low-vowel suffixes do not spread [+ATR] since the resulting span would violate both \*[-h]<sub>-</sub> and \*( $V_{-h}^{\otimes}$ )<sub>-</sub>:

(19) *Regressive [ATR] non-harmony with suffix [Λ]*

Input: = b.	DEP [-r]	V ↓ [-r]	*[-h] <sub>-r</sub>	*(V <sub>-h</sub> <sup>⊙</sup> ) <sub>-r</sub>	[-l] ↓ [-r]	MAX <sub>-r</sub> <sup>↓</sup>
a. 			*!	*		*
b. 					*	

If both stem and suffix V are [+hi], there is also progressive [ATR]-harmony (20). Again, spreading is driven by [-l] → [-r] and the resulting [-r]-span satisfies both \*[-h]<sub>-r</sub> and \*(V<sub>-h</sub><sup>⊙</sup>)<sub>-r</sub>:

(20) *Progressive [ATR]-harmony: [+hi] root + [+hi] suffix*

Input: = b.	DEP [-r]	V ↓ [-r]	*[-h] <sub>-r</sub>	*(V <sub>-h</sub> <sup>⊙</sup> ) <sub>-r</sub>	[-l] ↓ [-r]	MAX <sub>-r</sub> <sup>↓</sup>
a. 						*
b. 					*!	

On the other hand, progressive [+ATR]-spreading to a low/mid vowel is excluded since it would result in a violation of \*[-h]<sub>-r</sub> ranked above MAX<sub>-r</sub><sup>↓</sup>:

(21) Progressive [ATR] non-harmony with [-hi] suffix

Input: = b.	DEP [- <sub>→</sub> ]	V ↓ [- <sub>→</sub> ]	*[-h] <sub>→</sub>	*(V <sub>-h</sub> <sup>⊙</sup> ) <sub>→</sub>	[-l] ↓ [-l]	MAX <sub>→</sub> <sup>↓</sup>
a. $\begin{array}{ c } \hline [-] \\ \hline \text{?uŋ} \\ \hline \end{array}$ $\begin{array}{ c } \hline [-] \\ \hline \neq \\ \hline \text{e} \\ \hline \end{array}$			*!			*
b. $\begin{array}{ c } \hline [-] \\ \hline \text{?uŋ} \\ \hline \end{array}$ $\begin{array}{ c } \hline [-] \\ \hline \varepsilon \\ \hline \end{array}$					*	

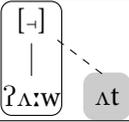
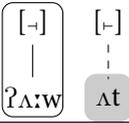
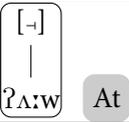
Similarly, a low-vowel stem cannot spread [+ATR] to the suffix because this would fatally violate \*(V<sub>-h</sub><sup>⊙</sup>)<sub>→</sub> (recall that there are no [+ATR] mid-vowel stems in Mayak which could induce spreading):

(22) Progressive [ATR] non-harmony with [-hi] root

Input: = b.	DEP [- <sub>→</sub> ]	V ↓ [- <sub>→</sub> ]	*[-h] <sub>→</sub>	*(V <sub>-h</sub> <sup>⊙</sup> ) <sub>→</sub>	[-l] ↓ [-l]	MAX <sub>→</sub> <sup>↓</sup>
a. $\begin{array}{ c } \hline [-] \\ \hline \Delta\text{m} \\ \hline \end{array}$ $\begin{array}{ c } \hline [-] \\ \hline \neq \\ \hline \text{i} \\ \hline \end{array}$				*!		*
b. $\begin{array}{ c } \hline [-] \\ \hline \Delta\text{m} \\ \hline \end{array}$ $\begin{array}{ c } \hline [-] \\ \hline \text{I} \\ \hline \end{array}$					*	

Let us finally turn to exceptional [+ATR]-spreading to the singulative suffix -at. I follow Andersen in ascribing the exceptionality of this affix to the fact that its vowel is underlyingly unspecified for [ATR]. As a consequence, undominated V → [-<sub>→</sub>] enforces assignment of a [ATR]-value to it. Since this cannot be provided by epenthesis as in (23b) which would violate equally undominated DEP [-<sub>→</sub>], progressive spreading applies even though this violates \*[-h]<sub>→</sub> and \*(V<sub>-h</sub><sup>⊙</sup>)<sub>→</sub> (23a):

(23) Exceptional progressive [ATR] harmony with singulative -at

Input: = c.	DEP [-r]	V ↓ [-r]	*[-h] <sub>-r</sub>	*(V <sup>Ⓢ</sup> ·) <sub>-r</sub>	[-l] ↓ [-r]	MAX <sub>[-r]</sub>
a. 			*	*		
b. 		*!				
c. 	*!					

4. Mayak stem-level harmony

Whereas Andersen claims that VR is a ‘grammatical process’, i.e., triggered morphologically by arbitrary affixes, I will show here that it derives from general phonological harmony processes which only differ from the word-level phonology described in the last section by constraint ranking. In fact there are good reasons to analyze VR as the result of vowel harmony, which becomes obvious if we turn our attention away from the verbal cases of VR, where the affixes inducing it are systematically deleted under hiatus with more peripheral word-level affixes, and turn to the nominal domain, where VR is virtually always accompanied by overt affixes.<sup>2</sup>

Consider first the plural affix -it which according to Andersen exhibits VR (24). Raising of [-ATR] stem vowels to [+ATR] in all of these forms is a straightforward case of regressive [+ATR] spreading. See Trommer (2011) for discussion of vowel shortening in the data in (24). Note also that Andersen does not cite any examples of -it with mid-vowel stems.

<sup>2</sup> Andersen discusses only three examples in passim where nouns without overt affixes are accompanied by VR. See Trommer (2011) for discussion.

(24) *A [-ATR] Stem-level affix: PL -it (Andersen 2000:38)*

	SG	PL	
a.	ma:c	mΛj-it̩	'fire'
b.	pΛ:m	pΛm-it̩	'mountain'
c.	mi:ŋ	miŋ-it̩	'deaf person'
d.	ki:n	kin-it̩	'mat'

To be sure, the type of [ATR]-harmony triggered by *-it* slightly differs from the one we have diagnosed for word-level [ATR]-harmony, but if *-it* is taken to be a stem-level affix, the divergence between *-it* and comparable word-level affixes such as the past marker *-u* (cf. (11)) can be derived simply from different constraint rankings at word and stem level. Crucially, not only *-it*, but all overt Mayak affixes which trigger VR are [+ATR] – at least in the contexts where they actually trigger [ATR]-raising – as can be easily verified by checking through (25), (26) and (27), a fact which is purely accidental if VR is interpreted as a morphological process, but could not be otherwise if it is due to V-harmony.

Let us now have a look at another nominal number affix for which Andersen gives data instantiating the [-high -low] ⇒ [+high -low] component of VR, the suffix *-uk/-uk* (25):

(25) *A [-ATR] + floating [+ATR] stem-level affix: PL -uk/-uk (Andersen 2000:37)*

	SG	PL	
a.	mɛ:k	miŋ-uk	'spider'
b.	ja:ŋ	jΛŋ-uk	'crocodile'
c.	na:c	nΛj-uk	'calf'
d.	gɔ:c	gɔj-uk	'bow'
e.	ɖi:r	ɖi:r-uk	'shield'
f.	mΛ:l	mΛl-uk	'leg of calf'
g.	bul	bul-uk	'stomach'
h.	pu:l	pul-uk	'well, pool'
i.	ci:ma	cim-uk	'knife'
j.	ba:rt̩	ba:rt̩-uk	'slave, servant'
k.	pura	pur-uk	'cloth'
l.	wɔ:rɔt	wɔ:r-uk	'hare'

Raising of stem vowels in the context of **-uk/-uk** can be understood as a standard case of height harmony: Mid vowels ([ɛ] and [ɔ]) are raised to high ([ɪ] and [ʊ]) in the context of other high vowels.<sup>3</sup> Again, this analysis cannot be rebutted by adducing word-level affixes such as **-u** which do not trigger height harmony on root vowels if height harmony is assigned to the stem level.

In fact there is independent evidence that the affixes triggering VR also differ in other respects from word-level affixes. First, they typically trigger shortening of stem vowels (cf. the examples in (25a–c, f, h, i)), a process which is apparently never found with word-level affixes. Second, the AP in Mayak which is cited by Andersen as the typical case for a morphological exponent of VR in the verbal domain, also exhibits stem-level properties in its effects on stem consonants (cf. Trommer 2011: chapter 7). Third, whereas word-level affixes such as plural **-ni** may attach to nouns of any length (26) (recall that verb roots in Mayak are strictly monosyllabic whereas noun stems may contain up to 4 syllables), the combination of a stem-level number affix and its base is always maximally bisyllabic.<sup>4</sup>

(26) *A word-level affix attaching to polysyllabic stems: PL -ni*  
(Andersen 2000:39)

	SG	PL	
a.	giriŋɿ	giriŋɿ-ni	'hippopotamus'
b.	alma:laga	alma:laga-ni	'spoon'
c.	rʊ:d-a	rʊ:d-a-ni	'my grandfather'
d.	ba:b-a	ba:b-a-ni	'my father'

The bisyllabicity restriction on stem-level affixes is especially striking for the only VR-triggering affix which actually attaches to bisyllabic bases, the infix **-u-**, **-ʊ-**, which adheres to bisyllabicity by overwriting the second stem vowel (27):

<sup>3</sup>That low vowels are opaque to vowel height harmony is a phenomenon found in many languages, see e.g. Beckman (1997) on Shona.

<sup>4</sup>Combinations of verb stems and stem-level affixes are always bisyllabic because verb stems in Mayak are always monosyllabic, and stem-level affixes subsyllabic or monosyllabic.

- (27) *A [-ATR] + floating [+ATR] stem-level affix: PL -u/-ʊ-*  
 (Andersen 2000:39)

	SG	PL	
a.	kɪkɑt̪	kɪkʊt̪	'broom'
b.	mɛɪɣɑt̪	mɪɪɣʊt̪	'shelf'
c.	rɛ:kɑt̪	rɪkʊt̪	'pot type'
d.	kɑmɑl	kʊmʊl	'girl'
e.	nɑnɑ:n	nʌnʌn	'snake'
f.	kɑwɪl	kʊwʊl	'sheep'
g.	ɖʌɖʌ:k	ɖʌɖʌk	'fox'
h.	mɔrcɔŋ	mʊrcʊŋ	'horse'
i.	ɖɔŋɔɭ	ɖʊŋʊɭ	'cock'
j.	gʊɖɔn	gʊɖʊn	'bull'
k.	kʊɛr	kʊɛr	'pig'

The analysis of Mayak V-harmony processes in the following is tentative simply because Andersen provides very few examples for most affixes. I depart from the observation that the affixes inducing VR differ in interesting detail. Thus, plural **-ɖɪn/-ɖɪn** (28) apparently differs from plural **-it** in two respects: It occurs in a [+ATR] and a [-ATR] variant according to the [ATR] specification of the stem vowel ((28a) vs (28e)), and it does not induce [+ATR] raising (28c). This dissociation of [+high]-raising and [+ATR]-raising further supports the assumption that VR must be decomposed into different phonological harmony processes.

- (28) *A [-ATR] stem-level affix: -ɖɪn/-ɖɪn* (Andersen 2000:38)

	SG	PL	
a.	ɖɔ:l	ɖʊ:l-ɖɪn	'anus'
b.	gɛ:l	gɪl-ɖɪn	'lion'
c.	ʔɪr	ʔɪr-ɖɪn	'thief'
d.	jɔ:m	jʊm-ɖɪn	'monkey species'
e.	run	run-ɖɪn	'year'

I assume that the vowel of **-ɖɪn** is underlyingly [-] and undergoes [ATR] harmony similarly to the one we have observed for word-level affixes, whereas

plural **-it** is specified [+ATR], which accounts for the fact that it never surfaces as **-rt**. Finally there seems to be a third class of stem-level affixes, instantiated by plural **-uk/-ɔk** and **-u/-ɔ-** which surface sometimes as [+ATR] and sometimes as [-ATR] according to the context, but nonetheless trigger [+ATR]-raising on low and high vowels. I analyze these affixes as containing [-ATR] vowels accompanied by exponents consisting of a floating [+ATR]. The table in (29) summarizes the representations and effects of all three affix types:

(29) *Stem-level affix types in Mayak*

		Context Dependent [ATR]	[high] raising [ɛ] ⇒ [ɪ]	[ATR] raising [a] ⇒ [ʌ]
a. -ḍin/-ḍin	$\begin{array}{c} [-] \\   \\ \text{ɪ} \\ \wedge \\ [+h] \quad [-l] \end{array}$	+	+	-
b. -it	$\begin{array}{c} [-] \\   \\ \text{i} \\ \wedge \\ [+h] \quad [-l] \end{array}$	-	+	+
c. -uk/-ɔk -u/-ɔ-	$\begin{array}{c} [-] \quad [-] \\   \\ \text{ɔ} \\ \wedge \\ [+h] \quad [-l] \end{array}$	+	+	+

The analysis uses the constraints in (30) which were already used for Mayak word-level harmony and are extended here to range over F (i.e., [ATR] and [h]). Thus DEP F abbreviates DEP [-], DEP [h]. DEP F which is again undominated will not be explicitly shown in the following tableaux.

- (30) *Constraints on [h] and [-]*
- a. DEP<sub>F</sub> Assign \* to every F  
which is in M but not in P
  - b. \*[-h]<sub>F</sub> Assign \* to every non-unary F span  
whose right-most vowel is [-h] in I  
Assign \* to every morphological association line  
between a segmental root node and a feature node  
which is not phonetic
  - c. MAX<sub>F</sub><sup>‡</sup>

The constraints in (31) trigger and further constrain [ATR]-harmony; they are all crucially undominated at the stem level.  $V \rightarrow [-]$ , an extended version of  $[-l] \rightarrow [-]$ , (31a) triggers [-]-spreading and accounts for the fact that regressive [-] spreading at the word level also affects the low vowel [a]. \*E<sub>F</sub> (31b) implements the ban on [+ATR] mid vowels already observed in section 3. It has two crucial effects: First, in the output of the stem level there are no phonetic mid-vowels which accounts for the fact that Mayak does not have such segments apart from those which are derived by regressive [ATR]-harmony triggered by word-level affixes. Second, Vs which are [-h-l] in the input to the stem level will not become [+ATR] at this stratum even if they finish as high vowels ([ɛ] may become [i], but not [e] or [i]). This holds because \*E<sub>F</sub> is an I-Structure constraint. The constraint DE<sub>F</sub><sup>‡</sup> (31c) is a DERIVED ENVIRONMENT constraint blocking association in monomorphemic contexts generalizing the constraint ALTERNATION proposed by van Oostendorp (2007) (see Trommer 2011 for general discussion of this constraint type). In the analysis here, it has the effect that a floating affix [-] can only associate to the affix vowel if it also associates to a stem V.

- (31) *Additional constraints on [-]*
- a.  $\begin{array}{c} V \\ \downarrow \\ [-] \end{array}$  Assign \* to every V  
which does not dominate a [-] in I
  - b. \*E<sub>F</sub>: Assign \* to every • which  
dominates [-h], [-l] and [-] in I  
Assign \* to every [ATR] node which is
  - c. DE<sub>F</sub><sup>‡</sup> dominated through an epenthetic | by a tautomorphic •  
but not by a heteromorphic •

Finally, there are two constraints which specifically refer to [h]. Constraint

(32a) triggers [h]-harmony on mid-vowels, and the undominated constraint in (32b) blocks rightward spreading of [+h]:

- (32) *Additional constraints on [h]*
- a. [-l] Assign \* to every V  
       ↓ which dominates [-l]  
       [+h] but not [+h] in I  
           Assign \* to every vowel
  - b. MAX<sub>h</sub><sup>l</sup> ] which is right-peripheral on its tier  
       and dominates F in M, but not in P

I will start the discussion of single cases with **-ḍin/ḍin**. With a mid-vowel stem, the [+h] of the affix vowel spreads to the base vowel to satisfy [-l] → [+h]. No [+ATR]-raising takes place since **-ḍin** is specified [-], and DEP F (not shown in the tableau) is undominated:

(33) *[High]-raising: left-spreading of [+h] (jɔm-ḍin ⇒ jɔm-ḍin)*

Input: = b.	*[-h]) <sub>F</sub> MAX <sub>h</sub> <sup>l</sup> ]	*E <sub>F</sub> DE <sub>l</sub>	[-l] ↓ [+h]	V ↓ [-]	MAX <sub>h</sub> <sup>l</sup>
a.				*	*
b.			*!	*	

The affix **-ḍin** does not trigger any changes in other stem-Vs. [+ATR]-raising is excluded since the affix does not contain an underlying [-], and low vowels do not undergo [+h]-raising because they vacuously fulfill [-l] → [-], thus the constraint does not induce a violation of MAX<sub>h</sub><sup>l</sup>. However, the vowel of **-ḍin** itself becomes [+ATR] after [+ATR] vowels to satisfy V → [-]:<sup>5</sup>

<sup>5</sup> Andersen does not provide data where **-ḍin** becomes [+ATR] after the low [+ATR] vowel ʌ,

(34) Context-dependent [ATR]-realization: right-spreading of [-]

(run-din ⇒ run-ḍin)

Input: = b.		*[-h]) <sub>F</sub>	MAX <sub>F</sub> <sub>i</sub>	*E <sub>F</sub>	DE <sub>F</sub>	[-l] ↓ [+h]	V ↓ [-]	MAX <sub>F</sub> <sub>i</sub>
a.								*
b.							*!	

Let us turn now to the behavior of -it, which is underlyingly specified as [-]. If preceded by a low (or high) [-] stem, the [-] of the affix spreads to the stem-V, resulting in [+ATR]-raising triggered by V → [-]. Candidate (35b) illustrates the fact that [+h]-raising never affects low vowels because the MAX<sub>F</sub><sub>i</sub> -violation for [h] (and the concomitant violation for [-l] to avoid a [+l+h] vowel) is not justified by a higher-ranked markedness constraint:

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but since -uk and -u- do so, I assume that this behavior extends to -ḍin. There are no input [+ATR] mid vowels in stems because \*E<sub>F</sub> is undominated at the exponent level.

(35) *Leftwards spreading of [-]* (maac-it ⇒ mΔc-it)

Input: = c.	*E <sub>i</sub> DE <sub>i</sub>	[-l] ↓ [+h]	V ↓ [-]	MAX <sub>F</sub>
<p>a.</p>				*
<p>b.</p>				**!*
<p>c.</p>			*!	

Andersen does not provide an example where -it attaches to a mid-V stem. However, the prediction made by the analysis here is that the stem-vowel raises to high as with other VR affixes. This is shown for the hypothetical noun root \*ʔot in (36):

(36) *L-spreading of +h/No L-spreading of [-]* (\*ʔot-it ⇒ \*ʔot-it)

Input: = d.	*E <sub>4</sub> DE <sub>1</sub>	[-] ↓ [+h]	V ↓ [-]	MAX <sub>F</sub>
<p>a.</p>			*	*
<p>b.</p>	*!			*
<p>c.</p>	*!	*		*
<p>d.</p>		*!	*	

The output of (36) would actually undergo regressive [+ATR]-spreading at the word level resulting in **ʔu t-it**. This is also the prediction which results from Andersen's description of the empirical generalizations.

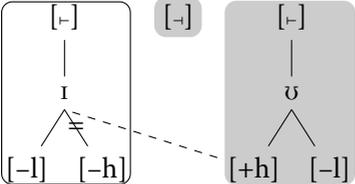
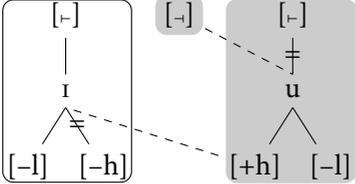
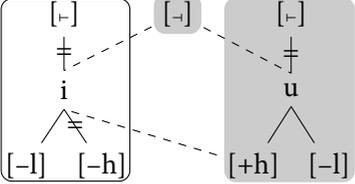
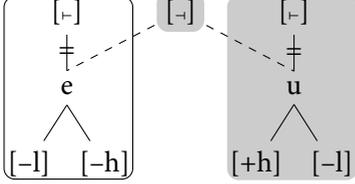
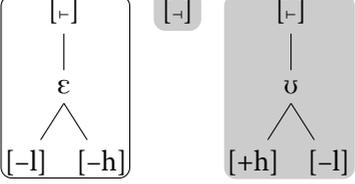
Affixes with a floating [-] induce [+ATR]-raising on both affix and peripheral (non-mid) stem vowels by association of the floating feature to satisfy  $V \rightarrow [-]$ :

(37) Association of floating [-] (cim-<sub>-</sub>uk ⇒ cim-uk)

Input: = d.	DEP F	DE <sub>-1</sub> <sup>‡</sup>	[-] ↓ [+h]	V ↓ [-]	MAX <sub>F</sub> <sup>‡</sup>
a.					**
b.		*!		*	*
c.				*!	*
d.				*!*	

Importantly with mid-vowel stems, we get [+h]-raising, but not [+ATR]-raising. The crucial candidate is (38c) which exhibits both processes, but is blocked since the stem vowel notwithstanding the phonetic deassociation is still associated to [-h], [-l], and [-], and hence violates \*E. The essential role of DE<sub>-1</sub><sup>‡</sup> becomes obvious in (38b), where it blocks association of the floating [-] to the affix vowel only:

(38) *L-Spreading of [+h]/non-association of floating [-]*  
 (mek-<sub>1</sub>-uk ⇒ mɪŋ-uk)

Input: = e.	*E <sub>1</sub> DE <sub>1</sub>	[-] ↓ [+h]	V ↓ [-]	MAX <sub>F</sub>
a. 			**	*
b. 	*!		*	*
c. 	*!			*
d. 	*!	*!		*
e. 		*!	**	

## 5. Conclusion

In this paper, I have shown that the apparent challenge posed by vowel raising in Mayak can be captured by two formal devices, generalized markedness constraints in a containment-based approach to phonological opacity (Trommer 2011), and the stratal organization of the morphology-phonology interface (Kiparsky 2003, Bermúdez-Otero 2013). Since both mechanisms are amply supported by empirical and conceptual evidence, this reduces the vowel raising problem to independently motivated primitives of grammatical organization. The added value of the phonological analysis for Mayak is that it allows for capturing succinctly apparent additional small-scale differences in the behavior of different affixes triggering vowel raising. The question whether these differences are fully general for the language is an important challenge for future empirical investigation.

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# Case matching as bidirectional Agree

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## Abstract

The aim of this paper is to derive the case matching patterns of free relative and parasitic gap constructions in German and Polish by varying the order and directionality of Agree operations. Case matching in both constructions is modeled as an Agree relation between an overt category and an additional covert category. Assuming that derivations proceed bottom-up and obey the Strict Cycle Condition, upward Agree between the two categories results in empty valuation, which in turn leads to configurations where case mismatches are allowed. In that sense, upward Agree counterbleeds the case matching condition that holds in free relatives and parasitic gaps.

## 1. Introduction

The main goal of this paper is to develop an analysis of case matching effects as they occur with free relatives (FRs) and parasitic gaps (PGs). An example for a free relative clause is given in (1), an example for parasitic gaps is given in (2).

(1) *Free relatives*

I'll buy *what* you are selling.

(2) *Parasitic gaps*

*Which article* did you file without reading?

In both constructions, we have one overt element that is shared between two verbs. This is obvious for parasitic gap constructions: the *wh*-phrase *which article* is the object of *file* and *read*. In the case of free relatives, the sharing is less obvious: the *wh*-pronoun *what* is the object of *sell*, but the entire embedded

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clause is the object of *buy*. Still, the embedded *wh*-pronoun is perceptible for selectional properties of the matrix verb (Bresnan & Grimshaw 1978). Therefore, the *wh*-pronoun can also be considered to be part of the matrix clause.

Further evidence for the fact that the *wh*-phrase in both constructions is shared between the two clauses comes from case matching effects. In both configurations, the overt category has to satisfy the case needs of the matrix verb and the embedded verb.

The aim of this paper is to explore this case matching property in more detail. As shown below, the matching condition is subject to linguistic variation. More concretely, we see that, when it comes to case matching in both constructions, Polish is the mirror image of German: In German, case mismatches are allowed with free relatives but not with parasitic gaps; in Polish, case mismatches are allowed with parasitic gaps but not with free relatives.

The cross-linguistic variation shows that each construction can in principle be subject to a case matching condition. Thus, an analysis is required that allows case matching in both constructions, but can still account for the distribution of case matching effects as shown in (2).

The paper is structured as follows: In section 2, the case matching patterns in German and Polish are introduced. In section 3, an analysis is developed that captures the twofold variation observed in the case matching patterns. The main assumption of the account is that case matching is modeled as Agree, that Agree is bidirectional, and that the direction of Agree depends on the language and the construction. In case of downward Agree, strict matching is required, while mismatches are possible in case of upward Agree. Section 4 summarizes the interactions between the Agree operations showing that upward Agree leads to counterbleeding of the matching condition. In section 5, some extensions to the basic pattern derived in section 3 are analyzed. These extensions concern speaker variation and syncretisms. Finally, in section 6, I discuss possible alternatives to the bidirectional Agree approach, concluding that this approach fares best with the data. Section 7 concludes.

## 2. Data

This section shows in detail why Polish can be considered the mirror image of German when it comes to case matching effects. First, the pattern of German is described. Afterwards the facts in Polish are introduced.

## 2.1. German (Fanselow 1993, Pittner 1995, Kathol 2001, Vogel 2001)

The examples in (3) show that the cases of the parasitic gap and its antecedent have to match in German. In (3a), both the parasitic gap and the antecedent bear accusative case. Thus, the sentence is grammatical. Example (3b) shows that it is also possible to have dative case in both positions. In (3c-d), the cases of the antecedent and the parasitic gap differ. Both sentences are ungrammatical. The cases in (3e) differ, too, but this does not lead to ungrammaticality. In contrast to (3c,d), the differing cases in (3e) are syncretic. This implies that the morphological cases rather than the syntactic cases are subject to the matching condition.

(3) *Parasitic gaps: Strict case matching*

- a. weil Hans *die*<sub>ACC</sub> *Frau* [ ohne anzusehen<sub>ACC</sub> ]  
 because Hans the woman without to.look.at  
 geküsst<sub>ACC</sub> hat  
 kissed has  
 ‘because Hans has kissed the woman without looking at her’
- b. weil Hans *der*<sub>DAT</sub> *Frau* [ anstatt zu helfen<sub>DAT</sub> ]  
 because Hans the woman instead.of to help  
 schadete<sub>DAT</sub>  
 hurt  
 ‘because Hans hurt the woman instead of helping her’
- c. weil Hans \**der*<sub>DAT</sub>/\**die*<sub>ACC</sub> *Frau* [ anstatt zu helfen<sub>DAT</sub> ]  
 because Hans the woman instead.of to help  
 behinderte<sub>ACC</sub>  
 hampered  
 ‘because Hans hampered the woman instead of helping her’
- d. weil Hans \**der*<sub>DAT</sub>/\**die*<sub>ACC</sub> *Frau* [ anstatt zu  
 behindern<sub>ACC</sub> ] half<sub>DAT</sub>  
 hamper helped  
 ‘because Hans hampered the woman instead of helping her’

- e. weil Hans *der*<sub>GEN/DAT</sub> *Verstorbenen* [ anstatt ein Gedicht zu  
because Hans the dead.one instead.of a poem to  
widmen<sub>DAT</sub> ] in einer Gradrede gedachte<sub>GEN</sub>  
dedicate in a eulogy commemorate  
'because Hans commemorated the dead one in a eulogy instead of  
dedicating a poem to her'

Turning to free relative clauses in German, we can observe a different pattern of case matching. Examples (4a) and (4b) show that if the cases assigned to the *wh*-phrase by the embedded verb and the matrix verb are identical, the resulting sentence is fine, just as with parasitic gaps in (3a-b). The sentences in (4c-d) show that free relatives differ from parasitic gaps in the matching condition. While in (4d), the differing cases lead to ungrammaticality just as in (3d), the case mismatch in (4c) can be resolved if the *wh*-phrase bears dative case, the case of the embedded clause. This contrasts with (3c), where the same case mismatch could not be resolved in a parasitic gap configuration.

(4) *Free relatives: Absence of case matching (with case restrictions)*

- a. Hans mag<sub>ACC</sub> [ *wen*<sub>ACC</sub> (auch immer) Maria hasst<sub>ACC</sub> ].  
Hans likes who ever Maria hates  
'Hans likes whoever Maria hates.'
- b. Hans hilft<sub>DAT</sub> [ *wem*<sub>DAT</sub> (auch immer) er vertraut<sub>DAT</sub> ].  
Hans helps who ever he trusts  
'Hans helps whoever he trusts.'
- c. Hans mag<sub>ACC</sub> [ \**wen*<sub>ACC</sub>/*wem*<sub>DAT</sub> (auch immer) Maria vertraut<sub>DAT</sub> ].  
Hans likes who ever Maria trusts  
'Hans likes whoever Maria trusts.'
- d. Hans vertraut<sub>DAT</sub> [ \**wen*<sub>ACC</sub>/*\*wem*<sub>DAT</sub> (auch immer) Maria mag<sub>ACC</sub> ].  
Hans trusts who ever Maria likes  
'Hans trusts whoever Maria likes.'

2.2. Polish (Citko 2013)

The case matching pattern in Polish differs from the one in German. As can be seen in (5a) and (5b), parasitic gaps in Polish are possible with accusative and dative case. Examples (5c-d) show that the case mismatches that are not allowed in German (3) are fine in Polish.

(5) *Parasitic gaps: Absence of strict case matching*

- a. To jest dziewczyna, którą<sub>ACC</sub> Jan tolerował<sub>ACC</sub> [ zanim  
this is girl which Jan tolerated before  
polubił<sub>ACC</sub> ].  
liked  
'his is the girl Jan tolerated before he grew to like.'
- b. To jest dziewczyna, której<sub>DAT</sub> Jan towarzyszył<sub>DAT</sub> [ zanim  
this is girl which Jan accompanied before  
zaczął pomagać<sub>DAT</sub> ].  
started help  
'This is the girl who Jan kept company before he started to help.'
- c. To jest dziewczyna, którą<sub>ACC</sub>/ \*której<sub>DAT</sub> Jan lubił<sub>ACC</sub> [ zanim  
this is girl which Jan liked before  
zaczął pomagać<sub>DAT</sub> ].  
started help  
'This is the girl Jan liked before he started to help.'
- d. To jest dziewczyna, której<sub>DAT</sub>/ \*której<sub>ACC</sub> Jan ufał<sub>DAT</sub> [ zanim  
this is girl which Jan trusted before  
polubił<sub>ACC</sub> ].  
liked  
'This is the girl Jan trusted before he got to like.'

Finally, the data in (6) show the case matching pattern of free relatives in Polish. If the cases are identical as in (6a) and (6b), the resulting sentence is grammatical. However, if the two cases are not the same, as in (6c) and (6d), the outcoming sentence is not grammatical. The example in (6e) shows again that, if the two mismatching cases are morphologically identical, a conflict can be circumvented.

(6) *Free relatives: Strict case matching*

- a. Jan lubi<sub>ACC</sub> [ *kogokolwiek*<sub>ACC</sub> Maria lubi<sub>ACC</sub> ].  
Jan likes whoever Maria likes  
'Jan likes whoever Maria likes.'
- b. Jan pomaga<sub>DAT</sub> [ *komukolwiek*<sub>DAT</sub> ufa<sub>DAT</sub> ].  
Jan helps whomever trusts  
'Jan helps whomever he trusts.'

- c. Jan lubi<sub>ACC</sub> [ \*kogokolwiek<sub>ACC</sub>/\*komukolwiek<sub>DAT</sub> dokucza<sub>DAT</sub> ].  
 Jan likes whoever teases  
 ‘Jan likes whoever he teases.’
- d. Jan ufa<sub>DAT</sub> [ \*komukolwiek<sub>DAT</sub>/\*kogokolwiek<sub>ACC</sub> wpuścił<sub>ACC</sub> do  
 Jan trusts whoever let to  
 domu ].  
 home  
 ‘Jan trusts whoever he let into the house.’
- e. Jan unika<sub>GEN</sub> [ kogokolwiek<sub>GEN/ACC</sub> wczoraj obraził<sub>ACC</sub> ].  
 Jan avoids whoever yesterday offended  
 ‘Jan avoided whoever he offended yesterday.’

### 2.3. Patterns

The patterns we have seen in sections 2.1 and 2.2 are summarized in the tables in (7) to (10). The cells show whether a certain combination of cases is grammatical. The columns correspond to the cases assigned in the embedded clauses. The rows show the cases of the matrix clause. The remarks in brackets indicate under which circumstances a case conflict can be resolved. In parasitic gap configurations in German and in free relatives in Polish, only a case syncretism can help to prevent ungrammaticality. In free relative configurations in German, on the other hand, case mismatches are fine as long as the *wh*-phrase bears the case of the embedded clause.<sup>1</sup> Similarly, in Polish, case mismatches in parasitic gap structures are allowed if the overt antecedent bears the case of the matrix clause.

#### (7) *Parasitic gaps in German*

M/PG	Acc	Dat	Gen
Acc	✓	*	*
Dat	*	✓	✓(syn)
Gen	*	✓(syn)	✓

<sup>1</sup>The only mismatch that is not allowed is a configuration where the case in the embedded clause is accusative while the case of the matrix clause is dative. This is due to case hierarchy effects active in German free relatives (see Pittner 1991, 1995, Vogel 2001 and Grosu 2003 for details). I do not discuss this complication of the pattern in this paper.

(8) *Free relatives in German*

M/FR	Acc	Dat	Gen
Acc	✓	✓(dat)	✓(gen)
Dat	*	✓	✓(gen)
Gen	✓(acc)	✓(dat)	✓

(9) *Parasitic gaps in Polish*

M/PG	Acc	Dat	Gen
Acc	✓	✓(acc)	✓(acc)
Dat	✓(dat)	✓	✓(syn)
Gen	✓(gen)	✓(syn)	✓

(10) *Free relatives in Polish*

M/FR	Acc	Dat	Gen
Acc	✓	*	✓(syn)
Dat	*	✓	*
Gen	✓(syn)	*	✓

The patterns allow for the following observations: First, German and Polish are mirror images of each other when it comes to case matching: free relatives that lack case matching effects in German, show them in Polish, while parasitic gaps that allow case mismatches in Polish show strict matching in German. Second, free relatives and parasitic gaps are mirror images of each: if one of the two constructions shows case matching effects, the other does not. Finally, we have seen that, in both languages, syncretic forms can repair violations of the case matching condition. Thus, what seems to count for matching are not the abstract Case features but the morphological form. Consequently, under the assumption that the morphological form does not count for narrow syntax, the case matching condition cannot be a principle of narrow syntax (see Trommer 2002 and Riemsdijk 2006 for the same conclusion).

### 3. Analysis

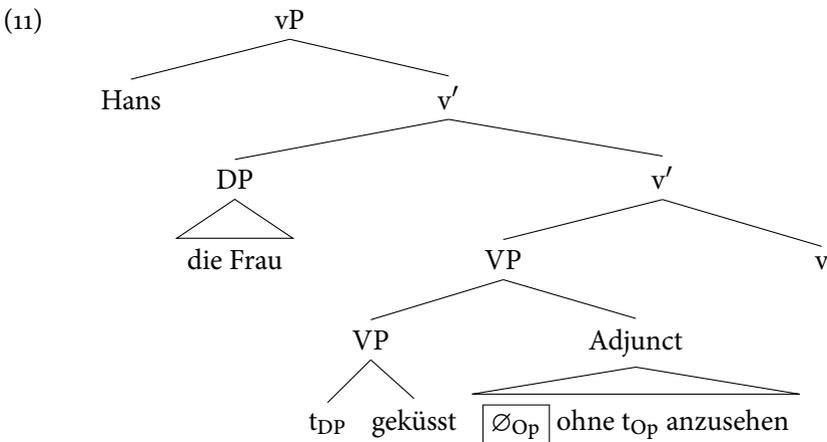
The analysis of the data presented in section 2 will be carried out in a derivational minimalist framework (Chomsky 1995 et seq.) combined with a derivational

modular version of Distributed Morphology (Halle & Marantz 1993, Arregi & Nevins 2012). In order to derive the patterns of case matches and case mismatches, three points will play an important role: the position of covert categories, the directionality of Agree and the order of Agree operations. In this section, I first present all major assumptions and then go through eight sample derivations that illustrate how the Agree approach to case matching works.

### 3.1. The structure

As for the first important point – the position of covert categories – I assume that the ‘dual task’ that the *wh*-phrase in free relatives and the antecedent of a parasitic gap have to perform with respect to case can be captured if there are actually two categories in the structure that each receive a case and have to agree in case. Since only one category appears in the surface structure, one of the two categories has to be phonologically empty.

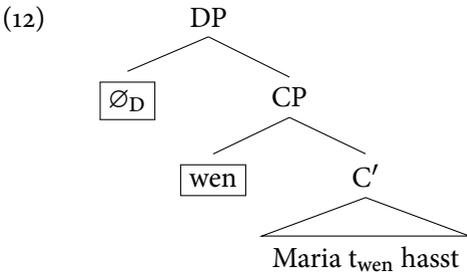
For parasitic gaps, this idea has more or less been the standard theory since Chomsky (1982), Engdahl (1983), Kayne (1983), Chomsky (1986), Cinque (1990), Nissenbaum (2000).<sup>2</sup> Concretely, I will follow the basic idea of Chomsky (1986) (see also Lee 1998 and Nissenbaum 2000), which assumes that the covert category is an empty operator in the left periphery of the embedded clause. Following this assumption, the structure for the German example in (3a) looks as depicted in (11).



<sup>2</sup>But see Nunes (2004) for an approach to parasitic gaps that does without covert categories.

The main point of this analysis is that the empty operator is generated inside the parasitic gap clause, where it receives case. From this position, it moves up to the embedded Spec-CP position. The gap created by movement of the operator is the parasitic gap. In the Spec-CP position, the operator can enter into a syntactic relation with the antecedent in the matrix clause (chain composition in Chomsky's 1986 approach). The antecedent is a phrase that is generated as an object in the matrix clause and moves to a position that c-commands the empty operator. In the example in (11), the DP *die Frau* is the object of the matrix verb *küssen*. This DP is scrambled to Spec-vP, a position that c-commands the empty operator.

Turning to free relatives, it has often been proposed that the structure contains a covert category as well (Bresnan & Grimshaw 1978, Groos & Riemsdijk 1981).<sup>3</sup> The exact position of this covert category has been subject to much debate. In the present analysis, I will adopt the approach by Groos & Riemsdijk (1981), which builds on the idea that the covert category is an empty D head. The structure for (4a) is given in (12).



Thus, the difference between a relative clause and a free relative is simply the overtiness of a nominal head. Unlike relative clauses with an overt head noun, the empty D head and the relative pronoun (the *wh*-phrase) in free relatives have a special syntactic relation which will be responsible for the matching effects we observe.

In sum, the present analysis proposes that the relevant elements in parasitic gap and free relative configurations do not receive case from both the embedded

<sup>3</sup>Equally, it has been proposed that only the *wh*-phrase is present in free relatives, e.g. Citko (2005), Riemsdijk (2006), Donati & Cecchetto (2011). See section 6 for a discussion of these approaches.

and the matrix clause. Instead there are two categories, one overt and one covert, which independently receive case but have to agree in case features.

### 3.2. Case agreement

Assuming that the covert and the overt category in parasitic gap and free relative structures receive case independently, there must be some sort of case agreement between the two categories. Otherwise, the matching effects cannot be derived. I would like to suggest that the case agreement is part of a more general agreement relation between the two elements. Such an agreement has already been proposed in previous approaches (see Assmann 2012 for parasitic gaps, Grosu 2003, Assmann 2013 and Grewendorf & Groat 2013 among others for free relatives).

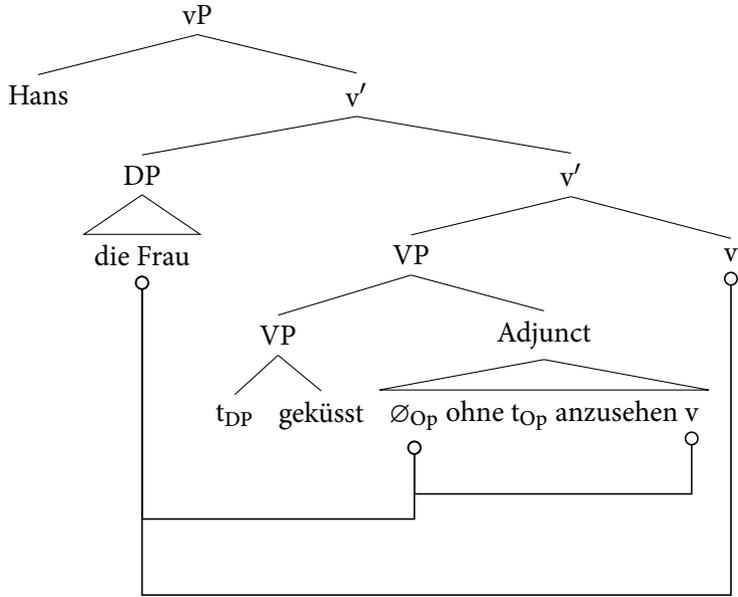
The analysis for case matching effects developed below is based on the crucial assumption that this agreement relation between the two categories is asymmetric: Only one of the two acts as the probe. Anticipating the outcome of the analysis, if the structurally lower category is the probe triggering upward agreement, case matching will not be necessary.

Looking at the properties of this case agreement relationship, I assume that case agreement works like case assignment, which is simply agreement in case features.

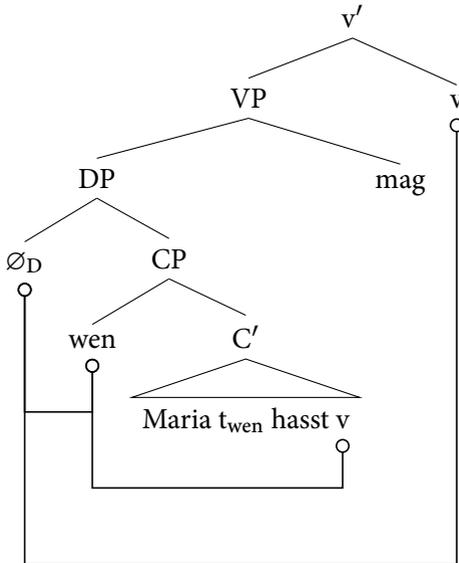
### 3.3. Case assignment

Case assignment is agreement in case features, which is implemented as an Agree operation: the case features from a case assigning head are copied onto a head that probes for case features. Due to the additional case agreement relation in PG and FR constructions, case features are in principle able to probe twice: once to receive case from a functional head and once to agree in case with the second category in the PG/FR construction. This situation is sketched in (13).

(13) a. *Parasitic gaps*



b. *Free relatives*



In parasitic gap constructions, the antecedent agrees with both matrix *v* and the empty operator in the embedded clause. The operator agrees with the embedded *v*. Similarly, in free relative configurations, the *wh*-phrase agrees with the embedded *v* and the empty *D* head. The *D* head receives case from matrix *v*.

Following Arregi & Nevins (2012), Agree consists of two operations: a syntactic Agree-Link and a post-syntactic Agree-Copy. Agree-Link establishes a syntactic relation between the probe and the goal. Post-syntactic Agree-Copy copies the case values from the probe onto the goal. Note that the fact that the success of case agreement depends on the morphological form and not the abstract Case features strongly suggests that at least part of the case dependency must be post-syntactic. The assumption that Agree cannot be entirely post-syntactic is confirmed by the fact that the case matching effects do not disappear if the covert category in parasitic gap or free relative constructions is not in a surface *c*-command relation with its antecedent. This can be illustrated with free relatives in German. Even though, in many cases, case matching is not required, there are cases where a mismatch seems impossible. The relevant example is repeated in (14).

- (14) Hans vertraut<sub>DAT</sub> [ \**wen*<sub>ACC</sub>/\**wem*<sub>DAT</sub> (auch immer) Maria mag<sub>ACC</sub> ].  
 Hans trusts who ever Maria likes  
 ‘Hans trusts whoever Maria likes.’

Changing the tense to past shows that the free relative can actually be extraposed. Since in German, DPs cannot be extraposed, it must be the CP that is moved, leaving the empty *D* head behind. But then, the *D* head no longer *c*-commands the *wh*-phrase. Still, a mismatch is not possible. Assuming that a mismatch is the result of an unsuccessful Agree relation and that Agree requires *c*-command, it follows that Agree must take place before CP-extraposition.

- (15) Hans hat vertraut<sub>DAT</sub> [ DP *D*<sub>∅</sub> *t*<sub>CP</sub> ] [ CP \**wen*<sub>ACC</sub>/\**wem*<sub>DAT</sub>  
 Hans has trusted who  
 (auch immer) Maria mag<sub>ACC</sub> ].  
 ever Maria likes  
 ‘Hans trusted whoever Maria likes.’

Thus, we have evidence that case agreement takes place quite early in syntax, and we have evidence that it applies post-syntactically. These facts fit well with

the theory proposed in Arregi & Nevins (2012) where it is argued that Agree is not one operation but needs to be split up into a search operation Agree-Link and a valuation operation Agree-Copy.

There are two types of conditions that govern successful Agree. The first condition is the *c-command* condition that applies to the syntactic Agree-Link operation. The special assumption I would like to make is that the directionality of Agree does not play a role: hence, either the probe *c-commands* the goal or the goal *c-commands* the probe. Consequently, there is upward as well as downward agreement for case features (see Zeijlstra 2012 for upward Agree).

The second condition is a matching condition that concerns Agree-Copy. Concretely, Agree-Copy is only successful if the case feature value of probe and goal do not conflict. Obviously, a conflict cannot arise if one of the two features is still unvalued. Thus, the second Agree relation can potentially fail if the probe already bears a feature value that is not matched by the goal.

The final point about Agree concerns the order of Agree operations. As Agree-Link applies in syntax, the order of Agree-Link operations is governed by Earliness (Pesetsky 1989, Řezáč 2004). Post-syntactic Agree-Copy cannot rely on Earliness because the structure is already built. I would like to propose that the order is determined by the syntactic structure, which is still present at the stage when Agree-Copy applies (see Arregi & Nevins 2012). Concretely, case probes that are lower in the structure receive their case features first, that is, Agree-Copy proceeds bottom-up. If a category probes twice for case features, which happens in free relative and parasitic gap constructions due to the additional relation (see above), the order is free.

### 3.4. Variation

The constraints on Agree and Case assignment proposed above hold cross-linguistically. What can vary, however, is the direction of the additional Agree relation in sharing constructions. This can vary between constructions and, as I would like to suggest, between languages. To account for the difference in case matching between German and Polish, I will propose that Polish and German differ in whether the overt element or the covert element triggers case agreement in FRs and PGs: In German, case agreement is triggered by the overt element, that is, the antecedent of a parasitic gap or the *wh*-phrase in free relatives. In Polish, on the other hand, the case probe sits on the covert item.

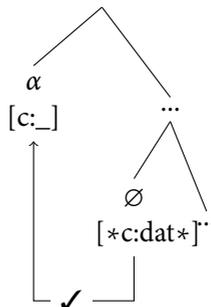
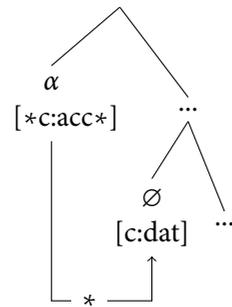
This means that in German, the case feature of the overt item in a PG/FR

construction has a double probe property: it probes for a case feature on a case assigning head and it probes for the case value of the empty element in these configurations. In Polish, it is the covert item that probes the case assigning head and the case feature of its antecedent in a PG/FR configuration. Henceforth this double probe property will be depicted as [*\*case:\_\**]. ‘\_’ stands for ‘I need a value’, while ‘\* \*’ stands for ‘I want to probe a second time’ (see Sternefeld 2006 for the notation \* \*). Put simply, sometimes case features need to be valued and additionally checked.

The proposed parameter leads to the four possible configurations shown in (16). Each configuration corresponds to one of the four patterns discussed in section 2.

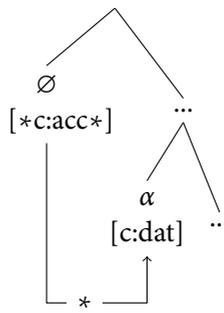
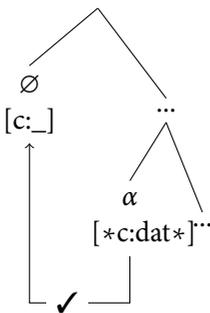
(16) a. *German PG*

b. *Polish PG*



c. *German FR*

d. *Polish FR*



The structures show the case features at the time when the case feature on  $\alpha/\emptyset$  undergoes post-syntactic Agree-Copy a second time.  $\alpha$  stands for the overt element, while  $\emptyset$  is the covert item in the structure.

In German parasitic gap constructions, the overt antecedent is higher up in the structure than the empty operator. Therefore, the empty operator receives all its case values before the antecedent. Furthermore, we have downward Agree between the two categories because, in German, the antecedent probes for the case value of the empty operator. This leads to a dilemma in configurations where the two cases are not identical. In (16a), the empty operator has received dative case from the embedded verb and its antecedent has received accusative case from the matrix verb. At the point when the antecedent wants to copy the case value of the empty operator, the matching condition on Agree is violated. Therefore, the case feature of the antecedent cannot be checked a second time and the derivation crashes.

In Polish, on the other hand, we have upward Agree in this configuration because the empty operator is the probe. At the time when the empty operator probes for the case value of the antecedent, the antecedent has not received a case value yet. Thus, matching is trivially fulfilled as seen in (16b). The result of this upward Agree operation is empty valuation on the empty operator. Later on, the antecedent receives its case value, but this comes too late to potentially cause a problem with Agree between antecedent and operator.

Turning to free relatives, we see that the direction of Agree is reversed with respect to parasitic gaps. The reason for this is that in the structure of free relatives, the covert category (the empty D head) is higher in the structure. Therefore, it is the overt category that receives its case value first. Thus, in German free relatives (16c) – because the overt item is the probe – we have upward Agree. Like in Polish parasitic gap structures, upward Agree leads to empty valuation with the result that case mismatches can be tolerated. In Polish free relatives, however, we have downward Agree since in Polish, the empty category is the probe.

In sum, the main idea of the analysis is that if the lower of the two elements is the probe, we have upward case agreement that results in empty valuation because the higher goal has not received its case features yet. Consequently, the case feature value of the higher goal will not count for matching and mismatches are allowed. If, on the other hand, the higher of the two elements is the probe, the lower element has already received its case feature value. In this case, both the case feature value of the higher probe and the lower goal will count for matching and strict case matching is required.

3.5. Derivations

In order to show why downward Agree leads to strict case matching while upward Agree makes mismatching possible, the rest of this section explains some of the most important derivations in detail. We start with German parasitic gaps.

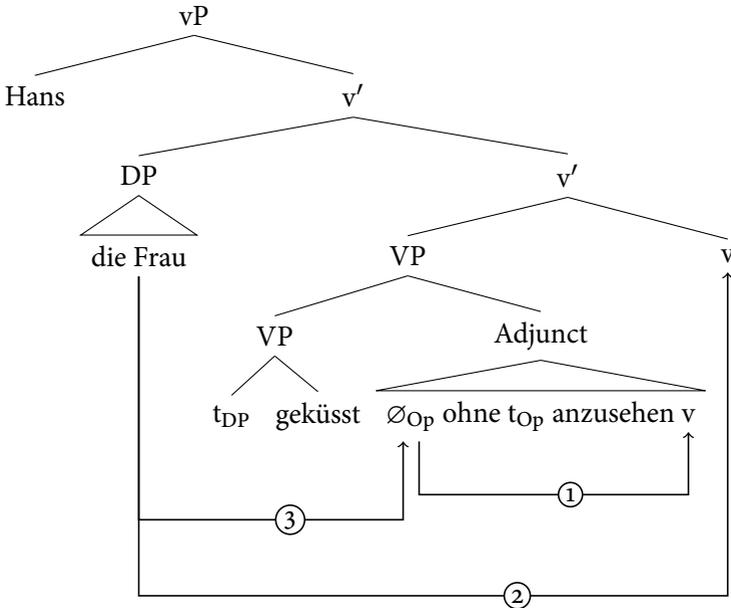
3.5.1. German parasitic gaps

To see how the proposed analysis works, we start with the description of an example with matching case. The relevant example is repeated in (17).

- (17) weil Hans *die*<sub>ACC</sub> Frau [ ohne anzusehen<sub>ACC</sub> ] küsste<sub>ACC</sub>  
 because Hans the woman without to.look.at kissed

The structure in (18) shows how the syntactic Agree-Link relations are established.

(18) Syntactic Agree-Link



At first, the empty operator in the embedded clause agrees with *v*. In the matrix clause, the antecedent first agrees with the matrix *v* head. Afterwards, the antecedent *die Frau* is scrambled to Spec-*v*P, where it *c*-commands the empty operator. In this configuration, a third Agree-Link relation can be established between the antecedent and the empty operator.

In the post-syntactic component, Agree-Copy applies and the case features of the antecedent and the parasitic gap are valued. This valuation proceeds bottom-up with the lowest probe being valued first. For case agreement, this means that, in parasitic gap structures, the empty operator receives its accusative from the embedded *v* before the antecedent *die Frau* receives a value. This step is shown in (19).

(19) Step I:  $\emptyset[c:_] \longrightarrow v[c:acc]: \emptyset[c:acc]$

Next, the case feature of the antecedent is valued. Since its case feature is a double probe, there are two possible orders of case assignment. Both orders lead to the same result, as shown in (20). (Note that  $\alpha$  stands for the antecedent.)

(20) Step II:  $\alpha[*c:_*] \longrightarrow v[c:acc]: \alpha[*c:acc*]$   
 or  $\alpha[*c:_*] \longrightarrow \emptyset[c:acc]: \alpha[*c:acc*]$   
 Step III:  $\alpha[*c:acc*] \longrightarrow \emptyset[c:acc]: \alpha[c:acc]$   
 or  $\alpha[*c:acc*] \longrightarrow v[c:acc]: \alpha[c:acc]$

In the first option, the antecedent receives accusative case from matrix *v* and checks it afterwards against the accusative case value of the empty operator. Since there is no mismatch, Agree-Copy applies successfully both times.

In the alternative order, the antecedent first receives accusative from the empty operator and agrees with matrix *v* afterwards. Again, since all the relevant case values are identical, Agree between the antecedent and the empty operator is possible.

Next, we see that, if the two relevant cases are not identical, Agree between the antecedent and the empty operator in German parasitic gaps fails. The example that illustrates this configuration is repeated in (21).

(21) weil Hans \**der*<sub>DAT</sub>/\**die*<sub>ACC</sub> *Frau* [ *anstatt* *zu helfen*<sub>DAT</sub> ]  
 because Hans the woman instead.of to help  
 behinderte<sub>ACC</sub>  
 hampered

The syntactic derivation of (21) works as in (18). The difference lies in the cases being assigned. In the derivation of (21),  $\emptyset$  receives dative case in the embedded clause. For concreteness, dative case is assigned by an empty applicative head Appl. Alternatively, dative can be assigned by an empty preposition or some other functional head. Nothing hinges on that.

The difference in the post-syntactic derivation is that some of the Agree-Copy operations cannot apply due to violation of the matching condition on Agree. The two possible orders of the relevant Agree-Copy operations are shown in (22).

$$\begin{array}{l}
 (22) \quad \text{Step I:} \quad \emptyset[c: \_ ] \longrightarrow \text{Appl}[c:\text{dat}]: \emptyset[c:\text{dat}] \\
 \hline
 \text{Step II:} \quad \alpha[*c: \_ *] \longrightarrow v[c:\text{acc}]: \alpha[*c:\text{acc}*] \\
 \quad \quad \text{or} \quad \alpha[*c: \_ *] \longrightarrow \emptyset[c:\text{dat}]: \alpha[*c:\text{dat}*] \\
 \\
 \text{Step III:} \quad \alpha[*c:\text{acc}*] \longrightarrow \emptyset[c:\text{dat}]: \downarrow \\
 \quad \quad \text{or} \quad \alpha[*c:\text{dat}*] \longrightarrow v[c:\text{acc}]: \downarrow
 \end{array}$$

In the first step, the empty operator receives dative case in the embedded clause. Afterwards, the antecedent (*Hans*) probes for the matrix *v* head and the empty operator. If it gets accusative case from *v* first, as shown in the left column in (22), a mismatch arises when it tries to agree a second time with the empty operator. Reversing the order as in the right column does not help either because after receiving dative case from the empty operator, the antecedent can no longer agree with the accusative bearing *v* due to a violation of the matching condition.

In sum, the fact that in the final Agree-Copy operation, both the probe and the goal bear a case value, requires identity of the values. Otherwise the matching condition is violated.

### 3.5.2. *Polish parasitic gaps*

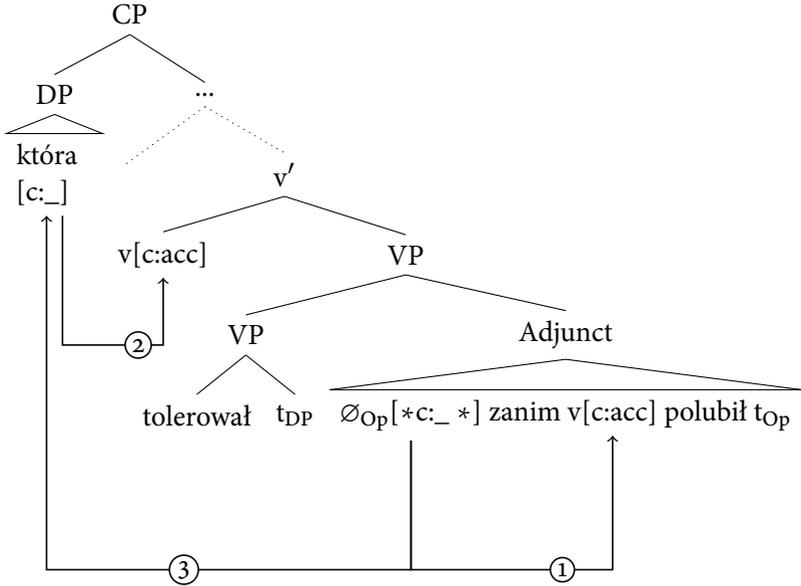
The difference between Polish and German is illustrated by the example in (23).

$$\begin{array}{l}
 (23) \quad \text{To} \quad \text{jest} \quad \text{dziewczyna}, \quad \text{którq}_{\text{ACC}} \quad \text{Jan} \quad \text{tolerował}_{\text{ACC}} \quad \text{zanim} \quad \text{polubił}_{\text{ACC}}. \\
 \quad \quad \text{this is} \quad \text{girl} \quad \quad \quad \text{which} \quad \text{Jan} \quad \text{tolerated} \quad \quad \text{before} \quad \text{liked}.
 \end{array}$$

The syntactic derivation of parasitic gaps in Polish is basically the same as in German. The crucial difference between Polish and German is that  $\emptyset$  bears the

case feature that probes twice. Thus, we have upward agreement in PGs in Polish. This is shown in (24).

(24) *Syntactic Agree-Link*



The two possible orders of post-syntactic Agree-Copy operations are given in (25).

- (25) Step I:  $\emptyset[*c:_*] \rightarrow v[c:acc]: \emptyset[*c:acc*]$   
 or  $\emptyset[*c:_*] \rightarrow \alpha[c:_]: \emptyset[c:_]$
- Step II:  $\emptyset[*c:acc*] \rightarrow \alpha[c:_]: \emptyset[c:acc]$   
 or  $\emptyset[c:_] \rightarrow v[c:acc]: \emptyset[c:acc]$
- 
- Step III:  $\alpha[c:_] \rightarrow v[c:acc]: \alpha[c:acc]$

At first, the empty operator copies the value from the embedded *v* and the antecedent *która*. Independent of the order between the two copy operations, the empty operator ends up with an accusative case value from the embedded *v* because *która* does not bear a value at this point. In the final step, *która* receives accusative case from matrix *v*.

The difference between German and Polish becomes obvious if we look at parasitic gap structures with mismatching cases. The relevant example from section 2.2 is repeated in (26).

- (26) To jest dziewczyna, *która*<sub>ACC</sub> / \**której*<sub>DAT</sub> Jan lubił<sub>ACC</sub> zanim zaczął  
 this is girl which Jan liked before started  
 pomagać<sub>DAT</sub>.  
 help.

In contrast to German, a mismatch in case features is tolerated in Polish parasitic gaps. This comes about because the probe of the  $\alpha$ - $\emptyset$  agreement relation is lower than the goal. Consequently, upward agreement will result in empty valuation, which counter-bleeds the matching condition. The derivation is shown in (27).

- (27) Step I:  $\emptyset[*c: \_ *] \rightarrow \text{Appl}[c:\text{dat}]: \emptyset[*c:\text{dat} *]$   
 or  $\emptyset[*c: \_ *] \rightarrow \alpha[c: \_]: \emptyset[c: \_]$   
 Step II:  $\emptyset[*c:\text{dat} *] \rightarrow \alpha[c: \_]: \emptyset[c:\text{dat}]$   
 or  $\emptyset[c: \_] \rightarrow \text{Appl}[c:\text{dat}]: \emptyset[c:\text{dat}]$   
 Step III:  $\alpha[c: \_] \rightarrow v[c:\text{acc}]: \alpha[c:\text{acc}]$

The derivation in (27) is basically the same as in (25), the only difference being that the empty operator receives dative from an applicative head. But crucially, since *która* receives its accusative case feature in step III after the empty operator, it cannot conflict with the dative feature on the empty operator. Hence, a violation of the matching condition is prevented by upward Agree.

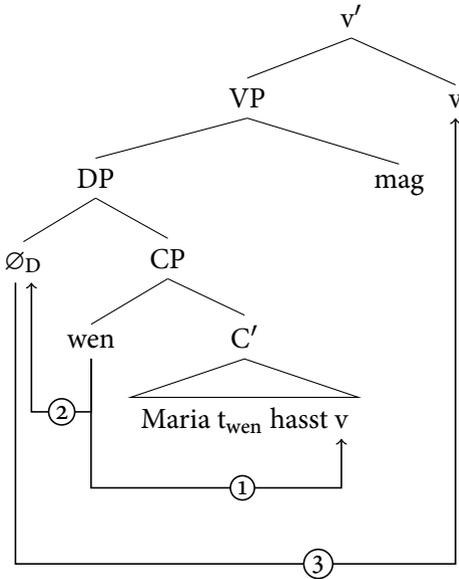
### 3.5.3. German free relatives

After explicitly showing how variation of case matching in parasitic gap constructions is derived, we turn to free relatives, which are the mirror image of parasitic gaps. We start with German. The crucial example is repeated in (28).

- (28) Hans mag<sub>ACC</sub>, wen<sub>ACC</sub> Maria hasst<sub>ACC</sub>.  
 Hans likes who Maria hates  
 ‘Hans likes who Maria hates.’

The tree in (29) shows the Agree-Link relations.

## (29) Syntactic Agree-Link



At first, the wh-phrase *wen* is merged as the object of the embedded clause where it establishes an Agree relation with the embedded *v*. Once the entire relative clause is built, *wen* moves up to Spec-CP. After the empty D head is merged, *wen*, being overt, probes for the D head. This is upward Agree. Finally as the structure-building continues, the D head agrees with matrix *v*.

The crucial difference to parasitic gaps is that this time, the overt item is lower in the structure. Still, being the probe, it adheres to the property of German, namely that it is the overt item that probes for the covert item.

Turning to the post-syntactic part of Agree, we see that (30) strongly resembles the derivation of parasitic gaps in Polish: the lower of the two categories – this time the covert one – probes for the higher category. Thus, we have upward Agree, which results in empty valuation and counter-bleeds the matching condition. The derivation is shown in (30).

- |      |           |   |
|------|-----------|---|
| (30) | Step I:   | $\alpha[*c:_*] \rightarrow v[c:acc]: \alpha[*c:acc*]$       |
|      | or        | $\alpha[*c:_*] \rightarrow \emptyset[c:_]: \alpha[c:_]$     |
|      | Step II:  | $\alpha[*c:acc*] \rightarrow \emptyset[c:_]: \alpha[c:acc]$ |
|      | or        | $\alpha[c:_] \rightarrow v[c:acc]: \alpha[c:acc]$           |
|      | Step III: | $\emptyset[c:_] \rightarrow v[c:acc]: \emptyset[c:acc]$     |

First, *wen* receives accusative from the embedded v. Since the empty D head does not bear a case value yet, *wen* ends up with accusative case from v after step II. After *wen* has received its case feature values, the case feature on the empty D head is copied from matrix v (Step III).

The fact that German free relatives allow case mismatches, just like Polish parasitic gaps, is shown with the example in (31).

- (31) Hans mag<sub>ACC</sub>, \*wen<sub>ACC</sub>/wem<sub>DAT</sub> Maria vertraut<sub>DAT</sub>.  
 Hans likes who Maria trusts

The derivation of (31) is the same as in (30), but this time, the wh-phrase *wem* receives dative case in the embedded clause. Again, the reason why this dative case value on *wem* does not conflict with the accusative case on the empty D head is that Agree-Copy between *wem* and D applies before D receives its value in Step III. That is, at the point where the matching condition of Agree applies, no conflict is given.

- (32) Step I:  $\alpha[*c:_*] \rightarrow \text{Appl}[c:\text{dat}]: \alpha[*c:\text{dat}*]$   
 or  $\alpha[*c:_*] \rightarrow \emptyset[c:\_]: \alpha[c:\_]$   
 Step II:  $\alpha[*c:\text{dat}*] \rightarrow \emptyset[c:\_]: \alpha[c:\text{dat}]$   
 or  $\alpha[c:_] \rightarrow \text{Appl}[c:\text{dat}]: \alpha[c:\text{dat}]$   


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 Step III:  $\emptyset[c:_] \rightarrow v[c:\text{acc}]: \emptyset[c:\text{acc}]$

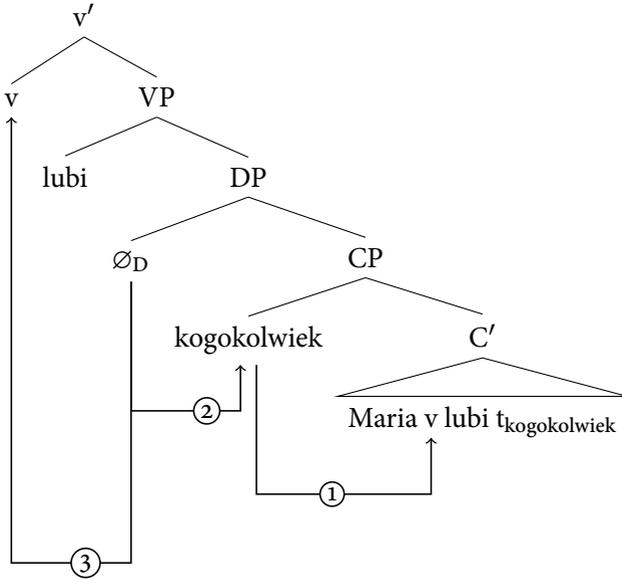
#### 3.5.4. *Polish free relatives*

Finally, looking at Polish free relatives, it can be seen that the derivation is close to the derivation of German parasitic gaps.

- (33) Jan lubi<sub>ACC</sub> *kogokolwiek*<sub>ACC</sub> Maria lubi<sub>ACC</sub>.  
 Jan likes whoever Maria likes

In contrast to German FRs, the probe of the additional case agreement relation is the covert D head, which is higher than the wh-phrase. The structure, as well as the Agree-Link relations are shown in (34).

## (34) Syntactic Agree-Link



The derivation in (34) is identical to the one in (29). The only difference is that we have a downward Agree relation between the empty D head and the wh-phrase *kogokolwiek* in (34). This leads to difference in Agree-Copy, as shown in (35).

- (35)
- |           |   |
|-----------|---|
| Step I:   | $\alpha[c:_] \rightarrow v[c:acc]: \alpha[c:acc]$                   |
| Step II:  | $\emptyset[*c:_*] \rightarrow \alpha[c:acc]: \emptyset[*c:acc*]$    |
|           | or $\emptyset[*c:_*] \rightarrow v[c:acc]: \emptyset[*c:acc*]$      |
| Step III: | $\emptyset[*c:acc*] \rightarrow v[c:acc]: \emptyset[c:acc]$         |
|           | or $\emptyset[*c:acc*] \rightarrow \alpha[c:acc]: \emptyset[c:acc]$ |

In (36), *kogokolwiek* receives accusative from the embedded *v* first. Afterwards, the empty *D* head gets case values from *kogokolwiek* and the matrix *v*. This is unproblematic as all the case values are the same.

However, if the cases differ, as shown in (36), the matching condition is violated.

- (36) Jan lubi<sub>ACC</sub> \*kogokolwiek<sub>ACC</sub>/?\*komukolwiek<sub>DAT</sub> dokucza<sub>DAT</sub>.  
 Jan likes whoever teases

The derivation in (37) shows why this is the case. First, *komukolwiek* receives dative case from the embedded applicative head. Then, the D head, being a double probe, has to decide whether its first value comes from *komukolwiek* or from matrix *v*. If the first option is chosen, the D head receives dative case from *komukolwiek*, but cannot receive accusative case from matrix *v* anymore, due to a mismatch. On the other hand, if it receives accusative first, it cannot match against the dative case of *komukolwiek*.

(37)	Step I:	$\alpha[c:_] \longrightarrow \text{Appl}[c:\text{dat}]: \alpha[c:\text{dat}]$
	Step II:	$\emptyset[*c:_*] \longrightarrow \alpha[c:\text{dat}]: \emptyset[*c:\text{dat}*]$
	or	$\emptyset[*c:_*] \longrightarrow v[c:\text{acc}]: \emptyset[*c:\text{acc}*]$
	Step III:	$\emptyset[*c:\text{dat}*] \longrightarrow v[c:\text{acc}]: \zeta$
	or	$\emptyset[*c:\text{acc}*] \longrightarrow \alpha[c:\text{dat}]: \zeta$

This is reminiscent of the derivation of parasitic gaps in German.

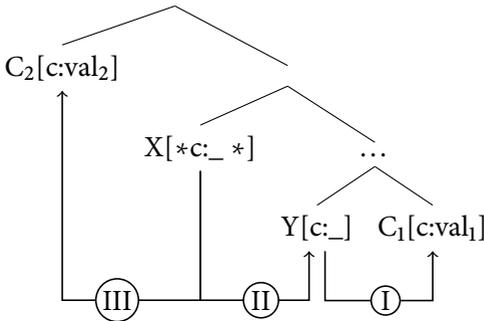
### 3.6. Interim summary

So far, we have seen that the case matching condition is subject to variation between constructions and between languages. Concretely, we have seen that German parasitic gap constructions and Polish free relative constructions adhere to the matching condition, while German free relatives and Polish parasitic gaps do not require matching. This twofold mirror image pattern can be derived if case matching is reduced to the matching condition of Agree and if Agree applies in two steps and is bidirectional: Variation between the constructions determines whether the overt or the covert category is higher in the structure. Variation between the languages determines whether the overt or the covert category triggers Agree. Thus, in German parasitic gap constructions, the overt category is higher in the structure and triggers Agree. This downward Agree requires strict matching between probe and goal. In German free relatives, on the other hand, the overt category is lower in the structure and triggers upward Agree with the higher covert category. Since the matching condition is trivially fulfilled in cases of upward Agree, mismatches are allowed in German free relatives. In Polish, parasitic gaps and free relatives are derived in the same way, the only difference being that it is the covert category that triggers Agree. Therefore, we have upward Agree in Polish parasitic gaps and downward Agree in Polish free relatives, leading to the mirror image of German.

#### 4. Bidirectional Agree and opacity

At the surface, both the overt category and the covert category bear case feature values. But only in some of the examples, conflicting case values cause a violation of case matching. These structures are therefore opaque. In the analysis above, the opacity was resolved by ordering the Agree-Copy operations. In all derivations there are three Agree-Copy relations that are important: (i) the relation between the lower element Y and a case assigning head  $C_1$ , (ii) the relation between the higher element X and another case assigning head  $C_2$  and (iii) the relation between X and Y. If the first two Agree-Copy relations result in feature valuation, the third relation is only successful if the two case values are identical. Otherwise, the matching condition on Agree would be violated. Thus, Agree between X/Y and the  $C_1/C_2$  can bleed Agree between X and Y. This bleeding configuration is illustrated in (38).

(38)

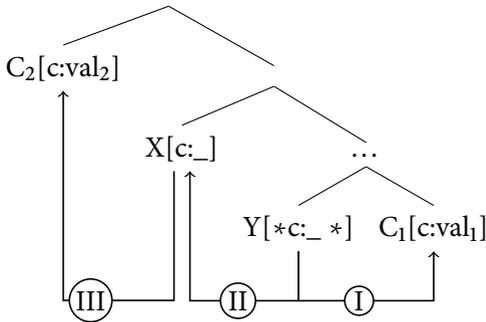


(39)

Step I:	$Y[c:_] \rightarrow C_1[c:val_1]: Y[c:val_1]$
Step II:	$X[*c:_*] \rightarrow C_2[c:val_2]: X[*c:val_2*]$
Step III:	$X[*c:val_2*] \rightarrow Y[c:val_1]: \zeta$

In the first two steps, X and Y receive case values independently from each other. Afterwards, X and Y cannot agree because the matching condition is violated. In the counter-bleeding configuration in (40), X and Y agree, before both have a case value. Thus matching is trivially fulfilled for Agree between X and Y.

(40)



- (41) Step I:  $Y[*c:_*] \rightarrow C_1[c:val_1]: Y[*c:val_1*]$   
 Step II:  $Y[*c:val_1*] \rightarrow X[c:_]: Y[*c:val_1*]$   
 Step III:  $X[c:_] \rightarrow C_2[c:val_2]: X[c:val_2]$

The order of Agree-Copy operations is determined by the position of the Agree probes with lower probes being valued before higher probes due to the bottom-up nature of the post-syntactic derivation. Hence, Y will receive its case feature value first because it is lower in the structure than X. The timing of Agree between X and Y depends on whether Y is the probe or X is the probe: If Y is the probe, it copies the case from X before X actually receives a value, which results in empty feature valuation and trivially fulfills the matching condition independent from the case value X receives later. We thus have a counter-bleeding interaction if Y probes for X, or to put differently, upward Agree leads to counter-bleeding (cf. Georgi 2014).

## 5. Complicating the pattern

### 5.1. More patterns

Not every speaker of Polish or German allows non-syncretic case mismatches in parasitic gap constructions (Bondaruk 1996) or free relatives respectively (Riemsdijk 2006). For these speakers, mismatching forms are ungrammatical in general. Such varieties can be derived under the assumption that, for these speakers, Agree between the overt and the covert and  $\emptyset$  is symmetric: both  $\alpha$  and  $\emptyset$  are probes. Put differently, the strict varieties have both the Polish and the German property. Importantly, Agree being symmetric means that these varieties will always have downward Agree between  $\alpha$  and  $\emptyset$ . Therefore, the

lower of the two items already bears a case value when the higher one probes for its value. Consequently, the values of both  $\alpha$  and  $\emptyset$  count for matching and have to be identical. An example that illustrates the variation is given in (42).

- (42) Hans mag<sub>ACC</sub>, \*wen<sub>ACC</sub>/(\*)wem<sub>DAT</sub> Maria vertraut<sub>DAT</sub>.  
 Hans likes who Maria trusts  
 ‘Hans likes whomever Maria trusts.’

In (42), the *wh*-phrase has to match the dative case of the embedded verb *vertrauen* as well as the accusative case of the matrix verb *mögen*. While some speakers can resolve the conflict by inserting the dative form *wem*, the strict variety does not allow this resolution.

A derivation for (42) that captures the strict variety of German is shown in (44). Note that the syntactic structures in both varieties is identical (see (29)). The only difference concerns the post-syntactic Agree-Copy operations. The derivation in (43) is repeated from (32). In this derivation, Agree between the covert D head and the *wh*-phrase takes place before the D head receives its case value from matrix *v*. Thus, the matrix case value does not count for matching.

- (43) *Mismatch allowed*
- |           |                   |                   |                    |                    |
|-----------|-------------------|-------------------|--------------------|--------------------|
| Step I:   | $\alpha[*c:_*]$   | $\longrightarrow$ | Appl[c:dat]:       | $\alpha[*c:dat*]$  |
|           | or                |                   | $\emptyset[c:_]$ : | $\alpha[c:_]$      |
| Step II:  | $\alpha[*c:dat*]$ | $\longrightarrow$ | $\emptyset[c:_]$ : | $\alpha[c:dat]$    |
|           | or                |                   | Appl[c:dat]:       | $\alpha[c:dat]$    |
| Step III: | $\emptyset[c:_]$  | $\longrightarrow$ | $v[c:acc]$ :       | $\emptyset[c:acc]$ |

In contrast to (43), the derivation in (44) enforces strict matching between the D head and the *wh*-phrase because both categories probe for each other.

(44) *Speakers that do not allow mismatches*

Step I:  $\alpha[*c:_*] \rightarrow \text{Appl}[c:\text{dat}]: \alpha[*c:\text{dat}*]$   
 or  $\alpha[*c:_*] \rightarrow \emptyset[*c:_*]: \alpha[c:_]$

Step II:  $\alpha[*c:\text{dat}*] \rightarrow \emptyset[*c:_*]: \alpha[c:\text{dat}]$   
 or  $\alpha[c:_] \rightarrow \text{Appl}[c:\text{dat}]: \alpha[c:\text{dat}]$

---

Step III:  $\emptyset[*c:_*] \rightarrow v[c:\text{acc}]: \emptyset[*c:\text{acc}*]$   
 or  $\emptyset[*c:_*] \rightarrow \alpha[c:\text{dat}]: \emptyset[*c:\text{dat}*]$

Step IV:  $\emptyset[*c:\text{acc}*] \rightarrow \alpha[c:\text{dat}]: \zeta$   
 or  $\emptyset[*c:\text{dat}*] \rightarrow v[c:\text{acc}]: \zeta$

The difference between (44) and (43) is that in (44) there is an additional downward Agree relation between  $\emptyset$  and  $\alpha$ . This results in a configuration where both the dative case from the embedded clause and the accusative case from the matrix clause count for matching (Step IV in (44)).

Turning to Polish, speaker variation concerns parasitic gaps. The relevant example is repeated in (45).

- (45) To jest dziewczyna, *którą*<sub>ACC</sub> / \**której*<sub>DAT</sub> Jan lubił<sub>ACC</sub> zanim zaczął  
 this is girl which Jan liked before started  
*pomagać*<sub>DAT</sub>.  
 help.

For some speakers, the mismatch between accusative and dative case can be repaired by inserting an accusative case form *którą* as the antecedent of the parasitic gap. The derivation that yields this structure is repeated in (46).

(46) *Speakers that allow mismatch*

Step I:  $\emptyset[*c:_*] \rightarrow \text{Appl}[c:\text{dat}]: \emptyset[*c:\text{dat}*]$   
 or  $\emptyset[*c:_*] \rightarrow \alpha[c:_]: \emptyset[c:_]$

Step II:  $\emptyset[*c:\text{dat}*] \rightarrow \alpha[c:_]: \emptyset[c:\text{dat}]$   
 or  $\emptyset[c:_] \rightarrow \text{Appl}[c:\text{dat}]: \emptyset[c:\text{dat}]$

---

Step III:  $\alpha[c:_] \rightarrow v[c:\text{acc}]: \alpha[c:\text{acc}]$

Similar to the derivation in (43), Agree between the covert and the overt category takes place before the higher category (in this case the overt *wh*-antecedent) receives its case feature. Therefore the matrix accusative case does not count for matching and a case mismatch should be allowed.

In contrast, if the *wh*-antecedent triggers an additional Agree relation with the covert operator, this Agree operation takes place later in the derivation, making both case values count for matching (Step IV in (47)).

(47) *Speakers that do not allow mismatch*

Step I:	$\emptyset[*c:_*] \rightarrow \text{Appl}[c:\text{dat}]: \emptyset[*c:\text{dat}*]$
or	$\emptyset[*c:_*] \rightarrow \alpha[*c:_*]: \emptyset[c:_]$
Step II:	$\emptyset[*c:\text{dat}*] \rightarrow \alpha[*c:_*]: \emptyset[c:\text{dat}]$
or	$\emptyset[c:_] \rightarrow \text{Appl}[c:\text{dat}]: \emptyset[c:\text{dat}]$
Step III:	$\alpha[*c:_*] \rightarrow v[c:\text{acc}]: \alpha[*c:\text{acc}*]$
or	$\alpha[*c:_*] \rightarrow \emptyset[c:\text{dat}]: \alpha[*c:\text{dat}*]$
Step IV:	$\alpha[*c:\text{acc}*] \rightarrow \emptyset[c:\text{dat}]: \downarrow$
or	$\alpha[*c:\text{dat}*] \rightarrow v[c:\text{acc}]: \downarrow$

In sum, altering the Agree relations does not only derive variation between languages but also within languages. The tables in (48) summarize all patterns we have seen so far and their corresponding patterns of Agree relations.

(48)

	Mismatch allowed?			
	German I	German II	Polish I	Polish II
Free relatives	✓	*	*	*
Parasitic Gaps	*	*	✓	*
	Agree			
	German I	German II	Polish I	Polish II
$\emptyset$	goal	probe	probe	probe
$\alpha$	probe	probe	goal	probe

Finally, it should be noted that, assuming that the agreement relation between  $\alpha$  and  $\emptyset$  is an essential property of FR and PG constructions, no language can be derived in which both constructions allow case mismatches. In fact, such a distribution of case matching effects has not been reported in the literature.

## 5.2. Syncretisms

In all four configurations discussed above, syncretic forms can remedy a violation of case matching. Thus, it seems that it is the morphological form and not the abstract case feature that is crucial for the matching effects. The split of Agree into two operations, one of them being post-syntactic, can nicely capture this fact.

The examples in (49) repeat the syncretism effects in Polish. The free relative clause in (49b) should be ungrammatical due to a mismatch between accusative and genitive case. But since the *wh*-phrase has a case form that matches both the accusative and the genitive, the matching violation is repaired.

- (49) a. To jest dziewczyna, *której*<sub>GEN/DAT</sub> Jan się bał<sub>GEN</sub> zanim zaczął  
 this is girl which Jan REFL fear before started  
 pomagac<sub>DAT</sub>.  
 help.  
 ‘This is the girl Jan was afraid of before he started to help.’
- b. Jan lubi<sub>ACC</sub> *kogokolwiek*<sub>ACC/GEN</sub> Maria nienawidzi<sub>GEN</sub>.  
 Jan likes whoever Maria hates  
 ‘Jan likes whoever Maria hates.’

Following standard assumptions, syncretic forms result from special morphological rules. For the sake of concreteness, I assume that syncretisms are due to language-specific feature changing syncretism rules (cf. Noyer (1992: 129)). Alternatively, impoverishment rules can be used. The rules in (50) specify two syncretism rules in Polish that are relevant for the examples in (49).

(50) *Syncretism rules in Polish*

- a. [c:acc] → [c:gen]/[anim:+]  
 b. [c:dat] → [c:gen]/[rel:+], [gen:fem]

Furthermore, the condition under which agreement fails must be refined: Agree-Copy always adds a value to a probe feature. Syncretism rules apply to the feature values as soon as their contexts are given. Thus, only if a mismatch between two values cannot be repaired by a syncretism rule, the derivation fails. The consequence of these assumptions is that the syncretism rules apply early before the final Agree-Copy operation applies (cf. Trommer 2002, Keine 2010) and can therefore feed Agree-Copy.

The derivation in (51) shows the interaction of Agree-Copy and syncretism rule (50a).

(51) *Derivation of (49b)*

Step I:	$\alpha[c:\_][anim:+] \rightarrow Appl[c:gen]: \alpha[c:gen][anim:+]$
Step II:	$\emptyset[*c:\_*][anim:_] \rightarrow \alpha[c:gen][anim:]: \emptyset[*c:gen*][anim:+]$
	or $\emptyset[*c:\_*][anim:_] \rightarrow v[c:acc]: \emptyset[*c:acc*][anim:_]$
Step III:	$\emptyset[*c:gen*][anim:+] \rightarrow v[c:acc]: \emptyset[c:gen,acc][anim:+]$
	$[c:acc] \rightarrow [c:gen]/[anim:]: \emptyset[c:gen,gen] = \emptyset[c:gen]$
	or $\emptyset[*c:acc*][anim:_] \rightarrow \alpha[c:gen][anim:]: \emptyset[c:acc,gen][anim:+]$
	$[c:acc] \rightarrow [c:gen]/[anim:]: \emptyset[c:gen,gen] = \emptyset[c:gen]$

Being a single probe, the overt *wh*-phrase receives genitive case first. Afterwards, the covert D head agrees with either the *wh*-phrase or the matrix *v*. If it agrees with the *wh*-phrase, it receives genitive case as well as being marked as animate.<sup>4</sup> Thus, when receiving the accusative case feature from matrix *v* in Step III, the context for the syncretism rule is given and the accusative value is changed into genitive, which prevents a conflict on the case feature.

The other possibility is that the D head first receives accusative case from matrix *v*. The context for the syncretism rule is not given at this point, but as soon as D agrees with the *wh*-phrase in Step III, the syncretism rule can apply.

In sum, the syncretism effects of case matching can be derived because there is a morphological component of Agree. A purely syntactic approach to Agree would have to invoke an additional mechanism to capture these effects, cf. Hein & Murphy (this volume).

## 6. Alternatives

The final question I want to discuss is whether there are any alternatives to the present account. The number of possibilities to analyze structures where one item seems to be a dependent of two verbs is limited. In principle, there are three strategies: First, there are agreement approaches like the present account. The main idea is to postulate a covert category additional to the overt category and let the covert and the overt category communicate in some way – usually by some form of agreement (Kuroda 1968, Bresnan & Grimshaw 1978, Groos & Riemsdijk 1981, Hirschbühler & Rivero 1981, Chomsky 1982, Engdahl 1983,

<sup>4</sup>By assumption,  $\emptyset$  and  $\alpha$  agree in other features such as animacy as well.

Harbert 1983, Suñer 1984, Chomsky 1986, Cinque 1990, Grosu & Landman 1998, Nissenbaum 2000, Caponigro 2002, Grosu 2003, Gračanin-Yukse 2008). The second type of approach are identity approaches: Here, the overt category is the only category and the additional syntactic dependency is modeled differently. Such approaches can be multidominance accounts à la Citko (2005, 2013), Riemsdijk (2006), Kasai (2008) or movement accounts (Bennis & Hoekstra 1985, Huybregts & van Riemsdijk 1985, Williams 1990, Rooryck 1994, Caponigro 2003, Nunes 2004, Donati & Cecchetto 2011, Ott 2011). Finally, the third possible type of approach are reanalyses. The core idea in this type of approach is to treat FRs and PGs differently in different languages. For example, the presence of a covert category varies between constructions and languages.

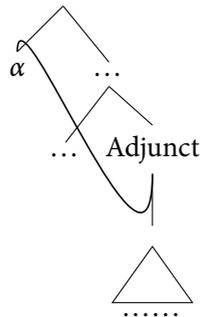
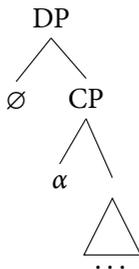
The present analysis of case matching effects is an example for how agreement approaches can deal with the pattern discussed in section 2. In the rest of this section, I will discuss how the alternative types of approaches could handle the data.

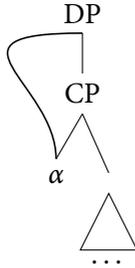
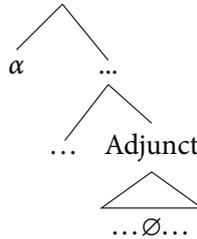
### 6.1. Reanalysis

A possible reanalysis strategy for case matching effects could be to assume that strict matching is due to identity: there is only one element that has to satisfy the case requirements of two verbs. The absence of matching effects arises if a second, covert, category is involved. The structures in (52) sketch this idea for the German and the Polish patterns.

(52) *German*

a. *Free Relatives*      b. *Parasitic Gaps*



(53) *Polish*a. *Free Relatives*b. *Parasitic Gaps*

The solution is very simple but requires additional evidence that the two constructions really have different derivations in different languages. As for Polish and German, there are no major differences concerning parasitic gaps (see Bondaruk 1996 on PGs in Polish) and free relatives. The tables in (54) and (55) summarize the behaviour concerning some of the core properties of the two constructions. Judging from the similarities between German and Polish, there seems to be no motivation for analyzing the two constructions differently.

(54) *Parasitic gaps*

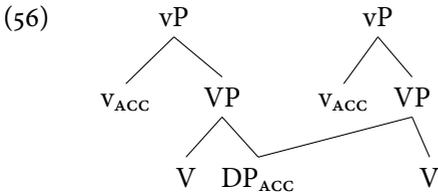
	<i>German</i>	<i>Polish</i>
island sensitivity	✓	✓
categorial restrictions	✓	✓
ban against licensing in-situ	✓	?
ban on A-movement licensing	✓	✓
tensed environments	*	✓

(55) *Free relatives*

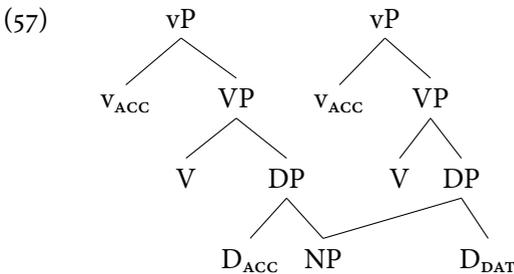
	<i>German</i>	<i>Polish</i>
lack of overt nominal head	✓	✓
wh-phrased instead of relative pronoun	✓	✓
clause with gap	✓	✓
replaceable with truth-conditionally equivalent DP or PP	✓	✓

6.1.1. *Citko (2013)*

A different kind of reanalysis approach is presented in Citko (2013) for Polish sharing constructions. The main idea of this account builds on multidominance: strict matching occurs when a DP is subject to multidominance. The case feature that is located on D is shared between two verbs. Thus, it has to match the requirements of both verbs. This configuration is sketched in (56).



Mismatching occurs if an NP is dominated by two DPs with one case feature each. Consequently, the two case features can receive two different values and the absence of matching effects is predicted. This is shown in (57).



The analysis faces problems with cross-linguistic variation since German PGs and FRs must be different from Polish PGs and FRs: In Polish parasitic gaps structures, only an NP is shared between two clauses, while in free relative contexts, the entire DP with only one case feature is shared. In German, PGs requires sharing of a DP and FRs require sharing of an NP. Again, there is no independent evidence that confirms these major structural differences.

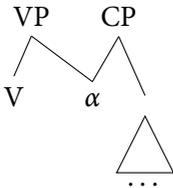
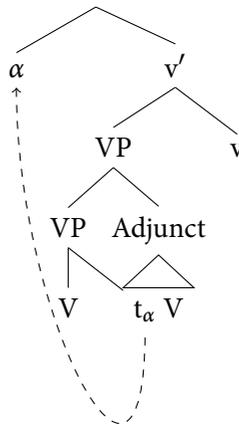
A further problem concerns case concord inside the DP. Morphologically, case is also realized on nouns. Thus, NPs must also bear a case feature. If the NP is shared between two D heads with conflicting case features, the single case feature on the NP cannot meet the requirements of both D heads, that is, the violation of matching is expected to occur on the NP level.

## 6.2. Identity

There are two kinds of identity approaches: multidominance approaches and movement approaches.

6.2.1. *Multidominance*

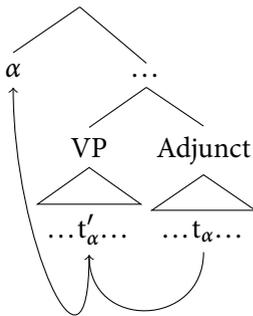
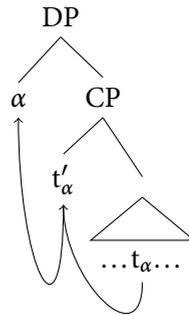
Multidominance can be depicted as in (58) and (59), where the overt category is shared between two verbs and is, thus, dependent on the case requirements of both verbs.

(58) *Free relatives*(59) *Parasitic gaps*

Such grafting approaches have a problem explaining variation. The cross-linguistic variation can be handled by assuming that in one language a matching condition holds while in the other language, there is no matching condition. However, since abstractly, FRs and PGs have the same derivation, both constructions in one language are predicted to either show case matching effects or not. The only way out would be that the matching condition is construction-specific which predicts that there should be languages which do not show matching effects in any of the two constructions, contrary to what is reported in the literature.

6.2.2. *Movement*

In movement approaches, the overt category is merged in the embedded clause, where it receives case. Afterwards, it moves to the respective argument position in the superordinate clause, before it reaches its target position. In the higher clause, the case features received in the embedded clause have to match the new case requirements. The abstract derivation is shown in (60) and (61).

(60) *Parasitic gaps*(61) *Free relatives*

The account faces the same problems as the multidominance account when it comes to the matching effects because the abstract derivation of the two constructions is the same.

6.3. *Unidirectional Agree*

So far, we have seen that reanalysis and identity approaches have difficulties deriving the variation introduced by the patterns in section 2. The following discusses two further alternatives to the bidirectional Agree account developed in the present paper. Both alternatives are based on a unidirectional Agree operation. That is, only upward or only downward Agree is possible.

6.3.1. *Only upward Agree*

The main assumptions in such an approach would be that case assignment is Agree between a probing argument and a case assigning head (Pesetsky & Torrego 2007). Since there is evidence that case assigning heads are higher than the case probe, this case Agree must be upwards. In a unidirectional approach to Agree, upward can be the only possible direction of Agree (Zeijlstra 2012).

But then, downward case agreement, as e.g. in German parasitic gaps must be a genuinely different syntactic process. Having excluded movement and multidominance since these processes are too rigid to account for variation, it is unclear which syntactic process is responsible.

Furthermore, case matching shows some of the core properties of the Agree operation. First, Agree relations and case assignment are subject to certain locality restrictions. For example, they do not cross a finite clause boundary.<sup>5</sup> This also applies to parasitic gap configurations in German (62). Examples where the empty operator and the antecedent are separated by a finite clause boundary are ungrammatical despite case matching (62b). This follows if Agree cannot apply across finite clause boundaries.<sup>6</sup> Since the probing features on the antecedent cannot be checked, the derivation crashes.

- (62) a. weil Hans *die*<sub>ACC</sub> *Frau* [ Op<sub>DAT</sub> anstatt t<sub>Op</sub> zu unterstützen<sub>ACC</sub> ] behinderte<sub>ACC</sub>  
 because Hans the woman instead.of to support hampered  
 ‘because Hans hampered the woman instead of supporting her’
- b. \*weil Hans *die*<sub>ACC</sub> *Frau* [ anstatt einen Freund zu treffen [ Op<sub>ACC</sub> der t<sub>Op</sub> unterstützen<sub>ACC</sub> könnte ] ] behinderte<sub>ACC</sub>  
 because Hans the woman instead.of a friend to meet who support could hampered  
 ‘because Hans hampered the woman instead of meeting a friend who could help her’

The second property that points to Agree being responsible for downward case agreement is intervention. Such intervention effects can be observed in parasitic gap configurations as shown in (63) (Heck & Himmelreich to appear).<sup>7</sup>

- (63) \*wenn jemand der Anette<sub>2</sub>[ \*c:dat\* ] das Buch[ \*c:acc\* ] [ Op[ c:dat ]  
 if someone the Anette the book  
 ohne zu vertrauen ] ausleiht  
 without to trust lends  
 ‘if someone lends Anette the book without trusting her’

<sup>5</sup>Vainikka & Brattico (2014) argue that Agree cannot cross a finite clause boundary.

<sup>6</sup>Note that locality is also a property of other syntactic operations such as movement. Still the data fit very well with the present Agree analysis.

<sup>7</sup>Note that the picture is more complicated than shown here. See Heck & Himmelreich (to appear) for discussion.

In (63), Agree between the antecedent *der Anette* and the empty operator is blocked by another potential antecedent *das Buch*, even though the cases between probe and goal match.

In sum, an account based on upward Agree being the only possible direction of Agree leaves open the problem of what operation is responsible for case matching effects.

### 6.3.2. *Only downward Agree*

If Agree can only apply downwards, case assignment must be a process different from Agree (see e.g. Chomsky 2001). Under this assumption, the variation in matching effects could be derived if all cases of upward Agree in the present account are simply missing and if unchecked Agree features do not lead to a crash of the derivation (Bošković 2009, Preminger 2010).

But if unchecked features can be deleted without successful Agree, the explanation for the ungrammaticality of mismatches is lost. Consequently, such an analysis is not suited for deriving strict case matching.

## 7. Conclusion

In summary, we have seen that Polish and German are mirror images of each other when it comes to case matching effects with free relatives and parasitic gaps: Polish free relatives and German parasitic gaps require strict matching, while German free relatives and Polish parasitic gaps allow case mismatches.

The analysis developed above essentially builds on the order of post-syntactic Agree operations and the bidirectionality of Agree. Both in FRs and PGs, there is an overt item and a covert item which have to Agree in case features additionally to their normal case agreement relation with case assigning heads. If Agree between the two items is upward agreement, it applies early and will not have an effect on other case assignment relations. If it applies late, it can potentially bleed other case assignment relations.

I have tried to show that an analysis based on the existence of a two-step bidirectional Agree operation can capture a kind of variation that other types of approaches potentially face difficulties deriving them. Furthermore, the analysis is an argument for a derivational view on post-syntactic operations since certain output representations are opaque. The opacity is resolved by making use of ordering of operations.

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# Case matching and syncretism in ATB dependencies

Johannes Hein & Andrew Murphy\*

## Abstract

In this paper, we propose a novel mechanism for ATB movement, which directly captures the intuition that one element originates in two positions. In particular, we claim that ATB movement involves an intersection operation. As well as the one-to-many relation between fillers and gaps in ATB, this approach can also provide a natural account of why syncretism can repair putative violations of case matching violations in ATB.

## 1. Introduction

This paper addresses a widely discussed instance of the ‘repair effect’ of syncretism with violations of the case matching requirement in so-called Across-The-Board (ATB) constructions such as (1); see e.g. Ross (1967), Williams (1978), and de Vries (to appear) for an overview.

- (1) a. What does [John like \_\_\_] and [Mary hate \_\_\_] ?  
b. The man who [John saw \_\_\_] and [Bill hit \_\_\_]

In languages with rich case morphology such as Polish, ATB constructions are subject to a case matching requirement, that is, ATB movement is only possible if the case assigned at each extraction site is the same:

- (2) a. \*Czego Jan nienawidzi \_\_\_<sub>GEN</sub> a Maria lubi \_\_\_<sub>ACC</sub>?  
what.GEN Jan hates and Maria likes  
b. \*Co Jan nienawidzi \_\_\_<sub>GEN</sub> a Maria lubi \_\_\_<sub>ACC</sub>?  
what.ACC Jan hates and Maria likes  
‘What does Jan hate and Maria like?’ (Citko 2005: 487)

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- (3) Kogo Janek widział <sub>ACC</sub> a Maria lubiła <sub>ACC</sub> ?  
 who.ACC John saw and Mary liked  
 ‘Who did John see and Mary like?’ (Borsley 1983: 170)

However, as noted by Borsley (1983), Dyła (1984), Franks (1995), Bondaruk (2003) and Citko (2005, 2011), this case matching requirement can be circumvented if the extracted item is syncretic, i.e. has the same morphological form for the cases in question. Whereas the equivalent of ‘what’ in Polish has different forms in genitive and accusative (2), ‘who’ is syncretic for genitive and accusative, and subsequently, ATB movement is possible despite the presence of a case mismatch (4).

- (4) Kogo Janek lubi <sub>ACC</sub> a Jerzy nienawidzi <sub>GEN</sub> ?  
 who.ACC/GEN John likes and George hates  
 ‘Who does John like and George hate?’ (Borsley 1983: 170)

Taken at face value, this ‘repair by syncretism’ seems to pose a challenge to a postsyntactic view of morphology such as Distributed Morphology (DM) (Halle & Marantz 1993, Harley & Noyer 2003, Embick & Noyer 2007), since it seems that a syntactic operation such as ATB movement can be licensed by morpho-phonological form. However, if syntax operates on abstract feature bundles with no morphological reality, as DM assumes, then it is difficult to reconcile this view with the observation that the case matching appears to be sensitive to the form of the elements in question. While some authors have attempted to maintain a DM view in the face of these facts by appealing to underspecification (e.g. Citko 2005, Asarina 2011), we will show that none of these approaches is entirely satisfactory (see section 3.1.4).

In this paper, we argue that the ameliorating effect of syncretism on case matching violations in ATB dependencies can be made to follow naturally under the view that ATB movement and syncretism have a common denominator, namely *intersection of feature sets*. The central characteristic of ATB is a one-to-many relation between fillers and gaps. From a derivational perspective, we capture the fact that two items seem to ‘become one’ by assuming that ATB movement involves movement of two items in parallel to an external workspace, where they are intersected to create a new item bearing the shared features of the moves. We argue that this view of ATB movement, and indeed the idea that movement in general (i.e. Internal Merge) must first proceed via an external workspace, has some independent motivation. More importantly,

under this view of ATB movement, the syncretism facts come for free if we assume that syncretic forms result from an underspecified exponent realizing a feature shared by both elements. For example, if a language has a syncretism between nominative and accusative, this can be captured by assuming that the syncretic form only realizes a feature such as  $[-\text{OBL}(\text{IQUE})]$  that is present in both the specification of nominative and accusative. Under an intersection approach to ATB, the result of intersecting the feature sets of two DPs, each bearing nominative and accusative, would result in a new item bearing  $[-\text{OBL}]$ , that is, the feature realized as the syncretic form. If two cases are non-syncretic, then their feature sets do not overlap. Intersection of case features thus results in the empty set, and therefore a crash in the derivation. In this way, the ameliorating effect of syncretism on case mismatches follows independently from the mechanism of ATB movement and must not be independently stipulated. Since ATB movement involves intersection of feature sets, the only way for DPs bearing different cases to successfully undergo ATB movement is if they happen to have a case feature in common that is also realized by a syncretic exponent.

The following paper is structured as follows. Section 2 discusses the data surrounding ‘repair by syncretism’ in more detail and discusses the problems surrounding two previous DM-based approaches to this problem by Citko (2005) and Asarina (2011). Section 3 provides the analysis of ATB based on intersection. In particular, section 3.1 discusses previous approaches to ATB movement, section 3.2 lays out a novel approach to ATB utilizing intersection of feature sets, section 3.3 shows how this approach can derive the syncretism facts in Polish and section 3.4 discusses some implications of the present approach for the analysis of Right Node Raising. Finally, section 4 concludes the paper.

## **2. Syncretism and syntax**

There are a number of cases in which syncretism has been reported to have the mysterious effect of repairing violations of syntactic constraints. There are a number of examples in which syncretism has an ameliorating effect on what would otherwise be violations of strict constraints on agreement as well as case matching requirements. This section will discuss a few prominent examples from the literature, concluding with the focus of this paper: syncretism with case matching in ATB constructions.

## 2.1. Agreement in Icelandic DAT-NOM constructions

The first case of syncretism repair with agreement is in Icelandic DAT-NOM constructions. Icelandic is known to have quirky subjects in the dative, and these have been shown to behave like genuine subjects with regard to a number of diagnostics (Andrews 1976, Zaenen et al. 1985, Jónsson 1996, Boeckx 2000). However, in Icelandic agreement targets the nominative DP rather than the dative subject (5). Furthermore, if there is only a dative subject, as in passives of verbs assigning inherent dative, then agreement is default (3SG) (6).

- (5) Henni líkuðu hestarnir.  
 her.DAT liked.3PL horses.NOM.PL  
 ‘She liked the horses.’ (Holmberg & Hróardóttir 2003)
- (6) Stelpunum var hjálpað.  
 girl.DAT.PL was.3SG helped  
 ‘The girls were helped.’ (Sigurðsson 1992)

However, there is a particular restriction on DAT-NOM constructions, namely that agreement with a non 3rd person nominative DP is ungrammatical (e.g. Sigurðsson 1991, 1996, Schütze 2003, Sigurðsson & Holmberg 2008).

- (7) a. \*Henni líkuðum við.  
 her.DAT liked.1PL us.1PL.NOM  
 ‘She liked us.’  
 b. \*Henni líkaðir þú.  
 her.DAT liked.2SG you.2SG.NOM  
 ‘She liked you.’ (Sigurðsson 1996)
- (8) *Person Restriction (Sigurðsson & Holmberg 2008: 254)*  
 In DAT-NOM constructions, *only 3<sup>rd</sup> person NOM* may control agreement.

However, Schütze (2003: 300) discusses an interesting exception to this restriction. As reported by Sigurðsson (1996), if the agreement form in question shows syncretism with the default form (3SG), then it is exceptionally possible to have agreement with a non-3rd person nominative in the DAT-NOM construction. For example, the verb *leiðast* (‘to find boring’) shows syncretism between first, second and third person singular. As a result, it is possible to have a 2SG nominative with this verb due to the syncretism in the singular (9a). However,

since the 1PL form does not show syncretism with the default, 1PL nominatives are not possible (9b).

- (9) a. Henni leiddist þú.  
 her.DAT bored.2PL/3SG you.2SG.NOM  
 ‘She found you boring.’ (Sigurðsson 1996)
- b. \*Henni leiddumst / leiddist við.  
 her.DAT bored.1PL bored.3SG us.1PL.NOM  
 ‘She found us boring.’

Thus, it seems that the Person Restriction banning agreement with non-3rd person nominatives, whatever form this constraint may take, can be circumvented only if the agreeing form of the verb (first or second person) is syncretic with the default third person singular form.

## 2.2. Matching effects with conjunct agreement in Hindi

The second case of ‘repair by syncretism’ from the domain of agreement comes from examples of so-called ‘closest conjunct agreement’ (see Bošković 2009, Bhatt & Walkow 2013, Marušič et al. 2015 and Murphy & Puškar 2016 for recent approaches and critical discussion). Consider the following examples taken from Bhatt & Walkow (2013: 962f.).

- (10) Rina-ne *gaa-yii* ek ghazal aur ek nazam *thii*.  
 Rina-ERG sing-PFV.F a ghazal.F and a nazam.F be.PST.F.SG  
 ‘Rina has sung a ghazal and a nazam.’

In (10), the verb and the auxiliary agree in gender and number with the conjuncts in question. Bhatt & Walkow (2013) show that there is what they call a ‘matching requirement’ with this particular agreement configuration, that is, the features on both conjuncts must match:<sup>1</sup>

- (11) \*Rina-ne *gaa{-yaa/-yii}* ek gaanaa aur ek nazam *thii*.  
 Rina-ERG sing-PFV.SG.M/-PFV.F a song.M and a nazam.F be.PST.F.SG  
 ‘Rina has sung a ghazal and a nazam.’

<sup>1</sup>However, Bhatt & Walkow also show that medial conjuncts in coordinations of more than two DPs do not matter for this matching requirement. In general, medial conjuncts seem to be inaccessible as they cannot be targeted for agreement in South Slavic, for example (see Marušič et al. 2015, Murphy & Puškar 2016).

In (11), the first conjunct is masculine, whereas the second is feminine and, as a result, this violates the matching requirement and no agreement form is possible. Furthermore, if conjuncts share the same gender but differ in number, the matching requirement is also violated and ungrammaticality results:

- (12) Rina-ne gaa-ye do gaane aur ek giit  
 Rina-ERG sing-PFV.M.PL two song.M.PL and a giit.M.SG  
 {??the / \*thaa}.  
 be.PST.M.PL be.PST.M.SG  
 ‘Rina has sung a ghazal and a nazam.’

Similar to Icelandic, this restriction does not hold if the relevant agreement markers are syncretic. As Bhatt & Walkow show, the feminine agreement forms for participial agreement are syncretic for singular and plural:

- (13) Agreement markers in Hindi (Bhatt & Walkow 2013: 954)

	Past		Present		Participial	
	SG	PL	SG	PL	SG	PL
M	tha-a	thee	hai	hā	-yaa	-ye
F	th-ii	th-ī	hai	hā	-yii	-yii

Subsequently, the illicit number mismatch we saw in (12) does not arise if both conjuncts are feminine, due to the syncretism between singular and plural:

- (14) Rina-ne gaa-yii kai nazmē aur ek ghazal thii  
 Rina-ERG sing-PFV.F many song.F.PL and a ghazal.F be.PST.F.SG  
 ‘Rina has sung a ghazal and a nazam.’

Furthermore, as can be seen in the paradigm in (13), there is a syncretism between masculine and feminine in the present singular, but not in the past singular forms. Bhatt & Walkow (2013: 965f.) show that in ‘Right-Node-Raising’ constructions such as (15), where the same matching requirements apply, mismatching gender on the subjects in each conjunct is only tolerated if the form is the syncretic present masculine singular.

- (15) a. ??Ram aalsii aur Sitaa karmaṭh thii  
 Ram.M.SG lazy and Sita.F.SG hardworking be.PST.F.SG  
 ‘Ram was lazy and Sita was hardworking.’

- b. Ram aalsii aur Sitaa karmath hai  
 Ram.M.SG lazy and Sita.F.SG hardworking be.PRES.M/F.SG  
 ‘Ram is lazy and Sita is hardworking.’

### 2.3. Case matching in free relatives

As well as agreement, matching effects for case have also been widely discussed in the literature. For example, free relatives in German have been shown to exhibit a case matching requirement with both the verb in the free relative and the host clause, see e.g. Gross & van Riemsdijk (1981), van Riemsdijk (2006) and Himmelreich (this volume). For example, in (16a) the *wh*-phrase in the free relative clause is unambiguously nominative. Since both the free relative and the host clause contain forms of the copula *sein*, which requires nominative, no problem arises. However, if the verb in the free relative assigns accusative as in (16b), then a mismatch arises between the verb *schaffen*, which requires accusative, and the copula in the matrix clause, which requires a subject bearing nominative case.

- (16) a. [CP Wer nicht stark ist<sub>NOM</sub>] muss klug sein<sub>NOM</sub>  
 who.NOM not strong is must smart be  
 ‘If you’re not strong, you have to be smart.’
- b. \* [CP Wer / wen Gott schwach geschaffen<sub>ACC</sub> hat] muss  
 who.NOM who.ACC God weak created has must  
 klug sein<sub>NOM</sub>  
 smart be  
 ‘If God made you weak, you have to be smart.’  
 (van Riemsdijk 2006: 342)

However, this requirement can be overridden by syncretism in the paradigm. Whereas the animate *wh*-phrases in German show case distinctions, the inanimate *was* (‘what’) is syncretic for nominative, accusative and dative. As a result, case mismatches are tolerated in free relatives.

- (17) a. [CP Was du gekocht<sub>ACC</sub> hast] ist<sub>NOM</sub> schimmelig  
 what.NOM/ACC you cooked have is mouldy  
 ‘What you cooked is mouldy.’  
 (van Riemsdijk 2006: 353)

The following minimal pair from Schütze (2003: 300) is also illustrative:

- (18) a. \*Ich zerstöre<sub>ACC</sub> [<sub>CP</sub> wer / wen mich ärgert<sub>NOM</sub>]  
 I destroy who.NOM who.ACC me.ACC annoys  
 ‘I destroy who(ever) annoys me.’  
 b. Ich zerstöre<sub>ACC</sub> [<sub>CP</sub> was mich ärgert<sub>NOM</sub>]  
 I destroy what.NOM/ACC me.ACC annoys  
 ‘I destroy what(ever) annoys me.’

Thus, it seems that conflicting case requirements imposed on elements in one-to-many relations such as free relatives (the same holds for ellipsis and ATB below) can be satisfied only if the cases in question are syncretic.

#### 2.4. Case matching in sluicing

A further example of ‘repair by syncretism’ with case matching comes from the domain of ellipsis. In sluicing, there is a general case matching requirement between the antecedent and the remnant. In an example such as (19), *somebody* is the antecedent and *who* is the remnant.

- (19) Somebody just arrived, but I don’t know who (just arrived)

In languages with somewhat richer case morphology, the case on the ‘sluiced’ wh-phrase has to match the antecedent. The classic example from German is given in (20).

- (20) Er will jemand-em schmeicheln<sub>DAT</sub>, aber wir wissen<sub>ACC</sub> nicht  
 he wants somebody-DAT flatter but we know not  
 wem<sub>1</sub> / \*wen<sub>1</sub> ⟨ er t<sub>1</sub> schmeicheln<sub>DAT</sub> will ⟩  
 who.DAT who.ACC he flatter wants  
 ‘He wants to flatter somebody but we don’t know who.’ (Ross 1969)

The fact that there is a case matching requirement with the case assigned by the verb in the antecedent clause provides strong evidence for fully-fledged elided syntactic structure in the ellipsis site (Merchant 2001). Furthermore, it is known that languages such as German which do not allow preposition stranding in ordinary wh-questions, also do not allow it in sluicing. However, van Craenenbroeck (2012) shows that, in certain cases, it is marginally possible

to omit a preposition under sluicing as in (21) (see Rodrigues et al. 2009, Nykiel 2012, Philippova 2014, for example).

- (21) Rudolf wartet auf einige Freunde, aber ich weiß nicht ?(auf)  
 Rudolf waits on some.ACC friends.ACC but I know not on  
 welche  
 which.ACC  
 ‘Rudolf is waiting for some friends, but I don’t know which (ones).’  
 (van Craenenbroeck 2012)

Interestingly, there are other examples, in which the preposition is completely impossible. For example in (22), omission of the genitive-assigning preposition *statt* is impossible, in stark contrast to (21).

- (22) Rudolf ist statt einig-er Freunde aufgetreten, aber ich weiß  
 Rudolf is instead.of some-GEN friends performed but I know  
 nicht \*(statt) welch-er  
 not instead.of which-GEN  
 ‘Rudolf performed instead of some friends, but I don’t know which.’  
 (van Craenenbroeck 2012)

An interesting account of these facts suggested by van Craenenbroeck (2012) rests on the assumption that sluices with omitted prepositions do not involve an isomorphic ellipsis site, but rather a cleft such as ‘who (it is)’ (see e.g. Szczepielniak 2008, Rodrigues et al. 2009, Nykiel 2012, and van Craenenbroeck 2010 and Barros et al. 2014 for general discussion). Since the pivot of a cleft has to bear nominative, there are conflicting requirements imposed on the case of the sluice: On the one hand it has to match the case assigned by the antecedent, on the other, it has to be nominative in order to be compatible with the cleft in the ellipsis site (but cf. Elliott & Murphy 2016). The reason why (21) is possible, and (22) is not, can be attributed to the fact that *welche* is syncretic for both the cases assigned in the antecedent clause (accusative) and in the cleft in the ellipsis site (nominative), whereas the genitive form is not. The effect of syncretism in licensing preposition omission can also be seen with *was* in (23), which is syncretic for nominative and accusative as was already shown in the free relative examples (17) and (18b).

- (23) Rudolf hat mich an etwas erinnert, aber ich weiß nicht  
 Rudolf has me on something reminded but I know not  
 mehr ?(an) was  
 anymore on what.NOM/ACC  
 ‘Rudolf reminded me of something, but I don’t recall what.’

Further examples of the kind from Greek, Russian and Zurich German are discussed by van Craenenbroeck (2012: 11ff.).

## 2.5. Case matching in ATB movement

We now turn to case matching effects with ATB movement, which will be the focus of the remainder of this paper. As was already briefly mentioned in section 1, in languages with rich case morphology, ATB constructions are characterized by an asymmetric dependency between one filler and two gaps. There are various restrictions on what kind of gaps are possible in these constructions (see section 3.1), one of the more interesting ones being case matching. In languages with rich case morphology, the case assigned by the verb to each of the ‘gaps’ has to match. For example in Polish, the verbs *widzieć* ‘see’ and *lubić* ‘like’ both assign accusative and ATB movement is licensed (24).

- (24) *Kogo* Janek widział —ACC a *Maria* lubiła —ACC ?  
 who.ACC John saw and Mary liked  
 ‘Who did John see and Mary like?’ (Borsley 1983: 170)

However, if the cases assigned by the verbs differ, for example with *lubić* ‘like’ (accusative) and *nienawidzić* ‘hate’ (genitive), then it is not possible for a single wh-phrase to fulfil the contradictory case matching requirements of each verb simultaneously.

- (25) a. \**Czego* Jan nienawidzi —GEN a *Maria* lubi —ACC ?  
 what.GEN Jan hates and Maria likes  
 b. \**Co* Jan nienawidzi —GEN a *Maria* lubi —ACC ?  
 what.ACC Jan hates and Maria likes  
 ‘What does Jan hate and Maria like?’ (Citko 2005: 487)

An interesting exception to this, discussed by Borsley (1983), Dyła (1984), Franks (1995), Bondaruk (2003) and Citko (2005), is if the forms of two cases happen to be syncretic. For example, in the inanimate wh-series, the accusative



- (29) Dziewczyna, *której* Janek nigdy przedtem nie widział  
 girl who.GEN/DAT John never before NEG saw  
 —<sub>GEN</sub> a dzisiaj pożyczył —<sub>DAT</sub> pieniędzy  
 and today lent money  
 ‘The girl who John had never seen before and today lent some money’  
 (*Polish*; Dylą 1984: 704)

- (30) Dziewczyna, *której* —<sub>DAT</sub> było zimno i z powodu  
 girl who.GEN/DAT was cold and from reason  
 tego —<sub>GEN</sub> nie było na zajęciach  
 this.GEN not was at class  
 ‘The girl who was cold and therefore not in class’  
 (*Polish*; Franks 1995: 64)

However, since there is no syncretism between accusative and genitive, a mismatch between the two cases is ungrammatical:

- (31) \*Dziewczyna, *którą* Janek lubi —<sub>ACC</sub> a Jerzy nienawidzi  
 girl who.ACC John likes and George hates  
 —<sub>GEN</sub>  
 ‘The girl who John likes and George hates’ (*Polish*; Dylą 1984: 703)

In addition, Franks (1995) discusses case mismatches in relative clauses in Russian. In (32), the relative pronoun *kotoroj* is syncretic for instrumental and dative, meaning that case matching is satisfied.

- (32) devuška, *kotoroj* ja byl uvlečen —<sub>INST</sub> i daval  
 girl who.INST/DAT I was carried-away-with and gave  
 den’gi —<sub>DAT</sub>  
 money  
 ‘The girl who I was carried away with and gave money to’  
 (*Russian*; Franks 1995: 63)

ATB topicalization also shows a case matching requirement that is obviated by syncretism. The third person masculine personal pronoun in Polish is syncretic for genitive and accusative (*jego*), whereas its feminine pendant is not (*ja* vs. *jej*). Consequently, only the former is possible in ATB topicalization structures with mismatched verbs.

- (33) a. *Jego* Janek lubi  $\text{---}_{\text{ACC}}$  a Jerzy nienawidzi  $\text{---}_{\text{GEN}}$   
 him.ACC/GEN John likes and George hates  
 ‘Him, John likes and George hates.’
- b. \**Ją* Janek lubi  $\text{---}_{\text{ACC}}$  a Jerzy nienawidzi  $\text{---}_{\text{GEN}}$   
 her.ACC Janek likes and George hates  
 ‘Her, John likes and George hates.’

(*Polish*; Dyła 1984: 703)

A similar effect is reported for German by te Velde (2005) (with an example that he attributes to van Oirsouw 1993) (34) and Blümel (2014) (35). The definite determiner in German is not syncretic for nominative and accusative (*dieser* vs. *diesen*) and is therefore impossible in ATB configurations. On the other hand, the form of the bare noun is invariant in all cases and therefore (34b) is reported to be grammatical by te Velde (2005).<sup>3</sup>

- (34) a. \**Dieser* Käse mag ich nicht  $\text{---}_{\text{ACC}}$  und  $\text{---}_{\text{NOM}}$  ist auch  
 this.NOM cheese.NOM like I not and is also  
 nicht gut für mich.  
 not good for me  
 ‘I don’t like this cheese and it isn’t good for me.’
- b. *Käse* mag ich nicht  $\text{---}_{\text{ACC}}$  und  $\text{---}_{\text{NOM}}$  ist auch  
 cheese.NOM/ACC like I not and is also  
 nicht gut für mich.  
 not good for me  
 ‘I don’t like cheese and it isn’t good for me.’

(*German*; te Velde 2005: 229)

- (35) ?*Bär-en* hat er  $\text{---}_{\text{ACC}}$  geliebt und  $\text{---}_{\text{DAT}}$  geholfen.  
 bear-PL.ACC/DAT has he loved and helped  
 ‘He has loved and helped bears.’

(Blümel 2014: 30)

A similar repair effect in German is also discussed by Ott (2012) for cases of so-called ‘split topicalization’ as in (36) (cf. Fanselow & Ćavar 2002). Whereas

<sup>3</sup>This does not seem to be the case for all speakers, as noted by te Velde himself. One plausible reason for this is that the example in (34b) violates the parallelism constraint on ATB movement proposed by Franks (1993, 1995) stating that ATB movement must take place from somehow parallel structural positions (also see Kasai 2004, Citko 2006). Here, the movement originates from an object position and a subject position, see section 3.2.2 for further discussion.

the word for ‘women’ is syncretic in dative and accusative (*Frauen*), ‘men’ is not (*Männern* vs. *Männer*). Accordingly, only the syncretic form is possible in split topicalization (36).

- (36) a. ?Frauen vertraut er nur blonden —<sub>DAT</sub> und küsst  
 women.ACC/DAT trusts he only blonde.DAT and kisses  
 er nur hübsche —<sub>ACC</sub>  
 he only pretty.ACC  
 ‘As for women, he only trusts blonde ones and kisses pretty ones.’
- b. \*Männer(\*-n) hilft sie nur blonden —<sub>DAT</sub> und küsst  
 men.ACC(-DAT) helps she only blonde.DAT and kisses  
 sie nur hübsche —<sub>ACC</sub>  
 she only handsome.ACC  
 ‘As for men, she only helps blonde ones and kisses handsome ones.’  
 (*German*; Ott 2012: 35)

## 2.6. Interim summary

We have seen that a number of languages impose matching restrictions on items in certain constructions. In particular, there are case matching effects that arise with ‘sharing constructions’ in which there is a one-to-many relation between fillers and gaps. On an intuitive level, it seems that what look like *bona fide* syntactic constraints are sensitive to the morpho-phonological form of linguistic objects. Taken at face value, the existence of ‘repair by syncretism’ would seem to be incompatible with postsyntactic ‘late insertion’ approaches to morphology, e.g. Distributed Morphology (Halle & Marantz 1993, Harley & Noyer 2003, Embick & Noyer 2007, Nevins 2015). Proponents of this view assume that syntax operates on abstract feature bundles that do not contain any morpho-phonological information. Consequently, if matching violations can be overridden by paradigmatic identity of distinct cases, then this would seem to pose a serious challenge to this view. On the other hand, one could claim that the syncretism facts indicate that case matching should be a processing or PF constraint, rather than a syntactic one (cf. Smits 1991, Vicente 2015). However, implementing a matching restriction in this module of the grammar would entail PF (or the parser) having access to syntax-specific information about the case-assigning properties of individual verbs. This seems to be undesirable if we want to maintain a strictly modular view of grammar. As a result, we seem

to be faced with the problem of ‘domain leakage’, that is, whichever module of grammar case matching is implemented in, it will require access to information ordinarily reserved for a different module.

In what follows, we argue that this is not necessarily the case under the view that both the mechanism for ATB movement and the approach to syncretism share a common property; non-empty intersection of feature sets. In the following section, we propose a new approach to ATB that can explain the syncretism facts while still remaining compatible with a DM view of morphology.

### **3. An intersection approach to ATB constructions**

In this section, we present a new take on ATB constructions in which the one-to-many relation between fillers and gaps is derived by an intersection operation that creates a single item from those originating in the gaps. It will be shown how this can directly derive the link between syncretism and ATB movement under the assumption that syncretism is derived by means of underspecification. First, section 3.1 discusses the main approaches to ATB in the literature and how these struggle to capture ‘repair by syncretism’ in a satisfactory way. Section 3.2 will lay out some of the core assumptions required for the analysis to follow. The following section 3.3 illustrates how an intersection-based approach to ATB can explain why case matching violations can only be repaired by syncretic forms and section 3.4 discusses some implications for Right Node Raising.

#### **3.1. Previous approaches to ATB**

A number of different theories of ATB movement have been proposed in the literature. Broadly speaking, they fall into one of two camps: Those that assume that there is ‘extraction’ from both conjuncts in parallel, what we might call ‘symmetric approaches’, and those that assume that genuine extraction only takes place from one conjunct and the other gap is not related to movement (‘asymmetric approaches’). Asymmetric approaches derive the second gap in an ATB structure either via a parasitic gap, sideward movement or ellipsis. Each of these approaches will be discussed in turn, considering the extent to which they can account for the syncretism facts. Subsequently, we will do the same for symmetric approaches which either assume genuine movement from both conjuncts or a multidominant structure.

## 3.1.1. Parasitic gaps

The first kind of asymmetric approach to ATB assumes that extraction only takes place from the first gap (e.g. Munn 1992, 1993, 1999, Franks 1995, Reich 2007), and the second gap contains a parasitic gap derived by empty operator movement (following the analysis of parasitic gaps in Chomsky 1981):

- (37) *Parasitic gap approach to ATB*  
 What<sub>1</sub> does [<sub>&P</sub> [<sub>TP</sub> John like t<sub>1</sub>] and [<sub>TP</sub> Op<sub>2</sub> Mary hate t<sub>2</sub>]] ?

Some motivation for this comes from the observation that certain reconstruction phenomena seem to behave asymmetrically, that is, they seem to only be able to reconstruct into the first conjunct.<sup>4</sup>

In terms of deriving syncretism, one could appeal to the fact that it has sometimes been argued that parasitic gaps also exhibit case matching effects similar to what we find in ATB. For example, Bayer (1988) argues that parasitic gap constructions in German exhibit case matching (Huybregts & van Riemsdijk 1985, Kathol 2001, Himmelreich this volume). In (38), the parasitic gap is assigned dative by the verb *anbieten* 'offer', whereas the real gap is assigned genitive by *entsinnen* 'remember'. There seems to be the familiar case matching requirement (38) that is alleviated by syncretism (39).

- (38) \*Dieses Polizisten hätte er sich [ohne —<sub>DAT</sub> schon  
 this policeman.GEN has.SUBJ he REFL without already  
 mal Geld angeboten zu haben] niemals —<sub>GEN</sub> entsinnen können  
 once money offered to have never remember can  
 'He would have never been able to remember this policeman without  
 having once offered money to (him).'
- (39) ?Der Polizei hätte er sich [ohne —<sub>DAT</sub> schon mal  
 the police.DAT/GEN has.SUBJ he REFL without already once  
 Geld angeboten zu haben] niemals —<sub>GEN</sub> entsinnen können  
 money offered to have never remember can  
 'He would have never been able to remember the police without having  
 once offered money to (them).' (Bayer 1988: 420)

<sup>4</sup>However, this is only true for some diagnostics (Principle A, Principle C and Weak Crossover). Other diagnostics such as Strong Crossover, variable binding, idiom reconstruction and scope reconstruction behave symmetrically (see Citko 2005, Salzmann 2012a,b for discussion). This seems to indicate that diagnostics that seem to behave asymmetrically are probably sensitive to effects of linear proximity.

However, the idea that case matching in ATB is related to parasitic gaps is undermined by the fact that not all languages show case matching effects with parasitic gaps, as also discussed by Himmelreich (this volume). Bondaruk (1996, 2003) shows that Polish, the language with the most widely discussed examples of case matching in ATB, does in fact not seem to impose the same case matching requirement on parasitic gaps. In (40), the form *którq* is unambiguously accusative and not syncretic for genitive. Nevertheless, a mismatch between the real gap and the parasitic gap is tolerated, in contrast to ATB constructions.

- (40) *Którq książkę obejrzał —<sub>ACC</sub> [nie zabierając —<sub>GEN</sub>]?  
 which book.ACC looked.through not taking  
 ‘Which book did he look through without taking?’*

(Bondaruk 2003: 230)

If the explanation for case matching in ATB constructions came from the fact that ATB involves parasitic gaps, then this difference in Polish would be entirely unexpected. Furthermore, there are a number of other more fundamental asymmetries across languages between ATB and parasitic gaps, in particular the much more restricted nature of parasitic gaps cross-linguistically (see Salzmann 2012a for relevant discussion).

### 3.1.2. Sideward movement

A closely-related approach involves the application of Nunes’ (2001, 2004) *Sideward Movement* operation to ATB (Hornstein & Nunes 2002). In this approach, the filler in the ATB configuration undergoes ‘interarboreal’ movement (i.e. between workspaces; cf. Bobaljik & Brown 1997). In the derivation of ATB, the moved item originates in the second clause of the conjunction, which is built in its own workspace (41a). It then undergoes sideward movement to the workspace in which the first conjunct is built, where it is merged as the object of *like* (41b). At a later step, the *v*Ps form a conjunct (now in the same workspace) (41c). Finally, the *wh*-phrase in the first conjunct is extracted to SpecCP (41d).<sup>5</sup>

<sup>5</sup>This approach is therefore not entirely asymmetric since, in a sense, extraction does take place from both conjuncts, but crucially movement to SpecCP proceeds only from the first conjunct and is therefore asymmetric.

(41) *Sideward movement approach to ATB*

- a. Workspace 1: [<sub>VP</sub> Mary [<sub>VP</sub> hate ⟨what⟩ ]] ⇒
- b. Workspace 2: [<sub>VP</sub> like what ] ⇒
- c. [&P [<sub>VP</sub> John [<sub>VP</sub> like what ] ] & [<sub>VP</sub> John [<sub>VP</sub> like ⟨what⟩ ]]] ⇒
- d. [<sub>CP</sub> what ... [<sub>VP</sub> [<sub>VP</sub> like ⟨what⟩ ] ] ] & [<sub>VP</sub> [<sub>VP</sub> hate ⟨what⟩ ]]]
- 

This approach can neatly derive the fact that there is a gap in both conjuncts, however it does suffer from a number of technical issues regarding cyclicity and activity (see Salzmann 2012a: 401f. for critical discussion). More importantly for our present purposes, it is not clear that this approach can derive ‘repair by syncretism’ in any insightful way. Since there is only a single element to which case is assigned, we require that cases can be assigned multiple times to the same item, or ‘stacked’ (see e.g. McCreight 1988, Yoon 2004, Merchant 2006, Richards 2013, Pesetsky 2013, Assmann et al. 2014). The case matching requirement could be straightforwardly captured by stipulating that only identical cases can be stacked, but it is unclear how syncretism could be invoked as a repair without opening the door to pre-syntactic morphology (also see Salzmann 2012a: 431, fn.41 for discussion).

3.1.3. *Ellipsis*

A different kind of asymmetric approach derives one of the ATB gaps via ellipsis (Ha 2008, Salzmann 2012a,b). In Ha’s (2008) approach, it is the gap in the first conjunct that is derived by ellipsis (42a), whereas Salzmann (2012a,b) assumes that it is the second one (42b).

(42) *Ellipsis approaches to ATB*

- a. *RNR & ATB (Ha 2008)*  
 What<sub>t1</sub> does [<sub>TP</sub> John like<sub>[E<sub>RNR</sub>]</sub> ⟨what⟩ ] and [<sub>TP</sub> Mary hate t<sub>1</sub> ] ?
- b. *Derivational ellipsis (Salzmann 2012a)*  
 What<sub>t1</sub> does [<sub>TP</sub> John like t<sub>1</sub> ] and<sub>[E<sub>ATB</sub>]</sub> [<sub>TP</sub> Mary hate ⟨what⟩ ] ?

Ha appeals to ellipsis approaches to Right Node Raising (cf. Hartmann 2000, but see section 3.4), whereas Salzmann follows Aelbrecht’s (2011) Agree-based approach to ellipsis licensing. In essence, both approaches are similar in that they involve some special version of Merchant’s (2001) [E]-feature (however,

only Salzmann (2012a) predicts asymmetric reconstruction in the first conjunct). The ellipsis analysis, as all asymmetric approaches, faces the challenge that ATB has been argued to require a ‘single identity reading’, which seems to implicate a movement gap in each conjunct (see e.g. Citko 2005: 489, but cf. Munn 1999, Salzmann 2012a: 402, fn.4). However, instead, we will focus on the question of ‘repair by syncretism’. Salzmann (2012a: 431, fn.41) claims that ‘once ellipsis is involved and if morphological mismatches are tolerated, one may expect case matches in ATB’. Indeed, one central characteristic of ellipsis is that it is known to tolerate form mismatches of various kinds (see e.g. Fiengo & May 1994, Merchant 2013). While morphological mismatches under ellipsis provide a potentially interesting account of exceptions to a case matching requirement in ATB, it seems that an ellipsis-based account predicts that there should not be a case matching requirement at all. Consider example (2a), repeated below.

- (43) \*Czego Jan nienawidzi  $\text{---}_{\text{GEN}}$  a Maria lubi  $\text{---}_{\text{ACC}}$ ?  
 what.GEN Jan hates and Maria likes  
 ‘What does Jan hate and Maria like?’

If, in the ellipsis approach to ATB, mismatches in case are assumed to be possible, then it is unclear how one can rule out (43).<sup>6</sup>

- (44) Czego<sub>1</sub> [TP Jan nienawidzi t<sub>1</sub>] a<sub>[E<sub>ATB</sub>]</sub> [TP Maria lubi ⟨co⟩] ?

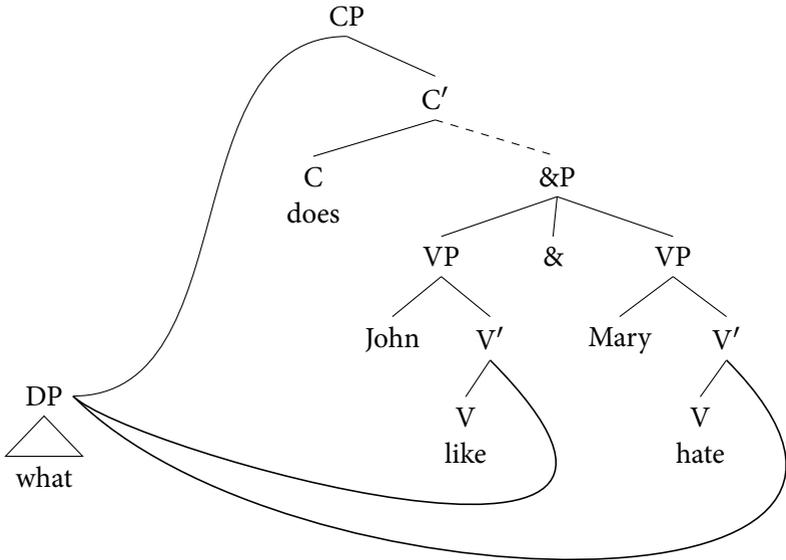
### 3.1.4. *Multidominance*

Now, we turn to the symmetric approaches that assume that each of the ATB gaps is directly related to the filler. One particular approach that has

<sup>6</sup>Salzmann (2012a: 431, fn.41) conjectures that the empirical situation surrounding ‘repair by syncretism’ might be more complicated, citing some inconsistency in Citko’s reported judgements. Nevertheless, the syncretism repair facts for Polish seem to be relatively robust going back to Borsley (1983). Furthermore, the supposedly controversial case (an accusative/dative mismatch), which we discuss as example (72), seems to conform to our expectations in being ungrammatical. In general, if it is the phonological form, rather than features, that actually matters for mismatches under ellipsis, it seems that the ellipsis approach would be better off claiming that no case mismatches are tolerated under ellipsis and then only phonologically matching forms (identical or syncretic cases) would be correctly predicted to be possible in ATB. On the other hand, this would imply pre-syntactic morphology for Salzmann’s (2012a) syntactic implementation of ellipsis. For Ha (2008), the problem would be that RNR has been shown to feed ATB movement out of islands (Bachrach & Katzir 2009: 288f.) and should therefore probably also be situated in the syntax.

gained much traction in recent years is the multidominance approach to ATB (Citko 2005, 2011, Gračanin-Yüksek 2007, 2013, Bachrach & Katzir 2009). This approach assumes that the filler is related to each gap, however this is not derived by movement. Instead, a multidominant view of syntax is adopted in which an element can be in more than one position simultaneously. In an ATB construction, the *wh*-phrase is associated with both gaps and its derived position in SpecCP, however it is only pronounced in one of these positions (45).

(45) *Multidominance approach to ATB*



This approach has the direct advantage that it can derive ‘single identity readings’ of ATB, that is, it is only possible to give a single individual answer, rather than a pair-list answer, to an ATB question:

- (46) A: Who does John like and Mary hate?  
 a. B: Jane  
 b. #B: John, Bill and Mary, Jane

For other arguments in favour of a multidominance approach to ATB, see Citko (2005, 2011). However, a problematic data point that is not often discussed in conjunction with the multidominance approach is the fact that, in some

languages, ATB movement can have resumptive pronouns in the gaps. For example in Akan (Niger Congo: Ghana),  $\bar{A}$ -movement of animate DPs triggers obligatory resumption, also in ATB wh-questions (Saah 1994, Korsah & Murphy 2016) (47).

- (47) [CP Hwáń<sub>1</sub> na [TP Kofi pé *nó*<sub>1</sub> ] nańsó [TP Ámmá tán *nó*<sub>1</sub> ] nó ] ?  
 who FOC Kofi like 3SG but Ama hate 3SG CD  
 ‘Who does Kofi like (him) but Ama hate (him)?’  
 (Akan; Sampson Korsah p.c.)

Furthermore, Salzmann (2012*b*) shows that it is possible to have resumptive pronouns in both gaps in ATB relativization in Zurich German (48).

- (48) de Lehrer<sub>1</sub>, wo [TP de Hans von *em*<sub>1</sub> schwärmt] und [TP d Susi  
 the teacher C the Hans of him is.excited and the Susi  
 über *en*<sub>1</sub> fluecht]  
 about him swears  
 ‘The teacher that Hans is excited about (him) and Susi hates swears  
 about (him)’  
 (Zurich German; Salzmann 2012*b*: 356)

These data are problematic for multidominance accounts of ATB since, as is clear in (45), they assume that the wh-phrase is syntactically present in both of the gaps. Whereas the multidominance account straightforwardly derives the fact that ATB movement leaves gaps, it does not seem to be possible to account for resumptive pronouns if the filler is also structurally present in its base positions.<sup>7</sup>

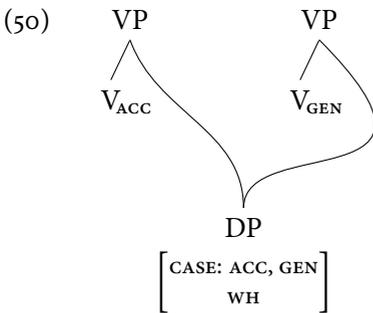
Turning now to ‘repair by syncretism’, Citko (2005: 486ff.) explicitly addresses the question of how her multidominance approach can derive the fact that syncretism can repair case matching violations. Citko puts forward an explanation based on underspecification couched in the framework of

<sup>7</sup>Martin Salzmann (p.c.) suggests that this might not necessarily be fatal for a ‘big DP’ approach to resumption, in which the DP starts out in the same phrase as the resumption pronoun and is extracted (e.g. [<sub>DP</sub> DP [<sub>D</sub> D resumptive ]]) (e.g. Boeckx 2003). If the ATB-moved item multiply dominated the specifier of both ‘big DPs’, then this might work. However, if one no longer has a movement approach, in which the resumptive pronoun is stranded, then it is unclear what the status of the ‘big DP’ is in such an analysis. A perennial problem is that these complex elements never occur overtly, so it is unclear what their motivation would be in a multidominance approach.

Distributed Morphology. She assumes that ‘the lexicon contains a single *wh*-form, underspecified in such a way that it is compatible with both genitive and accusative’ (Citko 2005: 487). Consider again example (4), repeated below, where syncretic forms license a mismatch in case.

- (49) Kogo Janek lubi —<sub>ACC</sub> a Jerzy nienawidzi —<sub>GEN</sub> ?  
 who.ACC/GEN John likes and George hates  
 ‘Who does John like and George hate?’ (Borsley 1983: 170)

Citko assumes that the *wh*-phrase is simultaneously present in the object position of both verbs (and also in SpecCP, of course). The element receives both case features assigned by the verbs in question (GEN and ACC) (50).



Citko (2005: 488) then states that ‘the lexicon contains a single form that is compatible with both accusative and genitive case feature by virtue of underspecification’ (*kogo*) and this can be inserted into the terminal. The ungrammaticality of case mismatches in the inanimate *wh*-series where there is no syncretism (2) (repeated below) is explained by the assumption that ‘there is no single lexical item that can be inserted into this slot without a feature clash, [...] the result is ungrammatical’.

- (51) a. \*Czego Jan nienawidzi —<sub>GEN</sub> a Maria lubi —<sub>ACC</sub>?  
 what.GEN Jan hates and Maria likes  
 b. \*Co Jan nienawidzi —<sub>GEN</sub> a Maria lubi —<sub>ACC</sub>?  
 what.ACC Jan hates and Maria likes  
 ‘What does Jan hate and Maria like?’ (Citko 2005: 487)

There are, however, a number of fundamental problems with Citko’s analysis. First, Citko seems to assume privative case features (GEN, ACC). As is clear

from (50), the *wh*-phrase receives both ACC and GEN and bears [CASE:ACC,GEN] at the point at which Vocabulary Insertion takes place. In order for *kogo* to be inserted, the Vocabulary Item would have to bear either the features [CASE:ACC,GEN], [CASE:ACC] or [CASE:GEN]. The first option, which is actually not underspecification, would render it unfit for insertion into terminals with [CASE:ACC] and [CASE:GEN] specifications, that is, non-ATB environments where the *wh*-phrase is assigned only one case, following the Subset Principle (see (52) below). The second and third options would incorrectly restrict the distribution of *kogo* to either genitive or accusative contexts respectively, but do not capture the fact that the forms are syncretic.<sup>8</sup> Furthermore, regarding the illicit case mismatches without syncretism in (51), Citko attributes the ungrammaticality to the fact that ‘there is no single lexical item that can be inserted into this slot without a feature clash’ (2005: 488). However, this is not a standard approach in DM, where Vocabulary Insertion relies on underspecification and the Subset Principle to regulate competition between exponents (52).

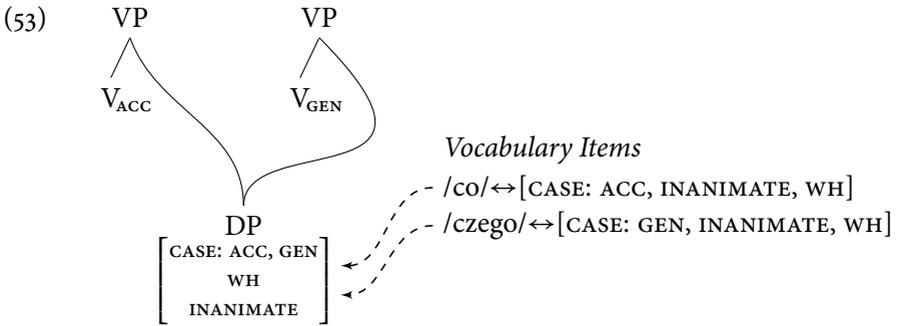
(52) *Subset Principle (Halle 1997; our emphasis)*

The phonological exponent of a Vocabulary Item is inserted into a morpheme in the terminal string if the item matches *all or a subset of the grammatical features specified in the terminal morpheme*. Insertion does not take place if the Vocabulary Item contains features not present in the morpheme. Where several Vocabulary Items meet the conditions for insertion, the item matching the greatest number of features specified in the terminal morpheme must be chosen.

Thus, if we have a terminal corresponding to an inanimate *wh*-phrase assigned both genitive and accusative, it is not true that we have a feature clash. Instead, the Subset Principle predicts that we should be able to insert either exponent since both fulfil the Subset Principle and are equally specific (53).<sup>9</sup>

<sup>8</sup>One would be forced to have multiple entries for *kogo*, which would reduce the syncretism here to accidental homophony, see Asarina (2011).

<sup>9</sup>Furthermore, the way the analysis in Citko (2005) is presented seems to suggest that inanimate *wh*-phrases involve the absence of an [ANIMATE] feature. If this is the case, then the single Vocabulary Item for *kogo* ‘who’ would realize the features [CASE:ACC,GEN,WH] and constitute a subset of the terminal in (i). Furthermore, it would count as equally specific for insertion (since it also realizes three features of the terminal; [CASE:ACC, CASE:GEN, WH]) and should therefore also be an option for insertion here; clearly an undesirable result.)



Consequently, we would expect that there should not be a case matching requirement to begin with.<sup>10</sup> In order for the derivation with the inanimate wh-phrase to actually crash, one would have to introduce an *ad hoc* condition on Vocabulary Insertion, which demands that features on the VI are not in conflict with features on the terminal (which only ever seems to be the case in ATB constructions). Insertion of either *co* or *czego* would be precluded by their respective case value of [ACC] or [GEN] conflicting with the additional case feature value on the terminal ([GEN] for *co* and [ACC] for *czego*). However, going down this route entails giving up the Subset Principle, one of the core assumptions of DM.<sup>11</sup> Thus, while Citko's vague proposal based on underspeci-

<sup>10</sup>We could get around the first problem by decomposing the privative case features ACC and GEN into smaller features such as  $[\pm\alpha]$  and  $[\pm\beta]$  such that ACC: $[\pm\alpha, +\beta]$  and GEN: $[\pm\alpha, -\beta]$ . By specifying *kogo* for  $[\pm\alpha]$  only, it would be compatible with ACC: $[\pm\alpha, +\beta]$  and GEN: $[\pm\alpha, -\beta]$ , as well as a situation where a terminal bears both ACC and GEN, i.e.  $[\pm\alpha, +\beta, +\alpha, -\beta]$ . The second problem, however, remains. Even if we leave aside the conceptual question of how a terminal can bear  $+\beta$  and  $-\beta$  simultaneously, we would still expect that either  $/co/ \leftrightarrow [\pm\alpha, +\beta]$  or  $/czego/ \leftrightarrow [\pm\alpha, -\beta]$  could be inserted into a terminal with both genitive and accusative features  $[\pm\alpha, +\beta, +\alpha, -\beta]$  in accordance with the Subset Principle (52).

<sup>11</sup>Alternatively, one could impose a ban against conflicting features on a terminal itself which could trigger a repair that deletes both conflicting features. This, however, seems implausible since deletion of only one of the conflicting features would be sufficient here. Thomas (2015) actually pursues this alternative strategy. She proposes a rule of *Case Unification* defined in (i).

(i) *Case Unification*:

Every DP can only have one case, i.e. bear maximally one specification of each case subfeature. If this number is exceeded, the subfeatures must be reduced by:

- a. deleting all but one subfeature of a kind if they coincide in value or
- b. deleting all subfeatures of a kind if instances with differing values are present.

In (i) though, the different treatment of subfeatures with equal values as opposed to those with different values seems to be an *ad hoc* stipulation tailor-made for the problem at hand.

fiction may sound plausible initially, it actually emerges as deeply problematic, if not untenable, when implemented explicitly.

### 3.1.5. *Parallel extraction*

The last approach is the most traditional one and assumes that we can simply extract from both conjuncts simultaneously (54) (e.g. Ross 1967, Williams 1978, Dylą 1984, Blümel 2013, 2014).

- (54) *Parallel extraction approach to ATB*  
 What<sub>t<sub>1</sub></sub> does [<sub>&P</sub> [<sub>TP</sub> John like t<sub>1</sub>] and [<sub>TP</sub> Mary hate t<sub>1</sub>]] ?
- 

For reasons that are still poorly understood (but see section 3.2.2), this particular kind of extraction can circumvent the *Coordinate Structure Constraint*, stating that extraction from a single conjunct is not possible (Ross 1967, Grosu 1973). Furthermore, it is unclear how moving two items can result in a single filler (cf. Blümel 2013, Weisser 2015: 147). This has typically been handled by construction specific rules (Ross 1967, Williams 1978), however this is something that the analysis to follow will explain. Since this approach is also symmetric, it shares with multidominance analyses the virtue of being able to explain single identity readings in ATB constructions.

Regarding the question of ‘repair by syncretism’, current parallel extraction approaches have to more or less stipulate the case matching requirement in one way or another (e.g. Dylą 1984: 702). For example, Blümel (2014) simply states the matching requirement as part of a ‘condition on chain formation’ (55b):

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

(Blümel 2014: 30)

Since chain formation is most plausibly syntactic in nature, Blümel’s approach is clearly incompatible with a postsyntactic view of morphology (despite his claims to the contrary; Blümel 2014: 31). The new approach that we pursue is also a symmetric extraction approach. However, the crucial difference to existing

symmetric extraction approaches is that it can explain both the one-to-many relation between fillers and gaps and the syncretism repair property.

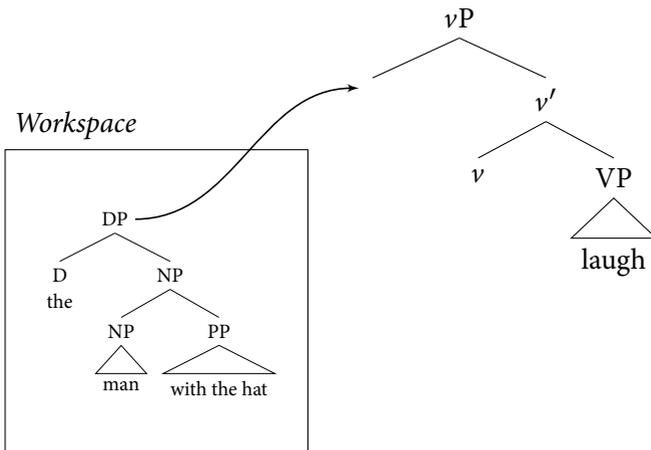
### 3.2. Theoretical assumptions

In the following, we propose an account of ATB dependencies that utilizes an intersection of the ATB-moved elements to create a single filler. In order to derive this, we will introduce new assumptions, or make some already existing ideas more explicit. The motivation for each of these assumptions will be discussed in turn.

#### 3.2.1. Movement via an external workspace

The existence of complex specifiers necessitates more than one workspace in a syntactic derivation. In (56), the complex subject *the man with the hat* undergoes External Merge with  $v'$  as its specifier, however, this complex DP must have been built somewhere other than the current workspace, i.e. from another numeration, see e.g. Nunes & Uriagereka (2000: 22), Nunes (2004: 174), Putnam (2007: 99), Di Sciullo & Isac (2008: 287), and Collins & Stabler (2016: 47).

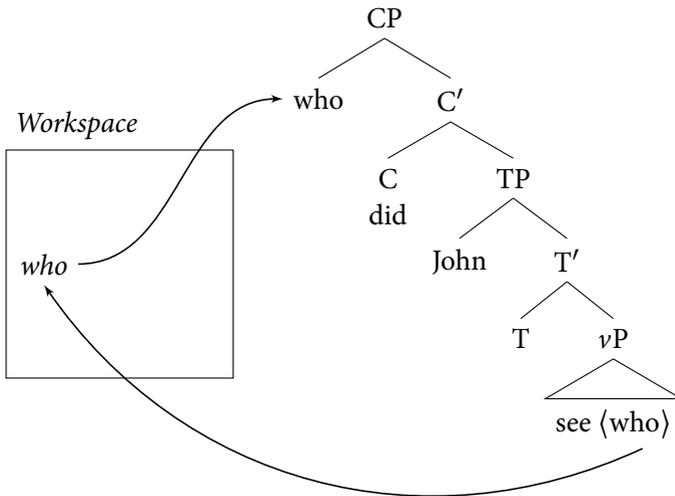
(56)



This existence of an additional workspace has been exploited by Nunes (2001, 2004) who assumes that it is possible for elements to undergo 'sideward' movement to another workspace of the local tree. Furthermore, there has been

an effort to dispense with a separate operation for movement, and instead view movement as a kind of Merge (e.g. Chomsky 1995, Starke 2001). In particular, movement is assumed to be a variant of External Merge, with the difference being whether the target of the operation is included in the same workspace (Collins & Stabler 2016: 48). Both operations have in common that they obey Chomsky's (1995) *Extension Condition*, stating that Merge must apply at the root node (i.e. extend the tree). We claim that one natural way to capture this is to actually decompose Internal Merge into two steps: Sideward Movement & External Merge. In the Copy of Theory of Movement, it seems that Internal Merge is already often (tacitly) assumed to consist of two steps: the first step creates a copy, and the second step involves External Merge of this copy at the root (this is made explicit in Putnam 2007, Stroik 2009 and Stroik & Putnam 2013: 22). One question that is not often explicitly addressed is where exactly this moving copy is generated and stored. It seems desirable to assume that External Merge always accesses an item in a separate workspace. Thus, we assume that all instances of Internal Merge proceed in a two-step fashion as in (57): 'sideward' movement to an external workspace (creating a copy) followed by External Merge at the root node.

(57) Who did John see?



3.2.2. *Parallel movement*

Another assumption we make is that ATB involves parallel movement, that is, simultaneous movement from two distinct positions to a single landing site.<sup>12</sup> It has been long noted that ATB must take place from ‘parallel positions’ (Williams 1978, Franks 1993, 1995, Kasai 2004, Citko 2006). For example, ATB extraction from a subject and object position is not possible:

(58) \*I know a man who [Bill saw  $t_1$ ] and [ $t_2$  likes Mary].

(Williams 1978: 34)

Furthermore, Franks (1993, 1995) discusses ungrammatical examples of ATB movement from Russian, in which the case matching requirement is met, but the extraction is from different structural positions, and therefore illicit. Given the Strict Cycle Condition (SSC) (Chomsky 1973), we can derive the parallelism requirement by assuming that ATB involves simultaneous movement to an external workspace as in (59).

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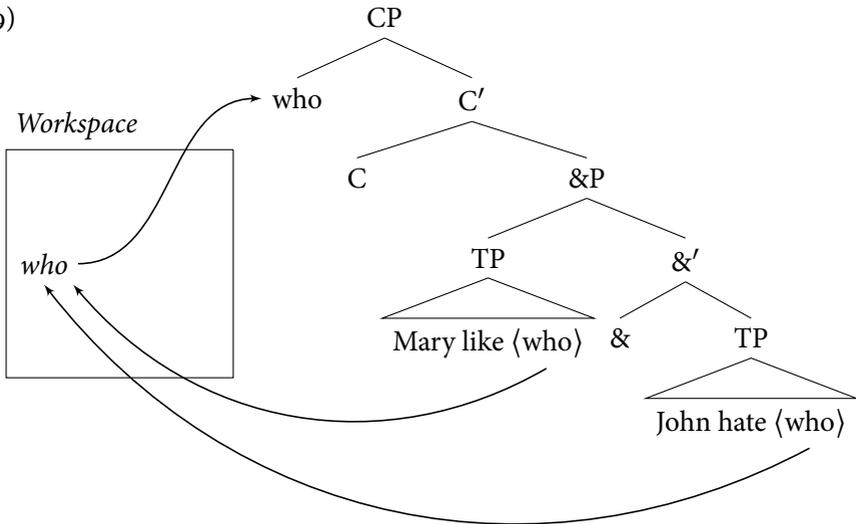
<sup>12</sup>Note that the idea of parallel movement chains already exists in the literature, but in fact in the opposite sense. Chomsky (2008) proposes that it is possible for a *wh*-phrase to move in parallel to SpecTP and SpecCP (also see Bošković 2012). This idea is motivated by the fact that traces of *wh*-movement in Icelandic trigger defective intervention (i) in a way that A-movement does not (ii) (Holmberg & Hróardóttir 2003).

(i) *Hvaða manni<sub>i</sub> veist þú að virðist/\*virðast  $t_1$  [TP hestarnir vera seinir ]*  
 which man.DAT know you that seem.3SG/\*seem.3PL horses.NOM be slow  
 ‘To which man do you know that the horses seem to be slow?’

(ii) *Mér<sub>i</sub> virðast  $t_1$  [TP hestarnir vera seinir ]*  
 me.DAT seem.3PL horses.NOM be slow  
 ‘It seems to me that the horses are slow.’

The assumption is that the *wh*-phrase moves in parallel to SpecTP and SpecCP and its initial trace therefore counts as an A/ $\bar{A}$ -trace and can trigger intervention. Crucially, this approach to parallel chains has one element moving to two positions simultaneously, rather than two elements undergoing movement to a single position.

(59)



For reasons that will be made clear in the following section, parallel movement to an external workspace results in a single item, which is subsequently remerged into the structure. Assuming that the SSC holds across conjuncts (i.e. they are built in parallel), extraction from the same position (i.e. subject or object) will be possible, whereas extraction from different positions will result in a SSC violation.<sup>13</sup>

Parallel movement would therefore seem to be restricted to coordinate structures.<sup>14</sup> One possible reason for this could be that it is a Last Resort option to circumvent the Coordinate Structure Constraint (CSC, Ross 1967) that militates against extraction from a single conjunct. If we take a representational

<sup>13</sup>In (59), movement takes place relatively late, however it is conceivable that this sideward movement takes place at a much earlier point of the derivation (e.g.  $\nu$ P) for reasons of phasehood and/or cyclicity.

<sup>14</sup>While ATB movement is overwhelmingly found in coordinate structures, Vicente (2015, to appear) claims that there are cases of ATB extraction outside of coordination. He offers some examples, whose status seems unclear. The following example from Munn (1999) is illustrative.

- (i) Who did you send pictures of \_\_\_ to \_\_\_ ?

First, it is unclear whether these are parasitic gaps (but Vicente argues against this position due to the apparent availability of sloppy readings) and second, it is unclear to which extent these kinds of examples reflect a productive ATB strategy outside of coordinate structures. The examples in question do not seem particularly well-formed to us and overwhelmingly favour strict, single identity readings.

view of the CSC as in (60) (see Mayr & Schmitt 2013: 41, Weisser 2015: 197f., but cf. Kato 2005), then no extraction can take place from a single conjunct at any point of the derivation. Crucially, by moving in parallel we avoid both of the configurations banned by (60):

(60) *Coordinate Structure Constraint* (Weisser 2015: 197)

In a structure [<sub>&P</sub> A [<sub>&'</sub> B ]], movement (out) of either A or B is prohibited:

\*[  $\alpha$  ... [<sub>&P</sub> [<sub>A</sub>  $t_\alpha$  ] & [<sub>B</sub>  $\beta$  ]]]

\*[  $\beta$  ... [<sub>&P</sub> [<sub>A</sub>  $\alpha$  ] & [<sub>B</sub>  $t_\beta$  ]]]

Furthermore, this general approach can help to make sense of an interesting restriction on ATB movement reported by Kasai (2004), Citko (2005, 2011). In multiple wh-fronting languages such as Polish, it is not possible to combine ATB extraction and multiple wh-fronting:

- (61) a. \*Kogo<sub>1</sub> kogo<sub>2</sub> [<sub>TP</sub> Jan lubi  $t_1$ ] a [<sub>TP</sub> Maria kocha  $t_2$ ] ?  
 who.ACC who.ACC Jan likes and Maria loves  
 ‘Who does Jan like and Maria love?’
- b. \*Kogo<sub>1</sub> komu<sub>2</sub> [<sub>TP</sub> Jan lubi  $t_1$ ] a [<sub>TP</sub> Maria się  
 who.ACC who.DAT Jan likes and Maria REFL  
 przygląda  $t_2$ ] ?  
 looks.at  
 ‘Who does Jan like and Maria look at?’ (Citko 2005: 492)

As Citko argues, this follows under a multidominance approach. Under a movement-based approach, these examples serve to show us that parallel extraction (somehow resulting in a single filler) is the only way to leave a coordination structure since multiple ATB wh-fronting entails two separate extraction operations that each violation the CSC as defined in (60). Revealingly, multiple wh-fronting is possible only if each filler corresponds to two gaps:

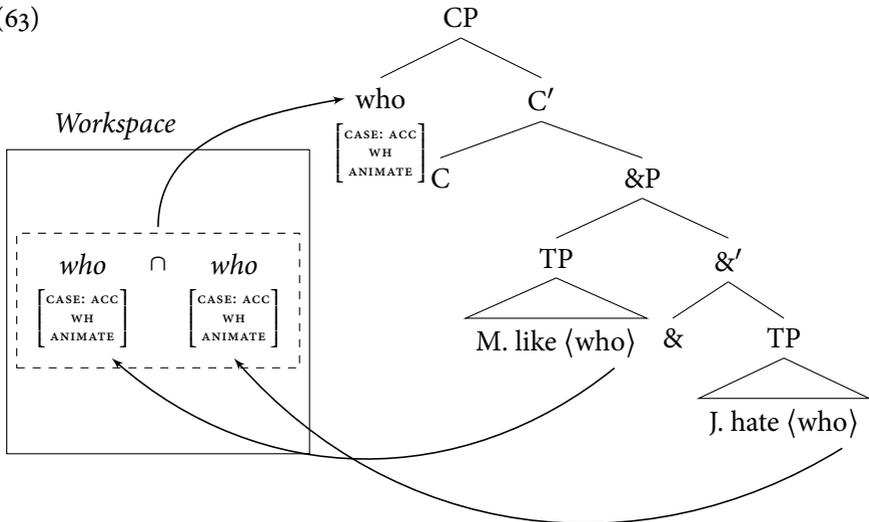
- (62) Co<sub>1</sub> komu<sub>2</sub> [<sub>TP</sub> Jan kupił  $t_1$   $t_2$ ] a [<sub>TP</sub> Piotr wysłał  $t_1$   $t_2$ ] ?  
 who.ACC who.DAT Jan bought and Peter sent  
 ‘What did Jan buy for whom and Peter send to whom?’  
 (Citko 2011: 57)

As a result, even in languages with the option of multiple *wh*-fronting, extraction from a coordinate structure must involve parallel movement. How exactly this parallel movement results in a single filler is discussed in the following section.

### 3.2.3. *Feature set intersection*

In the previous section, we established our assumption that ATB movement proceeds in parallel to an external workspace, however, how does ATB extraction result in a single filler if two elements are moved simultaneously? We suggest that parallel movement to an external workspace results in set intersection of the feature sets of the moving elements. Recall that parallel sideward movement is viewed as a Last Resort solution to circumvent the CSC and is therefore not the norm. We assume that the external workspace has a restriction that it can hold a single moving item. As a result of this restriction, something must happen if two items move in parallel. It seems we have two options: (i) intersection of feature sets, (ii) unification of feature sets. The latter option would run into the same problems shown for Citko's DM approach in section 3.1.4, since the *wh*-phrase would bear both case values in a unification approach (also see footnote 19). Thus, we assume that if more than a single item is moved (via the external workspace), intersection of the feature sets of these items must take place. In a simple example of ATB movement in (63), both *wh*-phrases (with matching feature sets) are intersected in the external workspace, resulting in a single *wh*-phrase bearing the same features as the two moved items. This single element then re-enters the structure at the the landing site for ATB movement.

(63)



In this way, we can derive the asymmetric relation between fillers and gaps that is a hallmark of ATB dependencies. Furthermore, if the feature sets of the items do not intersect for a particular feature, for example animacy features with *who* ([+anim]) and *what* ([−anim]), then the value of that feature will be empty and thus result in a crash (given *Full Interpretation*; Chomsky 1995). Example (63) is a somewhat trivial case, in which both of the intersected items have exactly the same features. However, as we show in the next section, this intersection operation has interesting, welcome consequences when cases do not match, but are syncretic.<sup>15</sup>

<sup>15</sup>One might also wonder how it is possible to intersect complex wh-phrases such as *which book*. One option is that the wh-determiner and NP are intersected separately, but this may not even be necessary if we view complex DPs from a set-theoretic perspective (e.g. Chomsky 2013). For example, a complex wh-phrase is a set containing two elements: a set containing the features of the determiner and another set containing the features of the NP (i).

- (i) *which book* =  $\{\{D, ACC, \phi\}_{which}, \{D, ACC, \phi\}_{book}\}$

Thus it should be possible to intersect these complex objects directly, without first decomposing them:

- (ii)  $\{\{D, \beta, \alpha, \phi\}_{which}, \{D, \beta, \alpha, \phi\}_{book}\} \cap \{\{D, \alpha, \gamma, \phi\}_{which}, \{D, \alpha, \gamma, \phi\}_{book}\}$   
 $= \{\{D, \alpha, \phi\}_{which}, \{D, \alpha, \phi\}_{book}\}$

## 3.3. Deriving ATB with syncretic forms

This section will illustrate how ‘repair by syncretism’ follows naturally in an intersection approach to ATB movement on the basis of the examples from Polish. To begin with, we decompose standard case features in Polish into the smaller binary subfeatures [ $\pm$ subj(ect)], [ $\pm$ gov(erned)], and [ $\pm$ obl(ique)] (Jakobson 1962, Bierwisch 1967, Wiese 1999, Alexiadou & Müller 2008) in (64).<sup>16</sup>

(64) *Polish case decomposition and wh-phrases*

Case	Decomposition	wh <sub>anim</sub>	wh <sub>inan</sub>
NOM	[+subj –gov –obl]	<i>kto</i>	<i>co</i>
ACC	[–subj +gov –obl]	<i>kogo</i>	<i>co</i>
GEN	[+subj +gov +obl]	<i>kogo</i>	<i>czego</i>
DAT	[–subj –gov –obl]	<i>komu</i>	<i>czemu</i>
INS	[+subj –gov +obl]	<i>kim</i>	<i>czym</i>
LOC	[–subj –gov +obl]	<i>kim</i>	<i>czym</i>

Syncretism can then be captured by assuming that syncretic forms are underspecified and realize a feature that is present in both contexts.<sup>17</sup> In other words, syncretic forms must have at least one feature in common (the one that the syncretic form realizes), i.e. their contexts’ feature sets must overlap. For example, one can see in (64) that animate wh-phrases in the genitive and the accusative share the feature [+gov]. Thus, the exponent *kogo* can be underspecified for only [+gov, +anim] and will therefore be inserted in both accusative and genitive animate contexts. We assume the following Vocabulary Items for Polish wh-phrases:

<sup>16</sup>Note that the features we use are arbitrary. However, for convenience, we adopt the conventional labels  $\pm$ subject,  $\pm$ governed and  $\pm$ oblique without attributing these any semantic relevance. They could easily be replaced by  $\pm\alpha$ ,  $\pm\beta$ ,  $\pm\gamma$ .

<sup>17</sup>An alternative approach is to use postsyntactic rules (e.g. impoverishment rules) to derive syncretism (see Himmelreich this volume), however, we find this approach somewhat more *ad hoc* and are unsure of how it is compatible with ‘repair’ effects of syncretism.

(65) *VIs for Polish wh-phrases*Animate series

DAT /komu/ ↔ [-subj -gov -obl +anim]

NOM /kto/ ↔ [+subj -gov -obl +anim]

INS,LOC /kim/ ↔ [-gov +obl +anim]

ACC,GEN /kogo/ ↔ [+gov +anim]

Inanimate series

DAT /czemu/ ↔ [-subj -gov -obl -anim]

GEN /czego/ ↔ [+subj +gov +obl -anim]

INS,LOC /czym/ ↔ [-gov +obl -anim]

NOM,ACC /co/ ↔ [-obl -anim]

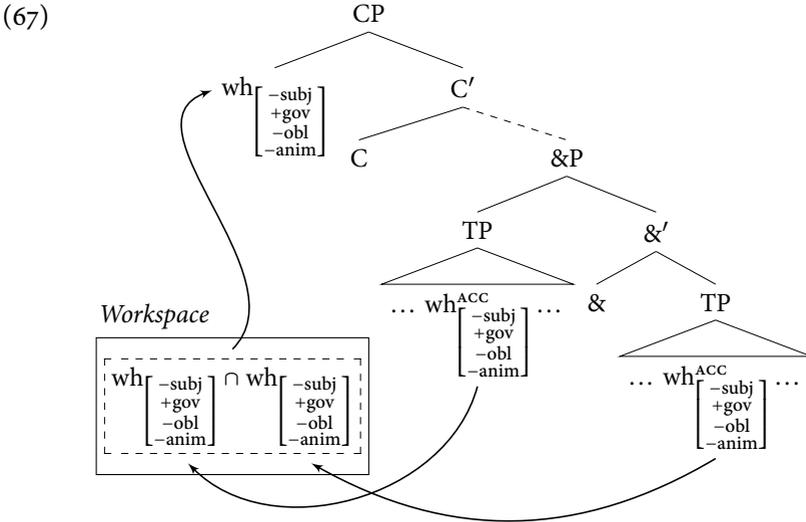
Although ATB is independently assumed to involve intersection in order to derive the one-to-many relation we observe between fillers and gaps, we also see that this will derive the case matching data, in particular, repair by syncretism in the following way: If we try to ATB-move two *wh*-phrases with mismatching cases, those with an overlapping feature will result in a successful intersection and – provided that there is a suitably underspecified VI – will be realized by that VI. We will show this in detail in the following sections.

3.3.1. *ATB with matching cases (no syncretism)*

An example of an ATB dependency with matching cases is given in (66) where both verbs assign accusative case to an animate *wh*-phrase.

- (66) Co Janek widział —<sub>ACC</sub> a Maria lubiła —<sub>ACC</sub> ?  
 what.ACC John saw and Mary liked  
 ‘What did John see and Mary like?’

As we saw in previous sections, both *wh*-phrases move in parallel via the external workspace. Given the assumption this workspace can only hold one item, both items undergo feature set intersection. Since in this case both items have exactly the same case features the newly formed item is identical to each of the two moving items, that is, it bears a fully specified accusative case. This new item is then merged from the external workspace into SpecCP.



At Spell-Out, only one of the four *wh*-vocabulary items from the inanimate series (68), namely *co*, is specified for a subset of the *wh*-phrase's morphosyntactic features and therefore available for insertion. All other VIs are specified for at least one feature-value that is not part of the terminal. Hence, the accusative marker *co* is inserted as expected in accordance with the Subset Principle.

- (68) *Vocabulary insertion:*  
 /czemu/ ↔ [-subj -gov -obl -anim] ⊄ {-subj +gov -obl -anim}  
 /czego/ ↔ [+subj +gov +obl -anim] ⊄ {-subj +gov -obl -anim}  
 /czym/ ↔ [-gov +obl -anim] ⊄ {-subj +gov -obl -anim}  
 /co/ ↔ [-obl -anim] ⊆ {-subj +gov -obl -anim}

3.3.2. *ATB with mismatching cases (no syncretism)*

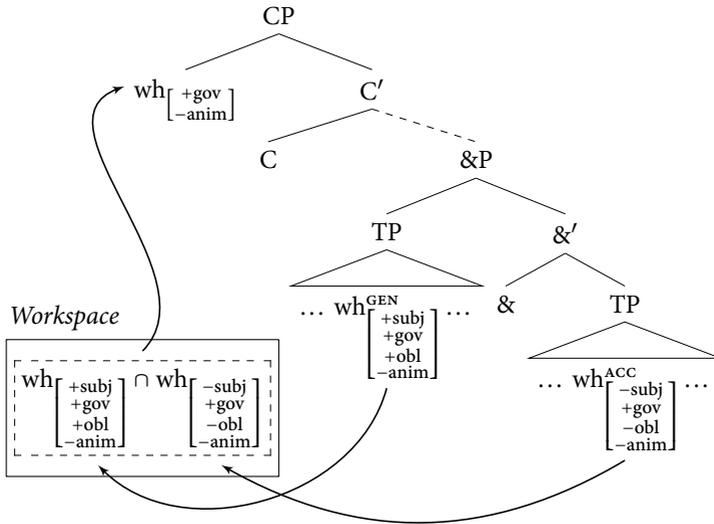
Now consider an example like (69) where one verb assigns genitive and the other accusative. Because the *wh*-phrases for both cases are not syncretic, the resulting sentences are ungrammatical.

- (69) a. \*Czego Jan nienawidzi <sub>GEN</sub> a Maria lubi <sub>ACC</sub>?  
 what.GEN Jan hates and Maria likes

- b. \*Co Jan nienawidzi  $\text{---}_{\text{GEN}}$  a Maria lubi  $\text{---}_{\text{ACC}}?$   
 what.ACC Jan hates and Maria likes  
 ‘What does Jan hate and Maria like?’ (Citko 2005: 487)

Again, as this is ATB movement, both wh-phrases move in parallel into the external workspace where they are intersected. In contrast to the above example with matching cases, there is a case mismatch between the moving items. The resulting single wh-phrase is thus specified for only those features which are present on both moves. These are features that accusative and genitive have in common plus the animacy (and wh) feature which are the same on both items. Since both cases differ in their value for  $[\pm\text{subj}]$  and  $[\pm\text{obl}]$  but have the same  $[\text{+gov}]$  value the newly formed wh-phrase only bears the latter together with the  $[-\text{anim}]$  feature (70).

(70)



When vocabulary insertion takes place, none of the vocabulary items of the inanimate series fulfils the Subset Principle. All of them are specified for features like  $[\pm\text{subj}]$  or  $[\pm\text{obl}]$  which are not present on the terminal. Hence, none of them can be inserted. For reasons of recoverability, however, a wh-phrase cannot remain unrealized at PF and the failure of vocabulary insertion results in a crash of the derivation which explains why (69) is ungrammatical.

- (71) *Vocabulary insertion:*  
 /czemu/ ↔ [-subj -gov -obl -anim]  $\not\in$  {+gov -anim}  
 /czego/ ↔ [+subj +gov +obl -anim]  $\not\in$  {+gov -anim}  
 /czym/ ↔ [-gov +obl -anim]  $\not\in$  {+gov -anim}  
 /co/ ↔ [-obl -anim]  $\not\in$  {+gov -anim}

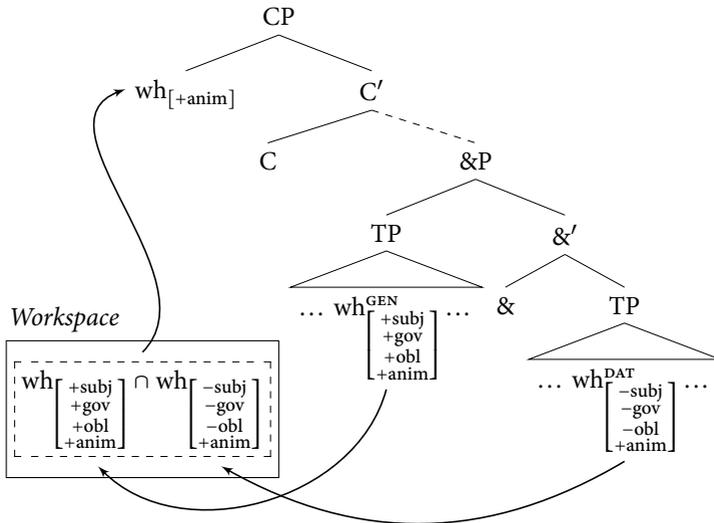
### 3.3.3. ATB with mismatching cases (empty intersection)

In addition, there is another way in which a case mismatch can lead to a crash and, thus, ungrammaticality. Consider a case mismatch like (72) where one verb *nienawidzić* ‘hate’ assigns genitive and the other verb *ufać* ‘trust’ assigns dative.

- (72) a. \*Kogo Jan nienawidzi  $\text{---}_{\text{GEN}}$  a Maria ufa  $\text{---}_{\text{DAT}}?$   
 who.ACC/GEN Jan hates and Maria trusts  
 ‘Who does Jan hate and Maria trust?’  
 b. \*Komu Jan nienawidzi  $\text{---}_{\text{GEN}}$  a Maria ufa  $\text{---}_{\text{DAT}}?$   
 who.DAT Jan hates and Maria trusts  
 ‘Who does Jan hate and Maria trust?’ (Joanna Zaleska, p.c.)

As in the examples discussed above, both wh-phrases move to the external workspace in parallel and a new single wh-phrase is created by intersecting both of them. However, since genitive and dative have different values for all three case features, the new item that is merged in SpecCP only bears an animacy feature but remains unspecified for case (73).

(73)



In other words, the newly formed wh-phrase is unvalued for case. Since there is no other case-assigner in the structure who at this point has not already assigned its case the item remains case-less until spell-out. A DP that does not have case, however, is in conflict with the Case Filter (or whatever ensures that DPs have case, e.g. *Full Interpretation*; Chomsky 1995). The derivation therefore crashes at the interface to PF.

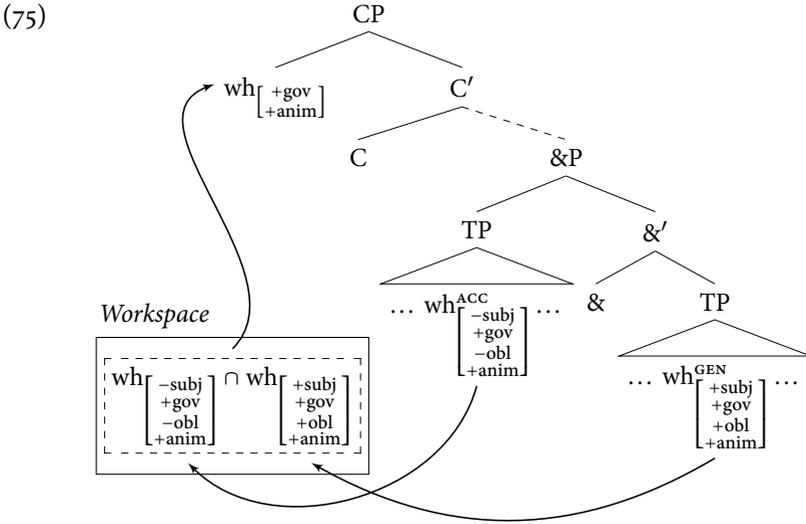
### 3.3.4. ATB with mismatching cases (with syncretism)

The interesting case now concerns ATB movement with mismatching cases that happen to be realized by the same (syncretic) form. Consider the, by now familiar, case in (74).

- (74) Kogo Janek lubi  $\text{---}_{\text{ACC}}$  a Jerzy nienawidzi  $\text{---}_{\text{GEN}}$  ?  
 who.ACC/GEN John likes and George hates  
 'Who does John like and George hate?' (Borsley 1983: 170)

As usual, ATB movement proceeds via parallel movement to an external workspace where both wh-phrases are intersected to create a new single wh-phrase. Again, like in (70), accusative and genitive only have one feature-value in common which is [+gov], while they differ in the values for the other two

case features  $[\pm\text{subj}]$  and  $[\pm\text{obl}]$ . The new wh-phrase is thus specified for  $[\text{+gov}]$  and, in contrast to (70), importantly also for  $[\text{+anim}]$  instead of  $[-\text{anim}]$ .



In contrast to the inanimate series, the animate series of Polish wh-vocabulary items contains a VI that is syncretic for accusative and genitive. *Kogo* is underspecified for  $[\pm\text{subj}]$  and  $[\pm\text{obl}]$  in exactly the same way that the wh-terminal in SpecCP is. It therefore fulfils the Subset Principle and can be inserted. Since ATB and syncretism employ the same underlying mechanism, i.e. intersection of feature sets, a syncretic vocabulary item can repair a case mismatch in an ATB dependency.

- (76) *Vocabulary insertion:*  
 /komu/  $\leftrightarrow [-\text{subj} -\text{gov} -\text{obl} +\text{anim}] \not\subseteq \{+\text{gov} +\text{anim}\}$   
 /kto/  $\leftrightarrow [+ \text{subj} -\text{gov} -\text{obl} +\text{anim}] \not\subseteq \{+\text{gov} +\text{anim}\}$   
 /kim/  $\leftrightarrow [-\text{gov} +\text{obl} +\text{anim}] \not\subseteq \{+\text{gov} +\text{anim}\}$   
 /kogo/  $\leftrightarrow [+ \text{gov} +\text{anim}] \subseteq \{+\text{gov} +\text{anim}\}$

### 3.4. Implications for Right Node Raising

The current approach to ATB dependencies also has potentially interesting implications for the debate about the proper analysis of Right Node Raising (RNR) (Bošković 2004, Abels 2004, Bachrach & Katzir 2009, Barros & Vicente

2011, Larson 2012). Right Node Raising (77) is a notoriously heterogeneous phenomenon and it is unclear what its correct treatment is. There are essentially three main contenders (i) ATB movement (e.g. Postal 1974, Sabbagh 2007), (ii) phonological ellipsis (e.g. Wilder 1997, Hartmann 2000) and (iii) multidominance (e.g. McCawley 1982, Gračanin-Yüksek 2013). Of these approaches, the general consensus seems to be that the evidence against an ATB movement account of RNR is pretty damning (e.g. Abels 2004, Bachrach & Katzir 2009, Larson 2011, Barros & Vicente 2011).<sup>18</sup> For example, RNR has been shown to display insensitivity to other processes that ordinarily constrain rightward movement, e.g. the *Right Roof Constraint* (Ross 1967). Consequently, the present debate focuses on whether the ellipsis or multidominance approach is correct, or even both (Barros & Vicente 2011).

However, there is a potentially new argument in favour of movement, based on what has been shown here. If the current approach is correct that ‘repair by syncretism’ effects that arise in ‘sharing constructions’ such as ATB wh-movement cannot be adequately captured by ellipsis or multidominance (cf. sections 3.1.3 and 3.1.4), then finding such effects with RNR would constitute an argument in favour of a movement-based approach. Asarina (2011) reports exactly this kind of data for RNR in Russian (77).<sup>19</sup>

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<sup>18</sup> However, see Sabbagh (2007) for some scope data that seem to support a movement-based account. Furthermore, Bachrach & Katzir (2009) make the interesting observation that RNR can feed, i.e. license, ATB movement out of islands. Although they have a rather involved account of this fact based on multidominance and ‘delayed Spellout’, the most natural explanation of these facts would be that RNR is syntactic movement that can therefore interact with other kinds of extraction.

<sup>19</sup> Asarina’s (2011) approach to dealing with conflicting case values on a single terminal differs from Citko’s (2005). When an element with a given feature matrix is assigned a second, different value for the already valued case feature, the whole feature matrix is duplicated to accommodate that value. The element then has two feature matrices that differ only in the value for the case feature. As long as both matrices can be spelled out by the same morphological rule (i.e. one that does not make reference to the distinct feature and is thus underspecified), the result is grammatical.

However, even though the rule should actually be able to spell out both feature matrices only one exponent exists on the surface. In effect, this ties insertion of a VI into a terminal’s feature matrix to a potential insertion of the same VI in the other feature matrix on the terminal even though that second insertion never actually happens. Roughly paraphrased: A VI may be inserted into a terminal with two feature matrices as long as it remains unclear which of the two it actually realizes. Thus, this leads back to the additional ban against a feature clash for vocabulary insertion: A VI may only be inserted into a terminal if it is not in conflict with any features on that terminal (even if they are in a different feature matrix). Another potential

- (77) \*On ne ostavil  $\text{---}_{\text{ACC}}$ , tak kak emu nadoela  $\text{---}_{\text{NOM}}$ ,  
 he not kept as him sick.of  
*tarelk-a/-u* s chürnoj kaëmkoj.  
 plate-NOM/-ACC with black border  
 ‘He didn’t keep, as he was sick of, the plate with the black border.’
- (78) On ne ostavil  $\text{---}_{\text{ACC}}$ , tak kak emu nadoela  $\text{---}_{\text{NOM}}$ ,  
 he not kept as him sick.of  
*bljudc-e* s chürnoj kaëmkoj.  
 saucer-ACC/NOM with black border  
 ‘He didn’t keep, as he was sick of, the saucer with the black border.’

In (77), ‘plate’ is not syncretic in the nominative and accusative cases (*tarelka* vs. *tarelku*) and therefore the mismatch is ungrammatical. However with ‘saucer’, the form *bljudce* is syncretic for both cases and this licenses a mismatch. This kind argument has not yet featured particularly in the debate on RNR, however it seems that the relevant ability of the theories at hand to capture ‘repair by syncretism’ effects should have a bearing on the question of its correct treatment.

#### 4. Conclusion

In this paper, we have shown how one can derive the fact that case matching requirements imposed on ATB constructions by a number of languages can be circumvented by syncretism. On the face of it, these data seem to be incompatible with a postsyntactic view of morphology since morphological form seems to play a role in licensing ATB movement. Whereas existing approaches are forced to simply state ‘repair by syncretism’ as a fact, or their proposal turns out to be flawed, we have shown that an intersection-based approach to ATB can derive the syncretism facts in an elegant way. In this approach, intersection is the operation independently required to derive the one-to-many ‘sharing’ characteristic of ATB, since it is otherwise puzzling why movement of two items results in a single filler. Once intersection is established as the core mechanism for deriving ATB, the syncretism facts follow naturally (given an underspecification approach to syncretism), rather than having to be

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problem is that if syntactic objects are understood as being just bundles of features duplicating an element’s feature matrix is the same as duplicating the actual element itself.

stated additionally. In particular, we have shown how the present approach can derive the classic facts of syncretism repair with case matching violations in Polish. Of course, any extension to other languages with similar effects, such as German or Russian, may entail a different case decomposition (as the syncretism will most likely differ), however the basic mechanism will remain the same.

Furthermore, we have argued that only a movement-based account with intersection can adequately derive the ameliorating effect of syncretism. The most (if not only) worked-out approach in multidominance theories, Citko (2005), is beset with a number of technical problems that become apparent once one tries to implement the proposal in a more explicit way. We have argued that this has potentially interesting consequences for the debate about the correct analysis of RNR. Multidominance is often invoked as the most likely explanation for this phenomenon, however the existence of syncretism repair facts in these constructions (e.g. in Russian) would seem to undermine this, given the present inadequacy of multidominance approaches in deriving this. Of course, one could enrich these theories with further operations (e.g. intersection for conflicting feature sets), but this lacks the elegance of an approach such as the present one, in which the motivation for intersection is independent of syncretism.

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# Sharing properties of pseudo-coordination in Norwegian

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## Abstract

This paper examines the sharing properties of pseudo-coordination in Norwegian where two verbs are inflected and joined by a coordinator. The main claim is that constituents are shared between the two verbs. I show that crucial properties that would support a subordination analysis are unattested in pseudo-coordination in Norwegian. The current proposal is a *vP* coordination where the subject and optionally an adjunct are multidominated by nodes in each conjunct. The claim is that subject sharing is a necessary condition for this construction and as soon as it is not shared, properties typical of pseudo-coordination are not found.

## 1. Introduction

Pseudo-coordination can be defined as a construction with two inflected verbs which are joined by a coordinator. It has been attested in a number of languages and has been discussed by several authors (cf. Lødrup 2002, Vos 2005, Wiklund 2007, Heycock & Petersen 2012, Josefsson 2014, Weisser 2015, among many others). Although there are many cross-linguistic differences, this construction attests several common properties which differ from garden-variety coordination. Some of these are the possibility of asymmetric extraction, fixed order of the verbs, conveyance of an aspectual meaning and the availability of only one subject referent. In (1), an example of pseudo-coordination in Norwegian is given. The two verbs *står* and *hopper* are both inflected in present tense and joined by the coordinator *og* ‘and’. Together they express progressive aspect.

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- (1) Gutten står og hopper i hagen.  
 boy.DEF stand.PRES and jump.PRES in the garden.DEF  
 ‘The boy is jumping in the garden.’

Pseudo-coordination in Norwegian has been divided into three groups which differ according to aspectual meaning and syntactic properties (cf. Lødrup 2002). The first group is the most heterogeneous one in that different kinds of aspectual meanings can be conveyed and  $V_1$  can be different verbs. I.e.,  $V_1$  can be a positional verb (*stå* ‘stand’ (1), *sitte* ‘sit’ (2a), *ligge* ‘lie’), a movement verb (*komme* ‘come’, *gå* ‘go’), a copula (*være*), verbs of assuming a position (*sette seg* ‘sit down’, *legge seg* ‘lie down’), and *ringe* ‘call’ (Lødrup 2002). The second group has the verb *drive* ‘carry on’ as  $V_1$  and the third group has *ta* ‘take’ as  $V_1$ . In this paper, I will look at some of the verbs within the first group, abbreviated as (PsC1).

There are three main cues that distinguish PsC1 from ordinary coordination: (i) aspectual interpretation (1), (ii) possibility of asymmetric extraction (2a), and (iii) incompatibility with the distributive operator *både* which selects two separate events (2c). Cue (ii) can be contrasted with ordinary coordination where asymmetric extraction leads to ungrammaticality (2b). Cue (iii) can be explained by the fact that PsC1 expresses only one event and is therefore incompatible with *både* (cf. Vos 2005, Wiklund 2007).

- (2) a. *PSC1 with extraction*  
 Denne boka<sub>i</sub> satt jeg og leste i går t<sub>i</sub>  
 this book.DEF sit.PST I and read.PST in yesterday  
 ‘I was reading this BOOK’
- b. *Ordinary coordination with extraction*  
 \*Denne boka<sub>i</sub> spiste jeg og leste i går t<sub>i</sub>  
 this book.DEF write.PST I and read.PST in yesterday
- c. *PSC1 with både*  
 \*Gutten både sitter og leser en bok  
 boy.DEF both sit.PRES and read.PRES a book

PSC1 is a construction with several interesting properties. On the one hand, it attests properties of monoclausality in that  $V_1$  and  $V_2$  cannot differ in morphological tense and they express one event. On the other hand, it also

attests biclausal properties in that  $V_1$  and  $V_2$  can be separately headed by a voice or tense auxiliary.  $V_1$  has properties of a functional verb in that it belongs to a closed class, has a fixed position, and contributes to the aspect of the construction. At the same time, it also has properties of a lexical verb: it can be modified by adverbs, it can have subject depictives and it can even take an argument as is the case of *ringe* ‘call’.

Previous analyses that have been proposed for pseudo-coordination can roughly go under coordination or subordination. The main argument against a coordination analysis has been that it encounters difficulties for the possibility of asymmetric extraction and that this is only allowed out of the right conjunct. According to Weisser (2015), this extraction asymmetry indicates a subordinative relation between the conjuncts. Subordination analyses proposed by Lødrup (2002), Vos (2005) and Wiklund (2007) have been the dominating ones for English, Afrikaans and mainland Scandinavian. However, they fail to capture the following properties for  $PsC_1$ : (i) As also argued by Weisser (2015) for English, the group of possible  $V_1$  verbs are too homogeneous to be a light verb; (ii)  $V_1$  denotes different activities according to which verb is chosen and its meaning is not entirely bleached. In some cases it is not bleached at all; (iii)  $V_1$  can be modified by adverbs and these constituents can also be extracted. Therefore, constituents can be extracted from both the left and the right conjunct.

In this paper, I propose a multidominance analysis where the two verbs share their subjects. Optionally, they can also share adjuncts. This multidominance analysis accounts for why the constituents are allowed to move out of the coordination without violating the Coordinate Structure Constraint (CSC, Ross 1967) because they have mother nodes in both conjuncts. As for the non-shared constituents that can be extracted out of one conjunct, I discuss the possibility of how the single eventuality combined with structure sharing might influence the coordination in allowing for extraction out of one conjunct alone. The data in this paper either come from ‘The Oslo Corpus of Tagged Norwegian Texts’ (abbreviated: OslCorp) or from blogs and newspapers resulting from Google searches. If no citation is given, the examples are my own and the judgments have been tested with several speakers of the Oslo dialect.

## 2. PsC<sub>1</sub> constituents and extraction

This section aims to show how constituents are shared in PsC<sub>1</sub> and that extraction can target both conjuncts. This will be an important component of the analysis in section 5 because it indicates that there might not be a subordinate relationship between the conjuncts in PsC<sub>1</sub>.

### 2.1. Subjects

Only one subject can appear in PsC<sub>1</sub> preceding V<sub>1</sub> and no overt subject of V<sub>2</sub> is allowed (Teleman et al. 1999). If it does, the acceptability is reduced and the aspectual meaning is lost. The sentence in (3) has a reduced acceptability if an overt subject like *hun* 'she' follows the coordinator and is coreferential with the subject of V<sub>1</sub>. The progressive meaning of the construction is also lost. The sentence becomes more acceptable with a locative modifying V<sub>1</sub> as in (4a). The aspectual meaning is also lost in this sentence and the overt subject forces an independent event reading of both verbs. This is shown by the fact that *både* is compatible with the sentence. Example (4a) does not show typical properties of PsC<sub>1</sub> and can therefore rather be referred to as ordinary coordination. Further examples of ordinary coordination with an overt subject of V<sub>2</sub> can be seen in (4b) and (4c).

#### (3) *Overt subject of V<sub>2</sub> in PsC<sub>1</sub>*

Hun<sub>i</sub> satt og (?hun<sub>i</sub>) spiste en brødskiye.  
 she sit.PST and she eat.PAST a sandwich  
 'She was eating a sandwich.'

#### (4) *Ordinary coordination with overt subject of V<sub>2</sub>*

a. Hun (både) satt på biblioteket og (*hun*) spiste en  
 she both sit.PST at library.DEF and she eat.PST a  
 brødskiye.  
 sandwich  
 'She both sat at the library and she ate a sandwich.'

- b. Amerikanerne sparer og *de* vil bruke sine  
 american.PL.DEF save.PRES and they want.PRES use.INF their  
 penger på egne problemer hjemme.  
 money on own problem.PL home  
 ‘The Americans are saving and they will use their money on their  
 own problems they have at home.’  
 (OsI Corp AV/Af94/01)
- c. De vasket og *de* feiet...  
 they wash.PST and they sweep.PST  
 ‘They washed and they swept.’  
 (OsI Corp AV/BT95/02)

In the case of PsC<sub>1</sub>, there is only one referent of the subject. This is shown by the fact that an independent reading of a DP pronoun within each conjunct is not available in PsC<sub>1</sub>. In (5a) the subject *en jente* ‘a girl’ does not result in a reading where one girl sat on the couch and a different girl read a book. This indicates that there is only one available subject as opposed to one overt and one elided one.

(5) *No independent reading of subject*

- a. En jente lå på sofaen og leste en bok.  
 a girl lay on couch.DEF and read a book.  
 ‘A girl was reading a book on the couch.’
- b. ≠ ‘Some girl lay on the couch and some (other) girl read a book.’

With a plural subject it is possible to get a reading with a different referent for each predicate. In this case, the construction does no longer have its typical properties of pseudocoordination in that a separate-event reading is forced (compatibility with *både*), the progressive meaning is gone, and an overt pronoun is optionally allowed (6a). In addition, nothing can be extracted (6b).

- (6) a. Jentene (*både*) lå på sofaen og (*de*) leste en  
 girl.PL.DEF both lie.PST on couch.DEF and they read.PST a  
 bok.  
 book  
 ‘The girls both lay on the couch and read a book.’/  
 ‘The girls were reading on the couch.’
- b. \*[P<sub>i</sub> på sofaen]<sub>i</sub> både lå t<sub>i</sub> jentene og leste en bok.  
 on couch.DEF both lie.PST girl.PL.DEF and read.PST a book

(7) *Available readings of (6a)*

- a. 'The girls both lay on the couch and read a book.'
- b. 'The girls were (\*both) reading a book on the couch.'
- c. 'Some girls lay on the couch and some other girls read a book.'

The same has been noted by Ross (1986) (and later by Kehler 2002) for English (8). When an overt subject appears in front of  $V_2$ , asymmetric extraction is no longer allowed. A possible interpretation of this is that the properties typical of pseudo-coordination depend on whether the subject is shared or not.

- (8) a. I went to the store and bought some whisky.
  - b. I went to the store and Mike bought some whisky.
  - c. Here's the whisky which I went to the store and bought.
  - d. \*Here's the whisky which I went to the store and Mike bought.
- (Ross 1986: 103)

The selectional restrictions of the two verbs in PsC1 differ compared to those of each verb outside the construction in that they are less strict in PsC1. A subject that occurs in PsC1 is not always grammatical with  $V_1$  alone. In (9a), PsC1 has an inanimate subject which is semantically selected by  $V_2$  (9b). This is shown by the fact that when it occurs alone with  $V_2$ , it forms a grammatical sentence (9b). When it however occurs with  $V_1$  alone, the sentence is no longer grammatical (9c). The same contrast is shown in (10). Outside of the PsC1 context, in (10a) the subject *sirenen* 'the siren' forms a grammatical sentence with  $V_2$  alone (10b), but not with  $V_1$  (10c).<sup>1</sup>

(9) *Selectional restrictions outside PsC1*

- a. Lyset sto og blinket  
light.DEF stand.PST and blink.PST  
'The light was blinking.'
- b. Lyset blinket.  
light.DEF blink.PST  
'The light blinked.'
- c. \*Lyset sto.  
light.DEF stand.PST

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<sup>1</sup>See Wiklund (2007: 193) for a discussion on selectional restrictions of pseudo-coordination in Swedish.

- (10) a. Sirenen i den forlatte patruljebilen sto fremdeles  
 siren.DEF in the abandoned patrol.car.DEF stand.PST still  
 og ulte.  
 and howl.PST  
 ‘The siren in the abandoned patrol car was still howling.’  
 (OslCorp SK/JeJH/o1)
- b. Sirenen (i den forlatte patruljebilen) ulte fremdeles.  
 siren.DEF in the abandoned patrol.car.DEF howl.PST still  
 ‘The siren (in the abandoned patrol car) still howled.’
- c. \*Sirenen (i den forlatte patruljebilen) sto fremdeles.  
 siren.DEF in the abandoned patrol.car.DEF stand.PST still

## 2.2. Objects

Depending on the subcategorization frame of  $V_2$ , a direct or an indirect object can occur in  $PsC_1$ . This object can be topicalized when it is definite or focused. As widely discussed in the literature on pseudo-coordination, this would be surprising if  $PsC_1$  were a coordination because conjuncts form strong islands (Ross 1967). According to the CSC, arguments cannot be extracted from one conjunct alone unless it is extracted from the other conjunct as well (ATB movement).

In (2a) (repeated here as (11a)), and in (11b) the object has been extracted out of the second conjunct.<sup>2</sup> In (12b), the verb *ringe* ‘call’ is  $V_1$  and  $V_2$  is *spørre* ‘ask’.  $V_2$  has an argument which is extracted. Example (13) shows ordinary coordination with *eat* and *write* as verbs. When the same constituent (also object of  $V_2$ ) is fronted, the sentence becomes ungrammatical. Note that ATB movement is allowed in coordination in Norwegian as in (14) where the two coordinated verbs both subcategorize for the fronted object.

- (11) *PsC<sub>1</sub> with extraction from conjunct 2*
- a. Denne boka<sub>i</sub> satt jeg og leste i går t<sub>i</sub>.  
 this book.DEF sit.PST I and read.PST in yesterday  
 ‘I was reading this BOOK.’

<sup>2</sup>Note that the extracted object has to be marked for definiteness by a determiner in order for the sentence to be grammatical: ?boka<sub>i</sub> satt jeg og leste i går t<sub>i</sub>.

- b. Hva sitter du der og smiler av?  
 what sit.PRES you there and smile.PRES of  
 ‘What are you smiling about?’

(OsI/Corp SK/GrEl/01)

- (12) a. Ringte du og spurte etter søknaden din?  
 call.PST you and ask.PST after application.DEF yours  
 ‘Did you call and ask for your application?’  
 b. Nei, en kopi<sub>i</sub> ringte jeg og spurte etter t<sub>i</sub>.  
 no a copy call.PST I and ask.PST after  
 ‘No, I called and asked for a COPY.’

(13) *Ordinary coordination with extraction*

\*Denne boka<sub>i</sub> spiste jeg og leste i går t<sub>i</sub>  
 this book.DEF write.PST I and read.PST in yesterday

(14) *ATB movement in ordinary coordination*

Hva spiser og drikker du i kveld?  
 what eat.PRES and drink.PRES you to night  
 ‘What are you eating and drinking tonight?’<sup>3</sup>

*Ringte* ‘call’ in the position of V<sub>1</sub> can take an argument (15a). In this case it can be extracted just like the argument of V<sub>2</sub> (15b).

(15) *Object extraction out of conjunct 1*

- a. Ketil ringte Telenor og bestilte et kontantkort.  
 K. call.PST T. and order.PST a prepaid.card  
 ‘Ketil called Telenor and ordered a prepaid card.’  
 b. Hvem<sub>i</sub> ringte Ketil til t<sub>i</sub> og bestilte kontantkort?  
 who call.PST K. to and order.PST prepaid.card  
 ‘Who did Ketil call to order a prepaid card?’

### 2.3. Adverbials

The positional V<sub>1</sub> can be followed by adverbs which naturally modify it. These adverbs can freely switch position between the verbs even when they would only naturally modify one of the verbs outside PsC1. This is demonstrated in (16a)

<sup>3</sup>URL: <http://vgd.no/forbruker/mat-og-drikke/tema/1645432/tittel/hva-spiser-og-drikker-du-i-kveld/innlegg/44526702/> [accessed 02.03.16]

where the PP *i hagen* ‘in the garden’ can either follow  $V_1$  or  $V_2$  without resulting in any semantic or grammatical differences. The locative PP naturally modifies  $V_1$  but not  $V_2$  as has been shown by Teleman et al. (1999) and Lødrup (2002).<sup>4</sup> This is indicated by the fact that when each verb forms an independent sentence and contains the same adverbial, the positional verb results in an acceptable sentence (16b) while  $V_2$  is less acceptable (16c). Nevertheless, the PP can freely switch position after the verbs as in (16a) without changing the acceptability. This kind of  $V_1$ -modifying adverbial can be fronted as a contrastive topic or a *wh*-word (17). The syntactic position of adjuncts in PsC1 is not entirely clear. The main point here is that  $V_2$  is more flexible regarding modification when it appears with  $V_1$  in PsC1 than alone in an independent clause.

(16) *Modification restrictions outside PsC1*

- a. Han står (i hagen) og glør (i hagen)  
 he stand.PRES in garden.DEF and stare.PRES in garden.DEF  
 ‘He’s staring in the garden.’
- b. Han står i hagen  
 he stand.PRES in garden.DEF  
 ‘He stands in the garden.’
- c. ?Han glør i hagen  
 he stare.PRES in garden.DEF

(Teleman et al. 1999; Lødrup 2002)

(17) *Fronting of adverbial naturally modifying  $V_1$*

- a. I hvilken hage står Richard og glør?  
 in which garden stand.PRES R. and stare.PRES  
 ‘In which garden is Richard staring?’
- b. I hagen til naboen står han og glør.  
 in garden.DEF to neighbor.DEF stand.PRES he and stare.PRES  
 ‘He is staring in the neighbor’s garden (not anywhere else).’

The same flexibility is attested in subordinated PsC1-contexts, see (18) and (19).

<sup>4</sup>Note that *i hagen* ‘in the garden’ here has a locative meaning as opposed to a directional one like ‘into the garden.’

(18) *Adverbials in subordinated PsC1*

Han trodde at Jon sto (i hagen) og glodde (i  
 he think.PST that John stand.PST in the garden.DEF and stare.PST in  
 hagen)

garden.DEF

‘He thought that John was staring in the garden.’

## (19) a. Jeg ler av at vi har sittet på hver vår side

I laugh.PRES over that we AUX.PRES sit.PTCP at each our side

av åsen og ventet...

of hill.DEF and wait.PTCP

‘I laugh about the fact that we have been waiting for each other on  
 each side of the hill.’

(OslCorp SK/ArRa/01)

## b. Jeg ler av at vi har sittet og ventet på

I laugh.PRES over that we AUX.PRES sit.PTCP and wait.PTCP at

hver vår side av åsen...

each our side of hill.DEF

‘I laugh about the fact that we have been waiting for each other on  
 each side of the hill.’

The same property is found in PsC1 with *ringe* as V<sub>1</sub>. The adjunct *hjemmefra* ‘from home’ can follow V<sub>1</sub> or V<sub>2</sub> in PsC1. Outside this construction, it forms an acceptable sentence with V<sub>1</sub> alone (20b) but the acceptability is reduced with V<sub>2</sub> alone (20c). This shows that the semantics of V<sub>2</sub> changes when it combines with V<sub>1</sub> in PsC1 in that it allows an adjunct to follow it that would not be compatible with the sentence alone.

## (20) a. Jeg ringte (hjemmefra) og vekket henne (hjemmefra).

I call.PST from.home and wake.PST her from.home

‘I called and waked her from home.’

## b. Jeg ringte henne (hjemmefra).

I call.PST her from.home

‘I called her from home.’

## c. ?Jeg vekket henne hjemmefra.

I wake.PST her from.home

Examples in (21) show that PsC1 can take adverbs that directly modify the action denoted by V<sub>1</sub>.

(21) *V<sub>1</sub>-modifying adjuncts*

- a. Regjeringen sitter *stille* og ser på flyktningskrisen.  
government sit.PRES quietly and look.PRES at refugee.crisis.DEF  
'The government is quietly looking at the refugee crisis.'<sup>5</sup>
- b. Bernt Nor sto *ivrig* og filmet det hele...  
B. N. stand.PST eagerly and film.PST it all  
'Bernt Nor was eagerly filming it all.'<sup>6</sup>

As (19b) showed, PsC<sub>1</sub> also allows complex adverbials following V<sub>1</sub>. More examples of this is shown in (22).

(22) *Complex adverbials intervening between V<sub>1</sub> and V<sub>2</sub>*

- a. Vi sitter *i kollektivet et sted i fylket* og prater.  
we sit.PRES in collective.DEF a place in region.DEF and talk.PRES  
'We are talking in the shared apartment some place in the region.'  
(OsI Corp AV/Ad96/01)
- b. Tre menn sitter *på fødeklinnens venterom* og  
three men sit.PRES at birth.clinic.GEN waiting.room and  
biter negler.  
bite.PRES nails  
'Three men are sitting in the birth clinic's waiting room biting nails.'  
(OsI Corp AV/Ad96/01)

Regarding adverbials, the group of PsC<sub>1</sub> discussed is now compared with the second group of pseudo-coordination which has *drive* 'carry.on' as V<sub>1</sub>. This group also conveys a progressive meaning. *Drive* is a functional verb which seems to lack lexical properties entirely. Compared to the first group of PsC<sub>1</sub>, for the *drive*-group there are much more restrictions regarding the type and position of adverbials which can follow *drive* as V<sub>1</sub>. No adverbial naturally modifies *drive*. Even a temporal adverbial such as *nå* 'now' is less acceptable following V<sub>1</sub> compared to when it follows V<sub>2</sub> (23a). Other temporal adverbials like *i går* 'yesterday' are only acceptable when following V<sub>2</sub> (23b). In addition, V<sub>1</sub> cannot form an independent sentence outside the coordination like the positional verb can (23c).

<sup>5</sup>URL: <http://www.lo.no/politikk/Okonomi-og-sysselsetting/Artikler/Fortsatt-svekkelse-av-arbeidsmarkedet/> [accessed 10.03.16]

<sup>6</sup>URL: <http://sfkut.blogspot.de/2013/02/lgnin-en-perle-i-namdalseid.html> [accessed 02.03.16]

(23) *Adverbials in pseudo-coordination with drive*

- a. Jeg driver            (?nå) og spiser    (nå).  
 I    carry.PRES.ON NOW and eat.PRES NOW  
 'I am now eating.'
- b. Jeg drev            (\*i går)            og spiste (i går).  
 I    carry.ON.PST in yesterday and eat.PST in yesterday  
 'I was eating yesterday.'
- c. \*Jeg drev            i går.  
 I    carry.ON.PST in yesterday

## 2.4. Summary

Several particular properties of PsC1 were shown in this section. Firstly, the subject is interpreted in both conjuncts but only pronounced in one. This indicates that it might be shared between the two verbs. Secondly, V<sub>2</sub> attests more flexibility of being modified by an adjunct compared to when it forms an independent clause outside PsC1. When V<sub>2</sub> enters a PsC1, an adjunct that outside this construction only naturally modifies V<sub>1</sub> can linearly follow V<sub>2</sub> or V<sub>1</sub> without leading to any differences of meaning or acceptability. Two properties indicate that there is not a subordinate relationship between the conjuncts in PsC1; (i) adjuncts that naturally modify the action denoted by V<sub>1</sub> are acceptable in PsC1. This indicates that V<sub>1</sub> is not a light verb. (ii) PsC1 differs from pseudo-coordination in other languages in that argument extraction is allowed out of both conjuncts. Extraction out of the first conjunct was showed with PsC1 with 'call' as V<sub>1</sub>. Finally, complex adjuncts are allowed to intervene between the V<sub>1</sub> and V<sub>2</sub>. This shows that there must be structure between the two verbs that allows this material to intervene.

## 3. Voice and tense

Morphological tense mismatches on V<sub>1</sub> and V<sub>2</sub> are not allowed in PsC1 (24). However, Lødrup (2002, 2014) shows that both V<sub>1</sub> as well as V<sub>2</sub> can be preceded by an auxiliary expressing perfective tense (25). The ungrammatical sentence in (24) can be compared to (25b) where V<sub>2</sub> is in perfect and the sentence is grammatical. It is also possible that an auxiliary expressing periphrastic passive precedes either V<sub>1</sub> (26a) or V<sub>2</sub> (26b). In the former example, both verbs have a

participle form while in the latter example,  $V_1$  has present (active) tense while  $V_2$  is passive.<sup>7</sup>

(24) *Morphological tense mismatches*

\*Jenta ligger og sov.  
 girl.DEF lie.PRES and sleep.PST

(25) *Periphrastic tense mismatches*

a. ...der hun ligger og har sovnet.  
 where she lie.PRES and AUX.PRES sleep.PTCP  
 ‘... where she has been sleeping.’<sup>8</sup>

b. Går ut fra at dere ikke har sittet på gjerdet  
 go.PRES out from that you not AUX.PRES sit.PART at fence.DEF  
 og tvunnet tommer...  
 and twist.PST thumb.PL

‘I assume that you have not been procrastinating on the fence.’

(OslCorp AV/Bb95/01)

c. Jeg sitter og har brukt opp datakvoten min  
 I sit.PRES and AUX.PRES use.PART up data.quota.DEF my  
 ‘I have filled my quota of data.’

(Lødrup 2014: 6)

(26) *Periphrastic voice mismatches*

a. Men det blir sittet og produsert  
 but there become.PRES sit.PART and produce.PART  
 ‘One sits and produces.’

b. Der står bilen og blir lakkert  
 there stand.PRES car.DEF and become.PRES paint.PART  
 /\*lakkeres  
 paint.PRES.PASS

‘The car is standing there being painted’

(Lødrup 2014: 5)

There is evidence that  $V_1$  is in T or a higher position. Sentence adverbials and negation elements which are assumed to adjoin to projections higher than  $vP$ ,

<sup>7</sup>Norwegian also has morphological passive (-s). In PsC1, this marking can only be on  $V_2$  if the first verb has it (in this case, it is obligatory) (cf. Lødrup 2014).

<sup>8</sup>URL: <http://www.bokselskap.no/boker/ulvehiet/v> [accessed 10.03.16]

can follow  $V_1$  (27a) but they cannot follow (or precede)  $V_2$  in PsC1 (27b) (cf. Lødrup 2002, 2014). When PsC1 is embedded, negation precedes  $V_1$  (28).

(27) *Position of  $V_1$  and  $V_2$*

- a. Han sitter *ikke* og leser.  
 he sit.PRES not and read.PRES  
 ‘He is not reading.’
- b. Han sitter og (\*ikke) leser (\*ikke).  
 he sit.PRES and not read.PRES not

(Lødrup 2014: 12)

- (28) Jeg merket at han *ikke* satt og leste i går.  
 I notice.PST that he not sit.PST and read.PST in yesterday  
 ‘I noticed that he wasn’t reading yesterday.’

The possibility of different voice- and TAM marking in PsC1 indicates that the construction is biclausal. A possible explanation for the impossibility of different morphological tense marking on the verbs is that the two conjuncts express two sub-events happening simultaneously. If the morphological tense differs, they no longer express a simultaneous action of two sub-events that overlap. Thus, it seems that the verbs in PsC1 can have any tense as long as the events denote simultaneity.

#### 4. Intermediate summary and non-solutions

A recurring analysis of pseudo-coordination involves different forms of subordination. A prominent work on pseudo-coordination in Swedish and Mainland Scandinavian comes from Wiklund (2007). Her proposal is a subordination analysis of pseudo-coordination in Swedish where TAM is copied onto  $V_2$ . She also suggests that this analysis accounts for Norwegian and Danish. Arguments for this include  $V_1$  having light verb properties and impossibility of TAM mismatches. As Lødrup (2014) has already discussed, the availability for temporal overlapping in PsC1 indicates that tense on  $V_2$  is *not* vacuous and simply copied from  $V_1$ .

The previous account for pseudo-coordination in Norwegian is a biclausal control analysis in the LFG framework proposed by Lødrup (2002, 2014). Under his analysis,  $V_1$  in PsC1 (first group) shares some properties with ordinary control verbs in Norwegian but differs from them in that PsC1 control verbs

have structure sharing instead of a PRO. The main argument against this analysis is that control verbs take infinitives while  $V_2$  has tense. It can also be argued that it is unappealing to introduce a new type of control verbs into the grammar of Norwegian in order to account for PsC<sub>1</sub>.

Other subordination analyses involve pseudo-coordination being a complex head where no material can intervene, cf. Vos (2005). This is referred to as Contiguous Coordination and is found in English. An analysis that makes the same prediction comes from Cardinaletti & Giusti (2001) who propose for Marlese that  $V_1$  has properties of a functional verb and is situated in a functional projection that impedes it from projecting arguments as a lexical verb. In both languages, no adverbials can intervene between the two verbs. Examples of this kind of pseudo-coordination is given for Marlese in (29b) and for American English in (30b).

(29) *Impossibility of intervening material*

- a. Va (agghiri a casa) a mangiari (\*agghiri a casa).  
[he]go.3s (towards to home) to eat.INF (towards to home)  
'He goes towards home to eat.'
- b. Va (\*agghiri a casa) a mangia (\*agghiri a casa).  
[he]go.3s (towards to home) to eat.3s (towards to home)  
(Marlese; Cardinaletti & Giusti 2001)

(30) *Impossibility of intervening material*

- a. #I go all the way there and eat.
- b. \*I go and eat all the way there.  
(American English; Cardinaletti & Giusti 2001)

For PsC<sub>1</sub>, it was shown in section 2.3 that VP-adverbials can intervene between the two verbs when this construction is in a matrix clause and also, when it is embedded. This indicates that PsC<sub>1</sub> is not a complex head. Indeed, it is even possible to have a PP embedded in another PP as was shown in (22) in section 2.3.

Finally, Weisser (2015: 145) has proposed that the first conjunct is base-generated as an adjunct before it moves to the specifier position of &P. This derivational analysis predicts that extraction is allowed out of the second conjunct (when it is the matrix verb of  $V_1$ ), but not out of the first one because adjuncts form an island. Because this asymmetry does not apply for PsC<sub>1</sub>, it

seems that there is not a subordinate relationship between the conjuncts where one starts out as an adjunct.<sup>9</sup>

Overall, a subordination analysis is not necessarily excluded for PsC1. However, I showed that it might not be the best account for PsC1 because it attests properties that contradict a subordinative relation between the conjuncts. These properties are summarized in (31).

(31) *Non-subordinate properties of PsC1*

- i. Constituents can be extracted from both conjuncts.
- ii.  $V_1$  is more than a light verb:
  - $V_1$  is a heterogeneous group which retains lexical meaning
  - $V_1$  can either be modified or have an argument (*ringe*)

If PsC1 is not subordination, then perhaps it is coordination. An ordinary coordination analysis would however encounter some problems. If PsC1 is a low coordinative structure where there is only one subject and the verbs are coordinated in their base position in V, it would have to be accounted for why material can intervene between the V heads assuming that adverbials attach to a projection higher than the V head. Indeed, material which is assumed to adjoin to a projection higher than VP can intervene in PsC1. This indicates that for a coordination analysis, the &P projection has to be of the  $\nu$ P or above it. If PsC1 is coordination of  $\nu$ P or a higher projection, it would have to be assumed that the subject of  $V_2$  is either elided or it is a PRO. If it is a PRO, it would have to be postulated that  $V_2$  is [-FINITE]. Again, we come into the argument that  $V_2$  can be headed by a tense or voice auxiliary and must have morphological tense. Evidence against  $\nu$ P coordination with ellipsis was shown in section 2.1 where independent reference of the subject is unavailable. Under an ellipsis account, it would have to be assumed that the subject of  $\nu$ P<sub>2</sub> in PsC1 is deleted under identity with the subject preceding  $V_1$ . However, the subject in PsC1 can never be overt and also, no independent reading of the subject DPs within each

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<sup>9</sup>Weisser (2015) addresses this very issue for a pseudo-coordination structure in English which allows extraction out of both conjuncts. He suggests that this might be accounted for by the fact that the conjuncts have a defective T head which needs to be valued. Following Müller (2010, 2011), he proposes that extraction out of the first conjunct in medial clauses or pseudo-coordination is possible because they have a defective T head which needs to be valued. Therefore the phase head remains active and allows for extraction. I do not assume for PsC1 that  $V_1$  is defective for reasons discussed in the previous section.

conjunct is available. It was demonstrated that if independent subject referents are available, PsC1 does no longer have its characteristic properties (extraction out of one conjunct, aspectual- and singular event-reading). Since singular referentiality is an indication of subject sharing (as opposed to subject ellipsis), subject sharing can be considered a necessary component for PsC1. Under a  $\nu$ P-coordination analysis, subject replication is a necessary component for PsC1.<sup>10</sup> The sharing properties of PsC1 are summarized in (32).

(32) *Sharing properties of PsC1*

- i. The subject is interpreted in both conjuncts but only pronounced in one.
- ii. Singular referentiality of the subject is a necessary condition for PsC1.
- iii. Adjuncts that naturally modify only  $V_1$  outside PsC1 can follow either  $V_1$  or  $V_2$  in PsC1.

## 5. Analysis: PsC1 with structure sharing

What I propose is that PsC1 is  $\nu$ P coordination where the two conjuncts are headed by &P and the subject is shared between  $\nu P_1$  and  $\nu P_2$ . In addition, the verbs can share an adjunct. This captures the properties of (32). Above the &P, there is a TP- and a CP-layer. The shared constituents ATB-move like the subject and adjuncts.

The main indicator for structure sharing is that a constituent is interpreted in two conjuncts but only pronounced in one (Gračanin-Yukse 2012: 107). This qualifies for the subject and adjuncts. The kind of structure sharing that I am proposing here is derivational in that the shared constituents can be traced back to where they were first projected in the tree. I already showed that for some verbs, the subject semantically belongs to  $V_2$ . Similarly, some adjuncts naturally modify  $V_1$  but not  $V_2$ . I propose the following generalization for PsC1 in (33) which is based on Collins (1997). Subject sharing is not optional under the present analysis as reasoned in (32). As soon as a reading with an independent subject referent is available for  $V_2$ , PsC1 turns into ordinary coordination (see section 2.1).

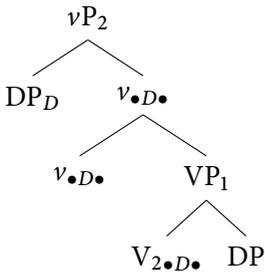
(33) *External argument sharing in PsC1*

In pseudo-coordination in Norwegian (group 1),  $\nu P_1$  and  $\nu P_2$  must share a DP. Optionally, they can share an adjunct.

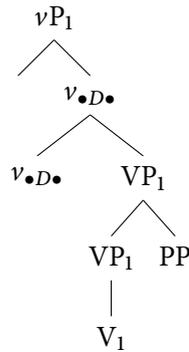
<sup>10</sup>Other accounts of this property are not excluded under a different analysis.

I make the following assumptions: structure building goes bottom-up and all syntactic operations are feature-driven. One basic operation is *Merge* for structure building. Structure building features (e.g. subcategorization features) [ $\bullet$ F $\bullet$ ] trigger Merge with an element that bears a corresponding feature [F] (for notation see Sternefeld 2006, Heck & Müller 2007). The derivation of PsC1 goes as follows.  $V_2$  enters the derivation first. Depending on its argument structure, it can have a D feature for a complement.  $vP_2$  projects a D feature for a subject (34). After  $vP_2$  has merged its subject,  $V_1$  enters the derivation.  $vP_1$  also projects a D feature (35). If it merges a different DP as subject, ordinary coordination arises. If it enters parallel merge with the DP of  $vP_2$  (cf. Citko 2005), pseudo-coordination arises (36). Evidence for that the subject originates in  $V_2$  was shown in (9).

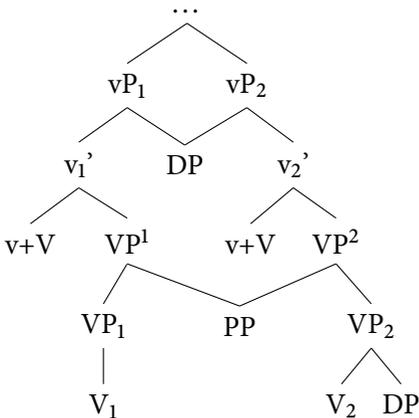
(34) *Step 1: merging  $vP_2$*



(35) *Step 2: merging  $vP_1$*



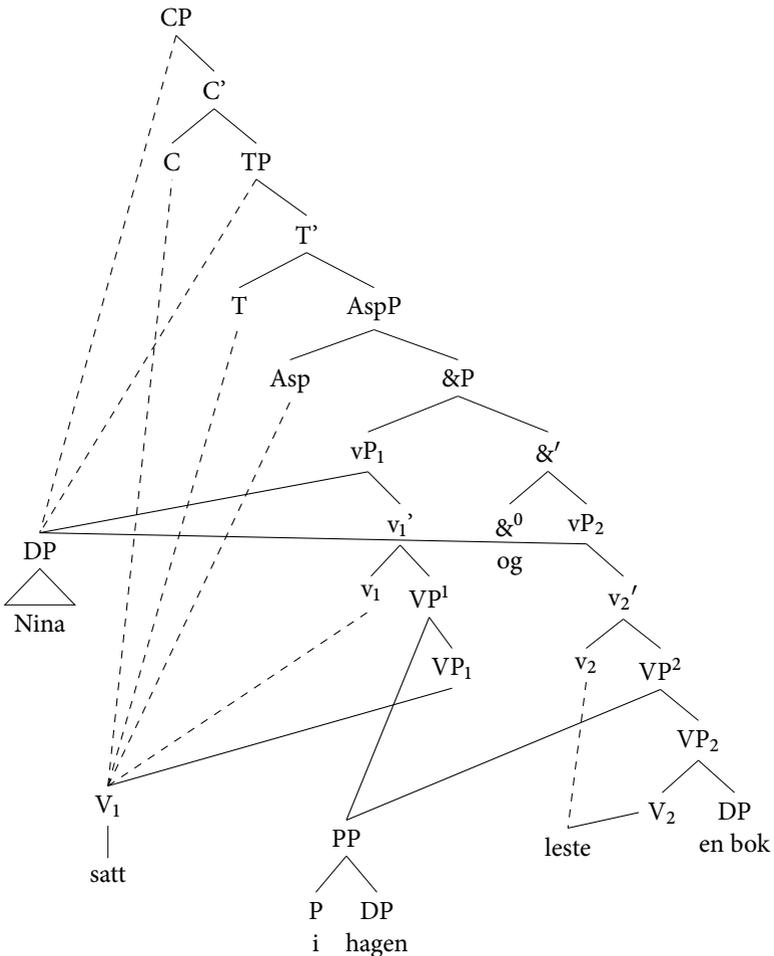
(36) *Step 3: parallel merge*



Parallel merge means that structure is replicated so that one constituent belongs to both conjuncts of a coordination. This results in a subject DP having two parent nodes. According to this analysis, parallel merge is optional for coordination but necessary for PsC1. The full structure of PsC1 is shown in (38).

- (37) *Extraction out of the &P: Subject and V<sub>1</sub>*  
 Nina satt i hagen og leste en bok  
 N. sat.PST in garden.DEF and read.PST a book  
 ‘Nina was reading a book in the garden.’

- (38) *Extraction out of the &P: Subject and V<sub>1</sub>*



The two  $\nu$ Ps are joined by a coordination phrase &P where  $\nu P_1$  is the specifier while  $\nu P_2$  is the complement of &P (Munn 1993). There is only one T head which is above the coordination layer. It agrees with the two  $\nu+V$  heads via *c*-command. This results in that identical morphological tense is realized on both verbs. Below T there is a *AspP*. This attributes to the aspectual interpretation in *PsC1*. The two  $\nu$  heads can project a separate *PerfP* or *VoiceP* as has already been assumed for scene-setting coordination in English (cf. Weisser 2015). This allows for each conjunct to be independently headed by an auxiliary of voice or tense/mood. The subject moves into the specifier position of TP and then into the specifier position of CP. In case another constituent is topicalized, it stays in *spec,TP*.  $V_1$  moves to C because of  $V_2$  in Norwegian (see Josefsson 1991). It should be noted that under this analysis, the two verbs are not dependent on moving into T to get tense because this is checked by the T head onto both verbs through *c*-command.

The proposed analysis is conform with the lexical properties that  $V_1$  shows and the generalizations in (31) that *PsC1* is not subordination. In addition, the fact that there is only *one* subject which has mother nodes in each conjunct means that it is associated with each sub-event denoted by the verbs. Together they form *one* event with the shared subject. With a non-shared subject, each conjunct would access an independent agent and this can lead to a separate event interpretation which is rather typical of ordinary coordination. Finally, under a multidominance analysis the subject and the adjunct can be topicalized without violating the CSC: no CSC violation occurs because these constituents are linked to positions of both conjuncts. Therefore, they actually move out of both conjuncts via ATB-movement. As Citko (2005) argues, this kind of ATB-movement where one constituents moves out of a position with shared mothers makes the operation straight-forward without having to stipulate that two constituents become one. It remains to be accounted for why other constituents which are not linked to both conjuncts can move out of the coordination. This is one of the topics I adress in the next section.

## 6. Discussion and open issues

Multidominance analyses usually account for coordinated constructions where one phonologically overt element positioned at the right or left periphery of a conjunct is interpreted in both conjuncts. The arguments for a multidom-

inance analysis have predominantly been that there is only one referent of the constituent, and that an element is interpreted in both conjuncts but only pronounced in one. Both of these criteria apply for PsC<sub>1</sub>. The differences lies in that the shared material is intervened by non-shared material. Indeed, current multidominance analyses mainly account for shared material which is positioned at landing sites of movement on the left or right periphery, for example, a coordination with a ATB wh-question as in (39). *What* is assumed to be shared between *John buy* and *Mary think Sam should read*.

- (39) What will John buy and Mary think Sam should read?  
(Citko 2005: 48)

According to Citko (2005), Gračanin-Yuksek (2007, 2012, 2013), unshared material dominated by multiple mothers of shared material must move. If it does not move, the structure cannot be linearized because according to the c-command-algorithm, “a shared node with more than one highest mother never c-commands an unshared node regardless of the structural position of either of them” (Gračanin-Yuksek 2012: 105). De Vries (2009) accounts for shared constituents at the left and right periphery. Wilder (1999, 2008) accounts for shared material in Right Node Raising which is subject to the right edge constraint. PsC<sub>1</sub> is therefore a different multidominance structure compared to other ones that have been proposed. For this reason, the multidominance algorithms proposed in the literature cannot account for constructions such as PsC<sub>1</sub>. The main reason for this is that PsC<sub>1</sub> has shared material which intervenes with unshared material. This regards the subject if it does not move to the spec position of CP, and it concerns adjuncts.

PsC<sub>1</sub> is however not alone in differing from current multidominance structures. Another construction that cannot be accounted for by existing algorithms is the German construction *Subjektlücke in finiten Sätzen* (SLF). This construction is analyzed by Mayr & Schmitt (2013) as a coordination of V<sub>2</sub> clauses with a shared subject. Extraction is allowed out of the left conjunct only.

- (40) *Subjektlücke in finiten Sätzen*  
Den Hund<sub>i</sub> hat er t<sub>i</sub> gefüttert und wird jetzt essen gehen.  
the dog has he fed and will now eat go  
'The dog, he fed it and will now eat.'

(Mayr & Schmitt 2013: 2)

Gračanin-Yukse (2012) notes that the shared subject in SLF is sandwiched between unshared material and that this is a problem for current linearization algorithms.<sup>11</sup>

Although it might seem problematic that current multidominance approaches cannot offer a linearization algorithm for PsC<sub>1</sub>, the reason for this is that they were designed to account for shared constituents in landing sites of movement. PsC<sub>1</sub> is different under this point of view. Structure sharing in PsC<sub>1</sub> differs from the movement-motivated sharing constructions regarding the kind of sharing it is. The kind usually discussed in the literature applies for sentences where the argument structure of each verb of a conjunct is compatible with the shared constituent. Sharing is possible because the argument structure of each conjunct subcategorizes for the shared constituent (Gračanin-Yukse 2012). In sentences like (39), both *buy* and *read* subcategorizes for *what* and this allows sharing. Under the current analysis of PsC<sub>1</sub>, structure sharing is a necessary component of PsC<sub>1</sub> in that it allows for a singular event interpretation. In addition, as was observed in section 2, subjects and adjuncts are allowed in PsC<sub>1</sub> which would not be compatible with one verb alone. This indicates that the verbs are more flexible regarding the shared constituents they can merge with or adjoin to compared to non-shared constituents. These two observations of sharing in PsC<sub>1</sub> indicates that it differs from sharing of constituents positioned in landing sites of movement. Therefore it seems reasonable that the linearization algorithms offered in the literature do not apply for PsC<sub>1</sub>.

The remaining issue to explain is why an unshared constituent of PsC<sub>1</sub> like the object of a transitive V<sub>2</sub> and V<sub>1</sub>, can move out of the second conjunct. I do not have a solution for this. However, a semantic explanation might be offered here. I again point to the observation that the properties of PsC<sub>1</sub> such as CSC violations is rendered possible because of subject sharing. As was shown in section 2.1 in (6) and generalized in (32), if a reading of independent referents of the subject DP is available, PsC<sub>1</sub> does no longer have all its typical properties and becomes ordinary coordination (each verb forms a separate event, no aspectual meaning, and extraction not allowed). Thus, when the

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<sup>11</sup>According to Mayr & Schmitt (2013), there is evidence for covert ATB movement of the subject. Gračanin-Yukse notes that in this case, the subject would be expected to be linearized preceding the rest of the sentences which it does not. For this she proposes a constraining factor for multidominance structures: Constraint on Sharing (COSH) which demands that two mothers of a shared node must dominate identical sets of terminal nodes (Gračanin-Yukse 2007).

subject is no longer shared, ordinary coordination emerges. Following this argumentation, I propose that the CSC can be violated in PsC<sub>1</sub> because (i) the two verbs have shared constituents, and (ii) this sharing allows a singular event reading. Under a semantic account of CSC violations, the one-event reading allows a constituent to be interpreted in both conjuncts even though it is not shared.

Contrary to ordinary coordination like (39) which denotes separate events, the conjuncts in PsC<sub>1</sub> are sub-events of one event. Therefore, if an argument of V<sub>2</sub> is extracted, ungrammaticality does not arise because the object is interpreted as part of both sub-events. When there are two events, this interpretation is not possible. The observation is that in a construction with coordination of two sub-events, the CSC is not enforced, while with coordination of two events it is enforced.

The connection between illocutionary force and island violations has been discussed by several authors. Bickel (2010) discusses the general possibility of extraction in a cross-linguistic survey. According to this work, languages allow extraction depending on independent scope of illocutionary force. For example, it cannot be extracted from an adjunct clause if it forms an independent illocution. This is also discussed in Weisser (2015) who points out that illocutionary force is associated with a C head in a given clause. Zhang (2010) shows that the CSC is relativized in non-distributive coordination. Coming back to the SLF construction, this is a construction which is claimed to go under natural coordination which opposes to accidental coordination (Wälchli 2005, Haspelmath 2004, Zhang 2010). SLF can be considered natural coordination because the events denoted by the conjuncts are part of a bigger event. Zhang (2010) claims that this construction has a cause-effect or contiguity reading which makes it part of 'natural coordination'. This might differ from sub-events like the ones in PsC<sub>1</sub> however there is a parallel: the events denoted by the coordinated verbs relate to each other. In both SLF and pseudo-coordination the events relate to each other and extraction is allowed. In Norwegian, ordinary coordination with event contiguity seems to permit the fronting of an adjunct that semantically relates more to the first conjunct than to the other (41a).

(41) *Adjunct fronting in coordination with event contiguity*

- a. Forsiktig åpnet jeg døren og tittet ut...  
 carefully open.PST I door.DEF and look.PST out  
 'I opened the door carefully and looked outside.'<sup>12</sup>

## 7. Summary

This paper discussed the sharing properties of one type of pseudo-coordination in Norwegian. I showed that the subject is shared between the two verbs and optionally, an adjunct can be shared. The indications of this is that these constituents are pronounced in one conjunct but interpreted in both. Regarding the subject, there is only one subject referent available for the two verbs. Interestingly, as soon as an independent reading of a subject referent is available for each verb, a separate event reading arises and the aspectual interpretation and possibility of extraction out of one conjunct is no longer found. PsC<sub>1</sub> attests properties of syntactic independence in that V<sub>1</sub> can be modified or have an argument, and extraction is allowed out of both conjuncts. In addition, each verb can be headed by a tense/mood or voice auxiliary. Based on these properties, a *v*P coordination was proposed with subject and adjunct sharing. This explains why an adjunct which naturally modifies one conjunct outside PsC<sub>1</sub> can, like *wh*-words, also be fronted: it is dominated by nodes in both conjuncts. Regarding the possibility of moving non-shared constituents like the object of one of the verbs, I suggested this might be semantically motivated and related to the fact that PsC<sub>1</sub> forms a singular event and therefore, the constituents are interpreted as part of both sub-events denoted by the conjuncts.

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# Closing by repetition: A formal account of replicative mechanisms in closing sequences

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## Abstract

This paper sketches a new way of integrating high-level linguistic units (turns, sequences) into a formal model of grammar. Our main claim is that some of the typical formal characteristics of closing sequences in conversation can be analysed as repetition of specific discourse entities at various levels of abstraction. We employ indexing in HPSG as a formal means to accommodate repetitions within larger sequence constructions.

## 1. Introduction

Interlocutors constantly reproduce fragments of conversation previously mentioned by some speaker in the course of a conversation. This is in part necessitated by the finiteness of lexical and grammatical resources in a language, and also by the fact that conversations develop around specific topics, and speakers tend to repeatedly utter specific words associated to the current topic(s) at a given time during a conversation.

Between-utterances replication of lexical items and syntactic objects has been argued to be a pervasive and ubiquitous feature of dialogical interaction, with no specific meaning attached to it (Du Bois 2014). However, there are also contexts in which repetition of material within a conversation clearly serves a specific discourse-related purpose. One such case are *closing* sequences, i.e. sequences in which a speaker tries to bring an ongoing conversation to an end (Schegloff & Sacks 1973). One of the characteristics of closing sequences is the reproduction of previously mentioned lexical items that are relevant for information structure or are otherwise salient. Another prominent feature of many closing sequences are multiple repetitions of the same discourse particle, often accompanied by special suprasegmental features such as integration of that particle string into a single prosodic unit.

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The aim of this paper is to show that both kinds of replication are part of a larger construction that licenses closing sequences containing repetitions at the offset of a conversation. Though two seemingly different processes on the surface, we argue that both kinds of replication can be modeled using a similar mechanism, namely feature identity in HPSG. To this end, we sketch a larger model of discourse based on HPSG into which the account of closings will be integrated.

The paper is organised as follows. Section 2 offers a discussion of several processes that involve replication in conversation and motivates our choice of closing sequences for the envisaged formalisation of discourse. In section 3, we discuss a concrete example of a closing sequence from Russian that includes several instances of interactionally motivated repetitions. In section 4, we introduce the formal model, and in section 5, we demonstrate how both replicative processes and sequence structure can be implemented within our adaptation of HPSG.

## 2. Replication in conversation

In the course of a conversation, speakers systematically reproduce parts of sentences from previous turns. Size and abstractness of the recycled material can vary considerably, ranging from adapting subtle sub-segmental details and simple repetitions of lexical items to copying of larger syntactic chunks. All those replicative mechanisms contribute to the perceived coherence and resonance (Du Bois 2014, see discussion below) of multiparty conversations. Recent work on talk-in-interaction has identified an impressive number of phenomena occurring in spontaneous speech that involve some form of replication such as *other-repair* (Schegloff 1987, Wu 2009), but also *accommodation* (Siebenhaar 2006, 2012, Beňuš et al. 2011, Schweitzer & Lewandowski 2014) in its numerous manifestations, e.g. as *prosodic orientation* (Szczepek Reed 2007) or *rhythmic integration* (Couper-Kuhlen 1993, Ogden 2015).

In the following, we will briefly sketch the idea of resonance, which we believe represents a very general and (nearly) unrestricted instance of replication in conversation (section 2.1). We then discuss closing sequences and argue that replication in those sequences is part of a construction associated with a specific interactional meaning and is thus subject to a much higher degree of restrictiveness (sections 2.2 to 2.3).

### 2.1. Resonance as an inherent property of dialogues

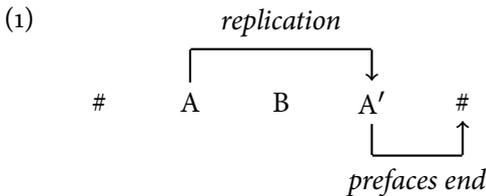
Du Bois (2014) presents an approach to replication in conversation named *dialogic syntax* – a framework that recognises the *diagraph* as a crucial structural unit to establish links between pairs of utterances which generate *resonance* – ‘catalytic activation of affinities across utterances’ (p. 360). His approach draws from the observation that speakers often construct an utterance based on a previous utterance by an interlocutor. The constant coupling of utterances is argued to give rise to a higher-order linguistic structure – the diagraph. Coupling can be achieved at ‘varying levels of abstraction, ranging from identity of words and affixes, to [syntactic] parallelism [...] to equivalence of [...] abstract features of form, meaning, and function’ (p. 360). Crucially, in dialogic syntax form does not predict function: The fact that a speaker reproduces parts of a previous speaker’s utterance does not entail that the meaning of the current speaker’s turn is parallel or opposite (or even related) to that of the one it replicates.

We believe that while the concept of resonance would be extremely hard to implement in a formal model of conversation as we envisage it (both from a formal and a functional point of view), the idea of a higher-order structural unit (in Du Bois’ terms, the diagraph) overseeing affinities across utterances at various levels resembles the idea of *constructions* – abstract constraints on relations between linguistic units. This idea is taken upon in our HPSG-style model, which we will argue to be capable of formally implementing replicative processes in conversation in section 5.

### 2.2. Bracket structure as replication: An analogy from classical music

Before we continue with the discussion of replication in dialogues, let us consider an example from music. Most classical musical compositions such as sonatas, arias and minuets, obey strict rules as to their formal make-up. Sonatas, for example, are characterised by a tripartite structure comprising exposition, development and recapitulation, and those parts again have some sort of internal structure as well, depending on which subtype of sonata they represent. A recurring pattern in many of those compositions is a general form *ABA'*, as illustrated in (1). Baroque da capo arias, for example, consist of three parts: Two contrasting parts (*A* and *B*) followed by a repetition of the first part, *A'*. The final part, *A'*, often comes with some degree of variation with respect to

the original *A*-part, be it in the form of modifications built into the score by the composer or as musical ornaments freely available to the interpreter.



From a derivational point of view, the *ABA'* pattern can be said to contain a bracket structure created by copying (and possibly slightly modifying) the *A* part to a designated position to the right side of *B*. From a functional perspective, however, *A'* does not only establish a link to the beginning of the piece, but also provides an indication of the ensuing end of the piece, as represented in (1). The copy thus serves two functions: The listener can once more enjoy the initial part of the composition, while at the same time he is made aware of its upcoming ending. Such a *prefacing* function of a (near-)copy of something produced at some earlier point is paralleled by other phenomena in the structure of conversations involving repetition, as will be shown in the next section.

### 2.3. Replication in closing sequences

In classical Conversation Analysis (Sacks et al. 1974, Ford et al. 2002; CA henceforth), the part of a conversation in which one or more interlocutors try to bring the ongoing conversation to an end is usually referred to as a *closing sequence* (Schegloff & Sacks 1973 and much subsequent work). Closing a conversation is an interactional process achieved collaboratively by all participants: simply exiting a conversation by stopping talking and walking away (face-to-face interaction) or hanging up (telephone interaction) at some point without any previous indication of an intention to do so would be considered rude in most situations and occurs extremely rarely. However, some participants may be more persistent in their endeavour to reach that goal than others, and socio-cultural rules may dictate a specific routine of sequences at the offset of a conversation, which is why often several closing attempts are necessary before the ultimate end of a conversation is reached.

Speakers have a wide range of resources available to them for initiating the end of a conversation, and normally several of them are used at the same time.

Closing strategies include lexical, phonetic, and syntactic devices as well as routines (Schegloff & Sacks 1973, Button 1987, Müller 1996, Wright 2011). One particular strategy that has been recognised in the literature (Button 1985, Curl et al. 2006, Local 2007, Barth-Weingarten 2011) is *repetition*. By repeating previously uttered parts of the conversation, speakers can make their turns closure-implicative, signalling their intention to complete an ongoing sequence or a whole conversation. In general, there seem to be no restrictions on the size and locality of repeated chunks – repetition can apply very locally to single lexical items, but it can also stretch over the whole of a conversation, e.g. when the main topics or results of a discussion are reiterated. One of the underlying principles of the latter case seems to be the fact that the need to communicate is often triggered by a mismatch in speakers' common ground. When, after some negotiation stretching over a certain number of turns, interlocutors have arrived at a point where that mismatch is resolved, a conversation can be considered felicitous and complete.<sup>1</sup> Speakers have several ways of communicating when they think that point is reached, and topical repetition is one of them. Thus, repetition does not need to be verbatim, but can also happen on the information-structural or the semantic level.

### 3. Case study: Two kinds of replications in a closing sequence

In this section, we will discuss a concrete example of a complex multi-turn closing sequence that contains both local and non-local repetitions. We will argue that both kinds of repetitions – local doubling of lexical material and non-local reproduction of topical discourse entities introduced previously in the conversation – are part of an interactional practice constituting a closing sequence, and that the repetitions can be thought of as part of an abstract sign-based construction licensing this practice.

The fragments in (2)–(4) are taken from the ORD speech corpus, a large collection of day-long recordings containing naturally occurring urban speech from Saint Petersburg (Šerstinova 2009). Transcriptions largely follow the GAT2 conventions (Selting et al. 2009). The fragments are situated within a

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<sup>1</sup>A similar approach is pursued in Yokoyama (1986, 2001): In its *neutral* mode, discourse is defined as a trade-off of knowledge, reflected by a constant updating of the interlocutors' *current concerns*. In addition, Yokoyama's model also includes a *non-neutral* mode, in which speakers can access a meta-level and negotiate the discourse setting itself.

larger episode in which S24, a 63-year old lecturer at Saint Petersburg State University, is talking to several colleagues and students at her department.

In line 01 of fragment (2), S24 is approached by FX, one of her students, who starts inquiring about a test that the students will have to take in the near future. FX establishes the common ground by mentioning a specific folder (l. 03), which S24 acknowledges (response token in line 04). FX then puts forward the main reason for starting the conversation: She seeks information on an upcoming test (l. 05), and is particularly worried about the questions that will appear in it (l. 06).

(2) *Initiating a request sequence: Russian transcription and English translation*  
(ordS24-10, 00:34.940 – 00:45.170)

01	FX	zdravstvujte (-)
02		možno vas pobespokoit'
03		ja (-) ja dostala papku po pervomu kursu večernikov=
04	S24	=tak=
05	FX	=vot (.) i chotela by uznat' v kakoj forme my sdaëm èkzamen
06		(.) °h i po povodu <b>voprosov</b>

01	FX	hello (-)
02		may I have a moment
03		I (-) I took the folder of the first-year evening students=
04	S24	=so=
05	FX	=well (.) and I wanted to ask in what form we will take the <b>test</b>
06		(.) °h and about the <b>questions</b>

Following the request initiation sequence, both interlocutors engage in a discussion about the exam and the test questions, with FX continuing to inquire about the details of the test and S24 promising to provide the necessary information in time, though the statements she makes are rather unspecific and her answers evasive. About 44 seconds after the end of fragment (2), S24 initiates a new sequence that aims at bringing the ongoing discussion sequence – and also the conversation as a whole – to an end. This new sequence (given in (3) below; a complete basic transcript including the omitted sections is included in the appendix) starts with S24 taking the floor (l. 30) despite the incomplete syntactic and prosodic nature (steady mid-level Fo throughout *to est' èto* 'that

means it's') of FX's previous turn (l. 28) and the fact that FX (unsuccessfully) tries to initiate a new TCU (Turn Construction Unit) at the same time S24 comes in (l. 29). The reason for this rather crude turn transition lies in the fact that S24 is obviously feeling uncomfortable with the current situation: Not only is she either not willing or unable to answer all questions directed to her by FX to their mutual satisfaction, but she also has a tight schedule and other pressing business at the department that she must attend to. For that reason, S24 readily reinterprets the response token *chorosho* 'ok' (l. 28) with which FX is indicating closure of some previous (sub-)sequence as prefacing the onset of a conversation-closing sequence, which S24 then initiates. Thus, external factors cause S24 to rank her own wish for the current conversation to be as brief as possible higher than the indications by FX as to the incompleteness of the ongoing discussion sequence.

(3) *Closing sequence (ordS24-10, 01:28.950 – 01:35.330)*

28	FX	chorosho. to est' èto- (-)
29	FX	[a]
30	S24	[è]to <b>ne problema budet voprosy</b>
31	FX	aga=
32	S24	=ja vam dam i èto ne budet vot tak (.)
33		<b>da da da da da</b>
34	FX	ugu (.) vsë.

28	FX	ok. that means it- (-)
29		[but]
30	S24	[the] <b>questions won't be a problem</b>
31	FX	I see=
32	S24	=I will give them to you and it won't be that's it (.)
33		<b>yeah yeah yeah yeah</b>
34	FX	mhm (.) that's all.

Let us now focus on some conspicuous features of the closing sequence proper (ll. 30–34). S24 recapitulates her previous comments on the concerns raised by FX by stating that the questions (*voprosy*) in the test will not be too difficult for the students (*ne problema budet*) (l. 30). This way, S24 'ticks off' the topic *questions* in the common ground, and – since the unresolved issue of the exam

questions was FX's justification for starting the conversation in the first place – clears the way for bringing the dialogue to an end. Crucially, S24 makes reference to the topic by using the exact same lexical item (*voprosy* 'questions') that has been uttered several times in the course of the conversation, e.g. at the very beginning in line 06. In the transcript, lexical repetitions are marked in boldface; *ne problema* 'not a problem' in line 30 has been highlighted, too, because it is not only the essence of what S24 is trying to convey throughout her discussion with FX, but also a literal repetition of one of her previous utterances (l. 16, see the complete version of the transcript in the appendix for reference).

FX reacts with a response token signaling agreement (l. 31), and S24 continues to reassure her of there being no reason to feel anxious about the test, and thus no reason to prolong the ongoing dialogue (l. 32). After the end of the TCU in l. 32, S24 produces five repetitions of the particle *da* in rapid succession (l. 33). Intervals between the repeated particles are of roughly equal length (around 0.6 – 0.7 sec), suggesting that the string of *da*'s is rhythmically integrated into a single larger prosodic unit; a diminuendo and steadily falling pitch contour stretching over the whole string offer further support for this analysis.<sup>2</sup> The single-unit five-partite string *da da da da da* serves the same purpose as the topical repetitions in line 30: It is almost as if with every new instantiation of *da*, S24 is trying to cancel any past, present and future attempts her interlocutor has made or might make to open a new sequence. The crucial interactional device at work here is the repetition and not so much the individual particle, as a repetitive string made up of a different particle such as *ladno* 'ok, alright' would be equally acceptable and pragmatically (quasi)-synonymous in this context.<sup>3</sup> Positive response tokens, however, do seem to be particularly well-suited to perform a function related to closings (of sequences or conversations) cross-linguistically (see e.g. the discussion of German *jaja* 'yesyes' in Barth-Weingarten 2011).

FX's immediate reaction to S24's turn consists of a response token *ugu* 'mhm' and a sequence-closing discourse marker *vsë* '[that's] all' (l. 34). Falling pitch

<sup>2</sup>Particle repetition is a strategy used by speaker S24 in a wide range of closing situations as attested in the ORD corpus (see Paschen & Richter 2014 for discussion)

<sup>3</sup>Another interesting case of *da*-repetition is reported in Bolden (2009): In a Russian telephone conversation, one speaker tries to initiate a closing sequence, while the other expands the conversation by commenting and asking questions. At some point, the latter speaker utters three repetitions of *da*, aiming at closing down her interlocutor's closing sequence. We thus have a case of *da*-repetitions with an other-directed sequence-closing function just as in our example above, but with the intention of sustaining, rather than concluding, an ongoing conversation.

at the end corroborates the impression of a closing function of *vsě*. FX thus appears to relent over her interlocutor's closing intentions which have just been reinstated in the form of the *da*-sequence. At this point, the conversation could have perfectly well come to an end, with an optional insertion of a farewell routine such as *spasibo, do svidanija* ('thanks, bye'). However, this is not what happens, as the continuation of the transcript given in (4) below shows.

- (4) *Re-negotiating and expanding the closing sequence, initiating a new sequence (ordS24-10, 01:34.440 – 01:54.425)*

34	FX	ugu (.) vsě. ↑togda značit=
35	S24	=i u vas budet da <b>ėkzamen</b>
36	FX	ugu
37	S24	Katja prosti da slušaj ətot

34	FX	mhm (.) that's all. ↑then so--=
35	S24	=and you will take the <b>test</b>
36	FX	mhm
37	S24	Katja excuse me yes listen this

Following the potential sequence-closing TCU in the first half of line 34, FX immediately self-selects to start a new TCU, expressing her intention of initiating a new sequence or returning to a previous sequence. Paralleling a previous competitive turn transition (ll. 28–30), S24 again does not allow FX to finish her turn, as she comes in at a point where FX's turn is not complete syntactically or prosodically (l. 35); this time, though, the transition lacks audible overlap and is somewhat smoother.

At the point S24 realises that her first attempt to conclude the conversation, the closing sequence in (3), has been unsuccessful, she has a set of possible options how to react. Still adamant in her intention to push her closing initiative through and unwilling to allow any new sequence to unfold, S24 chooses to post-expand the closing sequence; to that end, she resorts to the same strategy she used several times before in the course of the conversation: repetition of topically relevant lexical material (*ėkzamen* 'test', l. 35). However, the sequence (and the conversation as such) is then ended abruptly as S24 re-engages in a

conversation with a colleague of hers, *Katja* (l. 37 onward), with whom she talked before she was approached by FX.

To conclude, the essential structural components of the conversation and replicative devices used by the speakers can be summarised as follows:

(5) *Structure of the conversation*

Lines	Speakers	Sequence	Replication
01–06	FX	START, greeting, requesting	
07–29	S24, FX	discussing	
30–34	S24, FX	closing	topic ( <i>questions</i> ), particle ( <i>da</i> )
34	FX	re-opening discussion (at-tempt only)	
35–36	S24, FX	expanding prev. closing seq.	topic ( <i>test</i> )
37	S24	aborting current (= END) and opening a new conver- sation	

#### 4. The (quasi) formal model

In a different paper (Guzmán Naranjo & Paschen forthcoming) we propose a similar model based on Sign-Based Construction Grammar (Boas & Sag 2012), but for this paper we rethink the proposal in terms of constructional HPSG (Ginzburg & Sag 2000, GS from now on). The main reason for this is that the locality constraints imposed by SBCG might be too strong for CA phenomena. Our initial argument on why we need a declarative, model-theoretic approach to conversation still holds, however. The reason is simple: It makes more sense to describe conversational interactions with a set of constraints of what is possible and what is not, than to provide a set of rules to derive them. Additionally, ‘ungrammaticality’ in conversation can be easily understood as a type of awkwardness that follows the violation of some constraint. Assume, for instance, a simple constraint specifying that all conversations in a given language must start with a greeting sequence. Conversations without such a sequence then would still be possible, but speakers would feel that something went wrong. A rule-based approach, however, would fail to produce such a conversation in the first place.

#### 4.1. TCUs

Turn Construction Units (TCUs) were among the first structural building blocks recognised in classical CA (Sacks et al. 1974), and the concept has been widely used in the CA literature ever since. The exact definition and the categorical status of TCUs have been the subject of considerable debate, however (see Selting 2000 for discussion). The fundamental notion is that TCUs are divisions within turns. The idea is that there are significant units, usually smaller than turns, which can be understood as containing complete semantic content. What this means is that TCUs are understood as potentially complete turns (Schegloff 1996). Nonetheless, there is little agreement regarding the formal features of TCUs and how they should be formalised. In this study, we will assume that TCUs subdivide turns into complete messages, and optionally contain a boundary marker. Additional properties of TCUs could be integrated as long as they respect the turn boundary, that is, in this approach TCUs can not be shared by multiple speakers.<sup>4</sup>

#### 4.2. Turns

We take turns to be the basic units of conversation. We will analyse TCUs as clauses within a turn. That is, the feature TCUS is a list with all clauses contained in the turn. Additionally, we will define turn constructions which are constraints on turn sequences and turn interactions. The basic form of a turn is given in (6). *turn* types consist of three main features: FORM, TCUS and TURN-PRAG.<sup>5</sup> The FORM feature is the concatenation of the lists of the FORM features of the daughters. The TCUS feature lists the daughters of the turn, which are of the type *overt-expression* (phrases or words).

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<sup>4</sup>This obviously poses a problem for multi-turn TCUs, as they occur in other-completion or parenthetical constructions (see Mazeland 2007). One way of dealing with such cases in our model is to reanalyse them as competitive turn sequences consisting of non-complete messages and to require that it is only the sequence that forms a complete message.

<sup>5</sup>We will not elaborate on how conversational pragmatics interacts with formal semantics. For a more elaborated model of conversation pragmatics, see Ginzburg (2012).

$$(6) \left[ \begin{array}{l} \text{turn} \\ \text{FORM} \quad \dots \oplus \boxed{A} (\oplus \boxed{B}) \oplus \dots \\ \\ \text{TCUS} \quad \left\{ \begin{array}{l} \left[ \begin{array}{l} \text{PHON} \dots (\oplus \text{boundary}) \\ \text{FORM} \boxed{A} \\ \text{SEM} \text{ message} \\ \text{PRAG} \mid \text{C-IND} \mid \boxed{1} \end{array} \right] \\ \oplus \left( \begin{array}{l} \left[ \begin{array}{l} \text{FORM} \boxed{B} \\ \text{SEM} \text{ message} \\ \text{PRAG} \mid \text{C-IND} \mid \boxed{1} \end{array} \right] \end{array} \right) \end{array} \right\} \\ \text{TURN-PRAG} \quad [\text{NEXT-SPKR} / (-)] \end{array} \right]$$

Note that the basic *turn* type imposes no constraints on the SYN feature of the signs, but only on its SEM feature, specifying that it must be a semantic object of type *message*, that is, a complete communicative content (in GS: *message, proposition, question, outcome* or *fact*), which enforces that the sign in the TCU list must be clausal.<sup>6</sup> The constraint on the PHON feature is meant to indicate that there is some sort of intonational boundary marking that separates and delimits the borders between TCUs, except for the last one, which may lack it. Finally, the TURN-PRAG feature should contain the pragmatics associated with different types of turns and turn-taking. Provisionally we only include the feature NEXT-SP(EA)K(E)R, which indicates whether a current speaker yields the floor to the interlocutor or not. Because turns only mark NEXT-SPKR + if there is an over indication of this, we stipulate that by default turns are marked have a – value in this feature (marked by the use of ‘/’), which more specific constructions or types can override. With this simple structure we believe we are able to accommodate the most crucial characteristics of TCUs.

#### 4.3. Turn-managing constructions

With the types defined so far we can straightforwardly analyse turn-managing, turn-changing, and types of turn-taking. We define turn constructions as follows.

<sup>6</sup>Notice that coercing constructions will be necessary to allow cases which are syntactically non-clausal, but clausal in conversation. Also, notice that we cannot use the VFORM feature as in GS because we want to allow for non-verbal phrases to be clauses.

$$(7) \left[ \begin{array}{l} \textit{turn-seq} \\ \text{PRAG} \quad \textit{list}(\textit{turn-managing-prag}) \\ \text{DTRS} \quad \left\langle \left[ \begin{array}{l} \text{C-PARAMS} \mid \text{SPEAKER } \boxed{1} \\ \text{C-PARAMS} \mid \text{SPEAKER } \boxed{2} \end{array} \right], \dots \right\rangle \end{array} \right]$$

What this feature description says is that *turn-sequences* are composed of at least two adjacent turns from different speakers. This definition implies that there can be no turn sequences by the same speaker, and that any utterance sequence produced by a single speaker which is not interrupted by some other speaker's turn constitutes one turn.

Trivially, competitive vs cooperative turns are modelled with the NEXT-SPKR feature in that cooperative turn constructions assign a positive value to the first turn, while competitive turn constructions assign a negative value:

$$(8) \left[ \begin{array}{l} \textit{turn-seq-coop} \\ \text{PRAG} \quad \langle \textit{cooperative} \rangle \\ \text{DTRS} \quad \left\langle \left[ \text{NEXT-SPKR } + \right], \dots \right\rangle \end{array} \right]$$

$$(9) \left[ \begin{array}{l} \textit{turn-seq-comp} \\ \text{PRAG} \quad \langle \textit{competitive} \rangle \\ \text{DTRS} \quad \left\langle \left[ \text{NEXT-SPKR } - \right], \dots \right\rangle \end{array} \right]$$

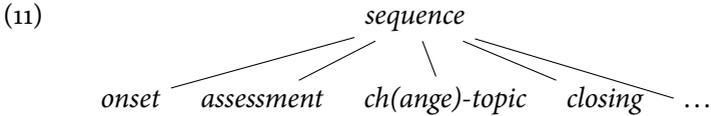
Since turn sequences are part of a hierarchy, unification provides the full types:

$$(10) \begin{array}{ccc} & \textit{turn-seq} & \\ & / \quad \backslash & \\ \textit{turn-seq-coop} & & \textit{turn-seq-comp} \end{array}$$

As mentioned before, additional overt constraints are required to allow turns to mark NEXT-SPKR as +. These might be over lexical material (posing a direct question), or a particular intonation contour. We will not elaborate on these constraints here.

## 4.4. Sequences

CA recognises that conversations have a structure of their own, with *onsets*, *topic changes*, *closings*, etc. We need to integrate this into our model to be able to account for closing turns. First we define a new type *sequence*:



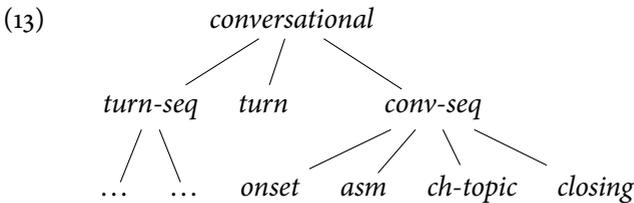
We then restructure the TURN-PRAG feature as:



Notice that this is a sketch, and we do not have a semantic ontology of exactly what these elements mean, but they are sufficient for our purpose of showing how conversation can be modeled parallel to syntax.

Then we need two special features: *START* and *END*, which mark the beginning and the end of a conversation.<sup>7</sup> We use these to mark that a list can not undergo concatenation on the left (*START*), or on the right (*END*):  $\langle \text{START}, \dots, \text{END} \rangle$ .

So far the hierarchy that we have established can be represented as follows:



Next we need to define closing turn sequences. Notice these are different from simple closing turns (with a *closing* value in the SEQ feature), because they do not make reference to a single turn, but to the conversation as a whole. We propose that closing sequences are used to license the end of a conversation. That is, in order for the speakers to successfully stop the conversation, they have to first initiate a closing sequence. In practice, a conversation can of course end abruptly, but this leads to awkwardness.

<sup>7</sup>As far as we are aware, there are no equivalent objects in standard HPSG.

The simplest solution is to posit that the end of the conversation must be preceded by a turn with the *closing* value:

$$(14) \quad \left[ \left[ \left[ \text{TURN-PRAG} \left[ \begin{array}{l} \text{SEQ } \textit{closing} \\ \text{NEXT-SPKR } +/- \end{array} \right] \right] \oplus (\dots \oplus \text{END}) \right] \right]$$

Notice that the turn with the *closing* feature need not be the last turn. The turn with the *closing* feature is simply the turn that initiates the closing sequence. Moreover, there is no restriction that says that a closing turn has to initiate a closing sequence, since speakers can ‘override’ closing turns and refuse to follow into a closing sequence.<sup>8</sup> All (14) says is that all closing sequences are initiated by a closing turn.

We could think of imposing further restrictions on the last turns of the closing sequence, like specifying that they must contain *goodbye* phrases. However, this is much more elaborate than we can describe here.

Finally, we would want to make more explicit what the properties of closing turns are. So far we have been dealing with the *closing* feature as if it were an abstract agreement feature. But just as agreement features usually have some formal expression, we want to claim that *closing* has a formal expression of its own. The two elements we will focus on here are repetition of semantic content, and repetition of particles.

## 5. Repetition and replication in our model

### 5.1. Particle repetition

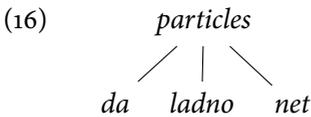
We see from the conversation that speaker S24 repeats *da* multiple times: *dadada*, but in principle other words are possible: *netnetnet*, *ladnoladnoladno*. These all mark the beginning of a closing sequence, and thus the *closing* feature. Note that we do not make any claims about other possible contexts in which particle repetitions can occur (closing a sequence, rhythmically-driven insertion of lexical material etc.); we merely state what can be said about them with respect to closing sequences.

<sup>8</sup>This is exactly what happens in sequence expansion, where a closing turn is present but the conversation does not end because of one of the speakers continuing it.

For the particle we see two possibilities. Either one proposes a recursive lexical rule that doubles a lexeme, or one introduces a construction that licenses reduplication of a given lexeme. Here we explore the second option. The main reason for this is that it seems to be a turn-specific phenomenon. Therefore, we encode the specification directly in the turn itself:<sup>9</sup>

$$(15) \left[ \begin{array}{l} \text{FORM} \quad \left[ (part^{2,n} \oplus) \langle \boxed{A} \rangle \right] \\ \text{TCUS} \quad \left\langle \left[ \text{FORM } \boxed{A} \right] \right\rangle \\ \text{TURN-PRAG} \quad \left[ \begin{array}{l} \text{SEQ } closing \\ \text{NEXT-SPKR } +/- \end{array} \right] \end{array} \right]$$

Importantly, these particles should not be listed in the part of the hierarchy where words live, because they do not behave like words in any way. They cannot be selected for, cannot select for, do not interact with grammatical constructions, and do not seem to carry much semantic content in the classical sense. A simple solution is to list them in the discourse hierarchy:



But alternatively one could postulate a lexical rule which essentially removes the *SYNSEM* feature from a word:

$$(17) \left[ \begin{array}{l} particle \\ \text{FORM} \quad \boxed{A} \\ \text{CAT} \quad discourse-particle \\ \text{M-DTRS} \quad \left\langle \left[ \begin{array}{l} lexeme \\ \boxed{1} \text{ SYNSEM } \left[ \text{FORM } \boxed{A} \right] \\ \boxed{2} \text{ ARG-ST} \end{array} \right] \right\rangle \end{array} \right]$$

This rule says that the only information which gets inherited by the mother

<sup>9</sup>We use a notation similar to that of regular expressions, which says that a particle (*da*) can be optionally repeated between 2 and *n* times.

is the FORM feature, while the rest of the SYNSEM and ARG-ST elements get lost. The advantage of using a lexical rule is that we can directly relate the discourse particles used for marking closings with their lexeme counterparts, the downside is that we still have to use a feature or hierarchy that specifies which lexemes this lexical rule applies to (since there are only a few that can be used in this way). Be it as it may, these discourse particles do not interact or behave like normal lexemes, and either approach captures this fact.

## 5.2. Topic repetition

Finally, we need to indicate how topic repetition works in closing marking turns. This is probably the hardest issue and we cannot give a complete explanation here. It is clear that not all cases of topic repetition result in a closing sequence:

- (18) A: so I went to the store yesterday  
 B: so you went to the store  
 A: yeah, and then...

We also have to keep in mind that the repeated material can be by the same or a different speaker:

- (19) A: what do we do about the books?  
 ...  
 B: so, I'll bring the books tomorrow and then we'll see  
 A: ok, bye  
 B: bye

What does seem to be the case is that the information repeated is a core part of the conversation and judged to be important for the conversation as a whole. We will call this the *Conversation Topic* (see Purver 2011 for computational approaches to topic extraction). There are two ways one could represent this. One possibility is that one proposes some sort of SLASH or feature amalgamation-like system for percolating the relevant information through turns. That is, turns all have a CONV-TOPIC feature which is passed to the next turn by default. This is not completely unmotivated. There are turns that explicitly change the conversation topic, and some can even refer to multiple topics. Alternatively, one could postulate a sort of turn external storage for this feature, similar to how common ground is usually understood. Importantly, in

these two alternatives the theme of the conversation can be accessed by a turn at any point, which means that independently of how one models conversation topic preservation and conversation topic management, the result is the same. We will ignore the issue of how exactly the conversation topic is marked. We will just assume that it is, and will simply employ a CONV-TOPIC feature. The CONV-TOPIC feature is a set of the same kind used for the semantic CONT(ent). Traditionally set elements are represented with  $\Sigma$  instead of Latin letters. With this, a closing turn sequence would then be as follows:

$$(20) \left[ \begin{array}{l} \text{closing-turn-seq} \\ \left[ \begin{array}{l} \text{closing-turn} \\ \text{FORM} \left[ (\text{part}^{2,n} \oplus \langle \underline{A} \rangle) \right] \\ \text{TCUS} \left\langle \left[ \begin{array}{l} \text{FORM} \underline{A} \\ \text{CONT} \left\{ \Sigma_3 \right\} \oplus \langle \underline{\Sigma}_1 \rangle \right] \right\rangle \\ \text{TURN-PRAG} \left[ \begin{array}{l} \text{SEQ closing} \\ \text{CONV-TOPIC} \left\{ \Sigma_2 \right\} \oplus \langle \underline{\Sigma}_1 \rangle \right] \end{array} \right] \\ \dots, \text{END} \end{array} \right] \end{array} \right] \\ (\Sigma_1 \in \text{given conversation topic}) \end{array}$$

What the construction in (20) says is that a closing turn sequence contains at least a closing turn, which repeats the conversation topic information already mentioned in a previous turn, and which is subsequently followed by the end of the conversation. This analysis assumes that the representation of the conversation topic is of the same kind as that of the semantic content, and that it can be paraphrased.

A difficult question to answer is how many turns can follow a closing turn at most before the closing turn fails to license the end of the sequence. Our intuition is that in principle, any number of turns are possible, though we do feel that some way of constraining the number and nature of turns is necessary; however, we cannot elaborate on this issue at this point.

## 6. Discussion

So far, there has been relatively little work that addresses problems in conversational analysis from a formal perspective. Some exceptions are Ginzburg et al. (2003), Hough & Purver (2012), Hough & Purver (2014), Howes et al. (2012), Purver (2004), and Purver et al. (2010). Most of this research, however, has focused on the interaction between formal pragmatics and syntax/semantics, the semantic and pragmatic ontology of speech acts, and to a much lesser degree on issues developed in the more traditional approach to conversational analysis. As far as we are aware there is no previous work that attempts to formalise turns by directly introducing conversational types and conversational constructions. Particularly, Purver (2004) gives an implementation of conversations based on *grounding rules*, which act as an algorithm for parsing and generation. We claim that (at least some) aspects of conversations can also be stated and described as constraints, parallel to those used for syntax.

This paper provides but a simple sketch of what a complete and more sophisticated formal model of conversation could look like. A proper theory would need to be much more specific regarding many aspects we did not touch upon but we hope to have shown that pursuing a formal model of CA is feasible and worthwhile.

## 7. Conclusion

We have argued for recognising replication as a constitutive formal feature of closing sequences. Both replicative processes discussed in the paper – particle repetition and recycling of topics – have been shown to be employed by speakers as an interactionally meaningful device for signalling intention to end an ongoing conversation.

We have developed a formal, constraint-based analysis of some structural properties of conversation. Our analysis of topic repetition does not require copying or movement, but rather relies on co-indexation, a general mechanism in declarative theories of grammar. The issue of local particle repetition is resolved by enriching the respective turn construction with frequency specifications.

We have thus tried to integrate structural notions of CA within a model-theoretic approach to conversation. Considering the careful and scrutinising methodology of modern CA and the dynamic nature of talk-in-interaction, the

model presented here awaits further discussion and refinement. However, we are confident that marrying conversation analysis with formal approaches to grammar is a fascinating enterprise and will ultimately yield valuable insights for both formally and functionally oriented frameworks.

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## A. Transcript

- 01 FX zdravstvujte (-)  
 02 možno vas pobespoit'  
 03 ja (-) ja dostala papku po pervomu kursu večernikov  
 04 S24 tak  
 05 FX vot (.) i chotela by uznat' v kakoj forme my sdaëm ekzamen  
 06 i po povodu voprosov  
 07 S24 voprosy ja vam (1.0) gde-to tam ja ne znaju  
 08 vo vtoroj polovine nojabrja ili v seredine nojabrja tol'ko dam  
 09 FX ugu  
 10 S24 voprosy da kakoj va- vot dva voprosa tam budet (0.8)  
 11 vot po è-è èto v osnovnom po è- tomu materialu  
 12 kotoryj my s vami (.) budem prochodit' vot  
 13 no èto ne isključet è-è učebnik i kak-to nam na-  
 14 vam nado ob učebnike pogovorit'  
 15 FX da u nas [prosto očen' mnogich] net  
 16 S24 [da ne problema ]  
 17 FX to est' èto budet vtoraja polovina nojabrja  
 18 a v internete vot dostat' v principe nel'zja  
 19 tol'ko vy vydaëte ich  
 20 S24 voprosy  
 21 FX da  
 22 S24 ja ne znaju ja ich vo vsjakom slučae v internet ne otpravljala  
 23 FX [((nrb., 2 sek.)) ]  
 24 S24 [možet kto-to da no u menja sobstennye]  
 25 sobstennye voprosy ja dumaju čto net (-)  
 26 a čto ja vam dam (-)  
 27 ne pisala tut (1.2) čitajte knižki poka  
 28 FX chorosho to est' èto (-)  
 29 FX [a]  
 30 S24 [è]to ne problema budet voprosy  
 31 FX aga  
 32 S24 ja vam dam i èto ne budet vot tak (.)  
 33 da da da da da  
 34 FX ugu (.) vsë togda značit  
 35 S24 i u vas budet da èkzamen  
 36 FX ugu  
 37 S24 Katja prosti da slušaj ètot  
 38 (1.8) a (1.7) net (.) tak ja sejčas ubegaju

- 01 FX hello (-)  
 02 may I have a moment  
 03 I (-) I took the folder of the first-year evening students  
 04 S24 so  
 05 FX well (.) and I wanted to ask in what form we will take the test  
 06 and about the questions  
 07 S24 I'll give you the questions (1.0) around I don't know  
 08 not until the second half of November or mid-November  
 09 FX mhm  
 10 S24 questions yes which- well there will be two questions (0.8)  
 11 well about uh basically about the course materials  
 12 that we will work with  
 13 but that does not exclude uh the textbook and somehow we ha-  
 14 you (will) have to say something about the textbook  
 15 FX well there are [simply many] that we haven't got (yet)  
 16 S24 [no problem ]  
 17 FX so it will be the second half of November  
 18 is it not possible to get access to them on the internet  
 19 is it only you who releases them  
 20 S24 the questions  
 21 FX yes  
 22 S24 I don't know in any case I did not upload them  
 23 FX [((unintelligible, 2 sec.)) ]  
 24 S24 [maybe someone else did but my own]  
 25 my own (questions) I don't think so (-)  
 26 so what's the matter I'll give them to you (-)  
 27 didn't write here (1.2) read your books in the meantime  
 28 FX ok that means it (-)  
 29 [but]  
 30 S24 [the] questions won't be a problem  
 31 FX I see  
 32 S24 I will give them to you and it won't be that's it (.)  
 33 yeah yeah yeah yeah yeah  
 34 FX mhm (.) that's all then so  
 35 S24 and you will take the test  
 36 FX mhm  
 37 S24 Katja excuse me yes listen this  
 38 (1.8) eh (1.7) no (.) so I'm leaving soon

# Displaced morphology in German – Evidence for post-syntactic morphology

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## Abstract

In this paper I will provide a new argument for post-syntactic morphology. The empirical evidence comes from so-called displaced morphology in German, where the non-finite verb form selected by a given governor does not end up on the immediately dependent verb but rather on the last verb of the verb cluster. The placement of the morphology thus depends on linear notions such as adjacency rather than hierarchical relations (c-command, minimality). I will argue that the exponents for non-finite morphology are inserted into separate functional heads which are linearized clause-finally. At a late stage of the PF-derivation, the exponents are associated with their verbal hosts by means of Local Dislocation (Embick & Noyer 2001). As a consequence, the non-finite morphology always comes last in the verb cluster. Displacement arises once the order in the verb cluster deviates from the strictly descending 321 order. The placement operation is thus always the same, displacement emerges just a side-effect of (partially) ascending verb cluster orders. Restrictions on displacement follow from the selectional requirements of the vocabulary items.

## 1. Introduction: Morphological selection

It is a fundamental property of syntax that heads determine the formal properties of their complements. In this paper I will focus on selection of non-finite morphology where several selection relations are involved. Canonically, the morphology selected by a verb  $V_n$  is realized on the immediately subordinate verb, viz.  $V_{n+1}$  (if the non-finite morphology is selected by a non-verbal head such as e.g. a complementizer, the non-finite morphology is realized on the

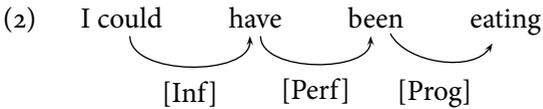
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highest verbal element in the relevant domain). This is schematically represented in (1), which depicts a sequence of verbs that are in a government relation:<sup>1</sup>



The non-finite morphology selected by V1 is thus realized on V2, the morphology selected by V2 on V3, and so forth. The following example from English illustrates the workings of selection.



The modal verb *could* selects an infinitive, which is realized on the perfective auxiliary *have* that immediately depends on the modal. *Have* in turn selects a perfect participle, which is realized on the progressive auxiliary *been*. *Been*, finally, selects the progressive form, which is realized on the lexical verb *eating*.

Ensuring that the selectional properties of a verb/complementizer are satisfied can be done in two ways: Either by means of a checking operation or by Agree between the selector and the dependent element. In the former, both elements are pre-specified for a certain value. If the values co-incide, checking and thus selection is successful. In the latter, first proposed in Adger (2003), the dependent element starts out with an unvalued feature that is valued in the course of the derivation by the selector. The Agree approach is particularly prominent in recent work by Susi Wurmbrand such as Wurmbrand (2012). She assumes that functional clausal heads (such as T, Mod, Asp etc.) have an interpretable T(ense)-feature which is typically valued; the value corresponds to the semantic value of the head, viz., PAST, MODAL, PERFECT etc. Furthermore, all verbal heads have an uninterpretable T-feature, which is typically unvalued. Since it is unvalued, it has to undergo Agree with the closest valued feature. The value of the *u*T-feature is what is realized at PF. A sentence like *He must have left* will then involve the following features and Agree operations (I simplify Wurmbrand's example 7 somewhat).

<sup>1</sup>In the traditional German literature, the selection of non-finite verb forms is called 'status-government'; verbs thus govern the 'status' of dependent verbs.

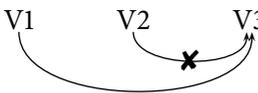
- (3) [ModP Mod<sub>T:mod</sub> [AuxP Aux<sub>T:Perf;uT:mod</sub> [VP V<sub>uT:Perf</sub> ]]]

The lexical verb thus receives the value [perf] from the auxiliary, while the auxiliary receives the feature [mod] from the modal. At PF, [perf] is realized by the perfect participle while [mod] is realized by the infinitive.

As Wurmbrand points out, in most cases, checking and Agree lead to the same result. She argues that parasitic morphology in Frisian and Norwegian/Swedish provides an argument in favor of the Agree approach because it involves copying of a value from a selector to several dependent verbs. In the following example, the perfect participle selected by the perfective auxiliary is not only realized on the modal that directly depends on it but also on the lexical verb that is governed by the modal (Wurmbrand 2012: 132).<sup>2</sup>

- (4) Jeg hadde<sub>1</sub> villet<sub>2</sub> lest<sub>3</sub> boka.  
 I had want.PTCP read.PTCP books  
 'I would have liked to read the book.' (Norwegian)

While I find Wurmbrand's arguments valid for parasitic morphology, I will argue for a very different position in this paper. The argument will be based on so-called displaced morphology in German where non-finite morphology is realized in a radically different way than in the canonical case depicted above: The morphology selected by  $V_n$  is not realized on  $V_{n+1}$  but rather on the last verb of the relevant domain, which in our case is the verb cluster. Displacement is schematically represented in (5).

- (5)  displacement

The form selected by V1 is not realized on the directly dependent V2 but rather on V3, the last element in the verbal hierarchy. Furthermore, the selectional requirements of V2 seem to be suppressed (for a more precise statement see sections 4 and 5 below).

I will argue that displaced morphology in German provides an argument for post-syntactic morphology (cf. Arregi & Nevins 2012) and against selection via Agree as in Wurmbrand (2012): First, the placement of non-finite morphology does not depend on the structural conditions that characterize

<sup>2</sup>The glosses follow the Leipzig Glossing Rules, see <https://www.eva.mpg.de/lingua/pdf/Glossing-Rules.pdf>.

Agree, viz. *c*-command and Minimality but rather on linear notions such as adjacency. Second, displacement does not have any semantic effects, which will be important in the case of participles. I will propose that the non-finite morphology is inserted into separate functional heads and associated with the verb post-syntactically by Local Dislocation (Embick & Noyer 2001). Displacement will be shown to arise from the conflict between the general head-finality of German and head-initial verb clusters. Importantly, there is no displacement operation as such; rather, displacement is just a side-effect of the linearization conflict.

This paper is organized as follows: Section 2 introduces the empirical phenomenon. In section 3, I provide a derivation of displaced morphology. In section 4, I address restrictions on displacement. Section 5 discusses configurations where displacement is exceptionally absent, and section 6 concludes. The appendix in section 7 addresses the IPP-effect.

## 2. The phenomenon of displacement

One prominent feature of West-Germanic OV-languages like Dutch and German is the clustering of verbal elements at the end of the clause in V-final structures, as in the following example (under verb second, where the finite verb moves to C, only the non-finite verbs occur together).<sup>3</sup>

- (6) dass er das Buch lesen<sub>3</sub> können<sub>2</sub> muss<sub>1</sub>  
 that he the book read.INF can.INF must.3SG  
 ‘that he must be able to read the book’ (Standard German)

Such sequences are referred to as verb clusters (for a detailed overview, see Wurmbrand 2005, to appear). In this section, I will describe the placement of non-finite morphology in German verb clusters; I will first discuss the situation in the standard language before addressing German dialects and earlier stages of the language.

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<sup>3</sup>The number indices on the verbs indicate the hierarchical relations, i.e. 1 stands for the highest verb in the government sequence, 2 for the immediately dependent verb, etc.

## 2.1. Standard German descending verb clusters: Well-behaved

Verb clusters in the standard language are mostly descending, viz., the governing verb follows the governed verb. Orders where the governing verb precedes the governed verb are referred to as ascending. Descending orders are unsurprising, the non-finite morphology selected by a given verb is faithfully realized on the immediately dependent verb, as illustrated in (7).

- (7) a. dass er das Buch **gelesen**<sub>3</sub> **zu** haben<sub>2</sub> dachte<sub>1</sub>  
 that he the book read.PTCP to have.INF think.PST.3SG  
 'that he thought he had read the book'  
 (321 Standard German)
- b. dass er das Buch **zu** lesen<sub>3</sub> **zu** versuchen<sub>2</sub> versprach<sub>1</sub>  
 that he the book to read.INF to try.INF promise.PST.3SG  
 'that he promised to try to read the book'  
 (321 Standard German)

In (7a), V1 selects a so-called *zu*-infinitive (semantically equivalent to English *to*-infinitives), which is realized on V2 (although *zu* is written separately in German orthography, I will show below that it is a prefix). V2 in turn selects a perfect participle, which is realized on V3. In (7b), V1 selects a *zu*-infinitive, which is realized on V2. V2 also selects a *zu*-infinitive, which is realized on V3. The placement in descending orders is schematically represented in (8).

- (8)  *no displacement*

2.2. Standard German (partially) ascending clusters: Displaced *zu*

Interestingly, once the cluster order deviates from the strictly descending 321-order, i.e. involves a (partially) ascending order, *zu*-placement is no longer in accordance with the hierarchical relations. Consider the triple in (9) where the complementizer *ohne* 'without' selects a *zu*-infinitive (note that while V2 appears as a participle in (9a), it appears as a bare infinitive in (9b/c). This instantiates the so-called IPP-effect, cf. section 7 for discussion).

- (9) a. ohne das Buch lesen<sub>3</sub> gekonnt<sub>2</sub> **zu** haben<sub>1</sub>  
 without the book read.INF can.PTCP to have.INF  
 'without having been able to read the book' (321)

- b. ohne das Buch haben<sub>1</sub> lesen<sub>3</sub> zu können<sub>2</sub>  
 without the book have.INF read.INF to can.INF  
 ‘without having been able to read the book’ (132)
- c. ohne das Buch lesen<sub>3</sub> haben<sub>1</sub> zu können<sub>2</sub>  
 without the book read.INF have.INF to can.INF  
 ‘without having been able to read the book’ (312)

In (9a), which involves a 321-order, the *zu*-infinitive appears on the hierarchically highest verb of the cluster, viz. V1. In (9b/c), however, which involve a 132 and 312 order, respectively, *zu* does not occur on V1 but rather on V2. It thus seems to be displaced. Crucially, if *zu* occurs on V1 in (9b/c), the result is sharply ungrammatical, as (10) shows for (9b).

- (10) \*ohne das Buch zu haben<sub>1</sub> lesen<sub>3</sub> können<sub>2</sub>  
 without the book to have.INF read.INF can.INF  
 ‘without having been able to read the book’ (132)

Displaced *zu* has been frowned upon by grammarians ever since Grimm (1837: 949). There seem to be two reasons: First, displacement is considered illogical (as it blatantly violates the canonical rule of morphological selection); second, subjects show a significant degree of uncertainty and variability in empirical tests (see Reis 1979, Haider 2011). As for the first point, German is frequently compared with the ‘logical’ well-behaved Dutch verb clusters, where the equivalent particle *te* always occurs on the hierarchically highest verb.

- (11) dat hij het boek dacht<sub>1</sub> te hebben<sub>2</sub> gelezen<sub>3</sub>  
 that he the book think.PST.3SG to have.INF read.PTCP  
 ‘that he thought he had read the book’  
 (123 *Standard Dutch*)

Since displacement (seemingly, see below) violates a rule of grammar, it is considered ungrammatical by Merkes (1895) and Haider (2011). Both argue that displacement may be an overgeneralization that is motivated by the fact that *zu* generally occurs at the end of the verb cluster. Haider (2011) argues that it is a grammatical illusion: Although the construction is acceptable to many speakers, it is nevertheless ungrammatical. Bech (1963) considers the construction grammatical but argues that it is a hybrid repair construction that results from the fact that two equal rules are in conflict with each other

(*zu* must be placed on the immediately dependent verbal element vs. *zu* must occur at the end of the verb cluster); the degradedness of the result may thus be unsurprising. Reis (1979), finally, argues that the grammatical status of the construction is undefined: She proposes that grammatical rules are only defined for the standard cases and may consequently not apply in very specific environments such as the one where displacement is found.

Following Meurers (2000) and Vogel (2009), I assume instead that displacement is a grammatical phenomenon. I will show that the picture changes drastically once the rule for the placement of non-finite morphology in German is reconsidered. There will be just one placement rule in my system so that no conflicts arise; both lack of displacement in descending orders and displacement in ascending orders will result from the very same rule and both thus arise as the only logical possibility in their respective grammatical environment. The theory-internal arguments against the grammatical status of displacement adduced in the works cited above thus disappear. Nor will there be any reason to consider displacement as either a hybrid construction or as a phenomenon outside the purview of grammatical rules.

Quite apart from the conceptual argument, there are also strong empirical arguments against treating displacement as ungrammatical/paragrammatical/hybrid: First, displacement is attested in careful sources, including poetic and scientific texts as well as prestigious newspapers as in (12) (for more examples see Merkes 1895: 69f., Meurers 2000: 72, ex. 114).

- (12) die Ohnmacht, nicht haben<sub>1</sub> helfen<sub>3</sub> zu können<sub>2</sub> ...  
 the powerlessness not have.INF help.INF to can.INF  
 'the powerlessness not having been able to help'

(*Standard German*, FAZ, 03.01.2005)

Second, treating displacement as ungrammatical/as a repair fails to account for the significant contrast between the displaced variant in (9b) and the version without displacement in (10). Third, displaced *zu* is unmarked in German dialects (see section 2.3), and fourth, displaced *zu* is part of a more general displacement phenomenon (see section 2.4). The somewhat reduced acceptability of displacement in the standard language will be addressed in the next subsection.

2.3. Displaced *zu* in German dialects

Displaced *zu* in the standard language is necessarily infrequent because (partially) ascending orders only occur in one type of three-verb cluster (Aux/Fut-Mod-V) and more complex clusters but crucially not in the much more frequent two-verb clusters. The situation in dialects is very different because ascending orders are much more prominent. Interestingly, while the phenomenon is well-attested, the literature discussing displacement in dialects does not contain any indications that the construction is marked or ungrammatical. Rather, displaced *zu* is described as the canonical realization of non-finite morphology in (partially) ascending orders. Its grammaticality is thus undisputed. Importantly, this holds for both traditional grammars (Hodler 1969: 560, Weber 1987: 244, and especially the works cited in Höhle 2006), more descriptive treatments (Comrie & Frauenfelder 1992) as well as formal approaches (Bader 1995: 22; Cooper 1995: 188f.). Furthermore, displaced *zu* can be heard on the radio (Cooper 1995) and be found on the internet. The following examples are but a small selection. Example (13a) is from Weber (1987: 244, fn.1), (13c) is from Comrie & Frauenfelder (1992: 1059), and (13d) is from Weise (1900: 154).

- (13) a. Er schiint<sub>1</sub> nüüt [wele<sub>2</sub> z wüsse<sub>3</sub>] dervoo.  
 He seem.3SG nothing want.INF to know.INF about.it  
 ‘He does not seem to be interested in it.’

(1 ... 23 *Zurich G.*)

- b. Ich liebe d freiheit, selber de tag [chöne<sub>1</sub> z  
 I love.1SG the freedom self the day can.INF to  
 bestimme<sub>2</sub>].  
 determine.INF  
 ‘I love the freedom to determine my schedule.’

(12 *Swiss G.*)

(cf. <http://badoo.com/de-ch/0279246484/>; accessed March 11, 2013)

- c. Ech ha ts Büach kchöiff, fer dam Marco cheni<sub>1</sub> z  
 I have.1SG the book buy.PTCP for the.DAT Marco can.INF to  
 sägan<sub>2</sub>, ...  
 say.GER  
 ‘I bought the book to be able to tell Marco ...’

(12 *Bosco Gurin*)

- d. weil er sich nicht von ihm braucht<sub>1</sub> lassen<sub>2</sub>  
 because he self not by him need.<sub>3SG</sub> let.<sub>INF</sub>  
 anzuschmauzen<sub>3</sub>  
 rant.at.<sub>INF</sub>  
 'because he does not need to be ranted at by him'

(123 *Altenburg*)

Note that displacement is also attested with Verb Projection Raising, viz., verb clusters that contain non-verbal material.

- (14) ohni mi welle<sub>1</sub> uf d bullesite z stelle<sub>2</sub>, im gegeteil  
 without me want.<sub>INF</sub> on the cops.side to put.<sub>INF</sub> on.the contrary  
 'without wanting to side with the cops, on the contrary, but ...'

(1X2 *Swiss German*)

(<http://www.fcbforum.ch/forum/showthread.php?4328-usschritige-nachem-spiel-!/page4>;  
 accessed March 11, 2013)

As mentioned above, there is no reason to believe that displacement is marked in the dialects. There are arguably two factors that lead to higher acceptability than in the standard language: First, since ascending clusters are much more prominent in dialects, including 2-verb clusters, displacement is much more frequent than in the standard language where they only occur in one type of 3-verb cluster. Second, because of the higher frequency of strictly ascending orders in dialects (12, 123), the relative dependencies between the verbs can be determined more easily than in the mixed clusters (132, 312) that prevail in the standard language: In the relevant 13zu2- and 31zu2-clusters, all verbs appear as infinitives so that it is not immediately obvious which verb depends on which. The dialect speaker, however, takes an ascending order for granted and will thus be able to determine the hierarchical relationships quickly despite the lack of morphological clues.

To summarize the empirical situation so far,  $z(u)$  always attaches to the last verb of the complement of the selecting head.<sup>4</sup> As a consequence,  $z(u)$  will appear displaced once the order in the cluster deviates from the strictly descending (3)21.

<sup>4</sup>For very rare exceptions, see Schallert (2012: 252).

## 2.4. Further types of displaced morphology in German (dialects)

Importantly, displaced *zu* is not an isolated phenomenon. Rather, displacement is a systematic property of certain morphological forms in certain German varieties. One example is the so-called Participio Pro Infinitivo (PPI)-construction that was found in earlier stages of the language. In (15), V1 selects a perfect participle, but V2 appears as an infinitive while V3 (which should be an infinitive given the selectional requirements of V2) appears as a participle, see Fleischer & Schallert (2011: 185).<sup>5</sup>

- (15) dez han<sub>1</sub> wir unser kunichlich Insigel an disen breiff  
 therefore have.1PL we our royal seal to this letter  
 haissen<sub>2</sub> gehenket<sub>3</sub>  
 let.INF attach.PTCP  
 ‘Therefore we had our royal seal attached to this letter.’

*(Middle High German, 1286)*

As with displaced *zu*, it appears, thus, that a verb in the government chain, V2, has been skipped. Furthermore, displacement is particularly prominent in East-Middle-German dialects, which have a much richer inventory of non-finite forms (cf. Höhle 2006). In these dialects, various kinds of infinitives and gerunds can be displaced. In (16), V1 selects a so-called *ge*-infinitive, viz. an infinitive with a *ge*-prefix. However, V2 (which selects a bare infinitive) occurs as a bare infinitive while V3 appears in the *ge*-infinitive, see Höhle (2006: 68).

- (16) kâsd<sub>1</sub> mə heləf<sub>2</sub> gəschri:3  
 can.2SG me.DAT help.INF GE.write.INF  
 ‘Can you help me write?’

*(dialect of Kleinschmalkalden)*

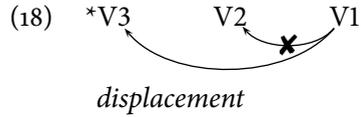
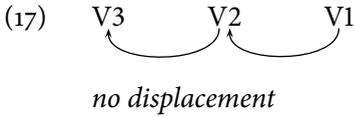
## 2.5. Summary

We have seen that the order in the German verb cluster has an effect on the placement of non-finite morphology. The distinction between strictly descending (3)<sub>21</sub> orders and partially ascending orders, viz., 123, 132 and 312, is

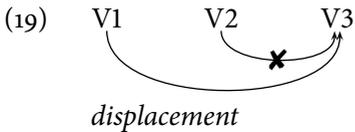
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<sup>5</sup>The PPI-construction is also residually found in some contemporary dialects, see e.g. Steil (1989: 41) and references cited there on Swabian clusters with V2 = ‘help’. See also Höhle (2006: 66, fn. 19) for a PPI-example from Sonneberg.

crucial. In strictly descending orders, the morphological properties selected by a given verb are always faithfully realized on the immediately dependent verb. Importantly, there is never any displacement in such orders, as the following diagrams show.



Things are very different in (partially) ascending orders: The form selected by V1 (or by some higher head like the complementizer *ohne* ‘without’) is not realized on the immediately dependent verbal element but on the last verb of the verb cluster. Furthermore, the selectional properties of verbs that are in the middle of the government sequence (usually V2) appear to be suppressed.



At first sight, the placement of non-finite morphology may appear rather idiosyncratic given that it can be both faithfully realized or be displaced, depending on the cluster order. A different perspective emerges, though, once it is realized that all cases we have studied so far obey the following very simple descriptive generalization.

(20) *Generalization: Placement of non-finite morphology*

The non-finite morphology selected by a head X is affixed onto the last verb of the complement of X.

In other words, the placement of non-finite morphology in German follows a very simple and general rule. What is remarkable, though, is the fact that it does not seem to be governed by hierarchical relations (at least not in partially ascending orders) but rather by linear order.

Before concluding this section, I will briefly discuss other cases of displacement in West-Germanic. I will show that they do not fall under the generalizations established above and thus require a different analysis than the one to be proposed in the next section.

The first case is the so-called Skandalkonstruktion ‘scandal construction’, first mentioned in Merkes (1895: 72), rediscovered in Reis (1979) and discussed in detail in Vogel (2009). In this construction, which obtains in 312 (and 1423) orders, the selectional requirements of V1 are displaced to V3. Crucially, displacement thus does not target the last verb of the verb cluster but rather the first one/the one left-adjacent to V1 (note that the *zu* selected by the matrix verb *bedauern* ‘regret’ is displaced to the last verb of the cluster, viz. V2), see Vogel (2009: 308).

- (21) Er bedauert, es nicht [verhindert<sub>3</sub> haben<sub>1</sub> zu können<sub>2</sub>].  
 He regret.3SG it not prevent.PTCP have.INF to can.INF  
 ‘He regrets not having been able to prevent it.’

Obviously, displacement of participle morphology to the left/the beginning of the cluster in (21) deviates from the general placement rule established above. I will consequently set the scandal construction aside in the rest of the paper. It is not my intention to brush it under the carpet, not the least because Vogel (2009) has convincingly shown that the scandal construction is not just a marginal phenomenon. Rather, I believe that it is fundamentally misguided to attempt to unify the scandal construction with the instances of displacement that target the last verb of the cluster. Consequently, the necessary mechanisms to derive the scandal construction will be rather different, see e.g. Vogel (2009) and Wurmbbrand (2012) for explicit proposals. An alternative view is proposed in Meurers (2000: 96ff.), taking up an observation by Merkes (1895: 33f.): He argues that the scandal construction should be considered a residue of a construction that was more prominent in Middle High German; this construction shows a systematic syntax-semantics mismatch: In 3-verb-clusters with the auxiliary semantically as V1 and the modal as V2, the modal appears syntactically as V1 and the auxiliary as V2 (basically as in English *should have left*). The scandal construction can then be re-analyzed as a 321 cluster where morphological selection is regular. I will not choose between these options and leave the issue for further research.

Displaced morphology in German should also be set apart from so-called parasitic morphology in Norwegian/Swedish and Frisian, which at first sight seems similar to displacement. In this construction, which is essentially a PPI-construction, the participle morphology selected by V1 is not only realized on

V2, but also (optionally) on V3 although V2 selects an infinitive, see Wurmbrand (2012: 132).

- (22) a. Jeg hadde<sub>1</sub> villet<sub>2</sub> lest<sub>3</sub> boka.  
 I had want.PTCP read.PTCP books  
 ‘I would have liked to read the book.’ (Norwegian)
- b. Ik ben tankber dat ik sa folle dien<sub>3</sub> kinnen<sub>2</sub> haw<sub>1</sub>.  
 I am thankful that I so much do.PTCP can.PTCP have  
 ‘I am grateful that I could do so much.’ (Frisian)

Parasitic morphology in these languages differs in significant ways from displacement in German so that a unification is undesirable. First, displacement in German involves various types of non-finite forms while in the other languages it is limited to participles. Second, only German features default forms (infinitives, supines) on V2 (there is no IPP-effect in the other languages). Third, displacement in German is limited to right-branching clusters while parasitic morphology in Frisian occurs in left-branching/descending orders (right-branching/ascending structures are only possible in the 3rd construction in Frisian, see fn. 16 below). Fourth, Frisian also has upward displacement (the requirements of V3 are realized on V2), see Wurmbrand (2012: 139).

- (23) hy soe<sub>1</sub> it dien<sub>4</sub> ha<sub>3</sub> kinnen<sub>2</sub>  
 he would it do.PTCP have.INF can.PTCP  
 ‘He would have been able to do it.’ (Frisian)

Finally, unlike German, Frisian and the two Scandinavian languages allow for multiple displacement, i.e. displacement of a selectional requirement to several dependent verbs (to V<sub>4</sub> and V<sub>5</sub> in (24)), see Den Dikken & Hoekstra (1997: 1068).

- (24) hy soe<sub>1</sub> it dien<sub>5</sub> kinnen<sub>4</sub> wollen<sub>3</sub> ha<sub>2</sub>  
 he would it do.PTCP can.PTCP want.PTCP have.INF  
 ‘He would have liked to be able to do it.’

Displacement in these languages is thus aptly characterized as ‘parasitic’. It is more akin to spreading in a pre-theoretic sense while in German the non-finite morphology always only occurs once.<sup>6</sup>

<sup>6</sup>There are some attested examples of the PPI-construction in German where V2 appears as

### 3. The derivation of displaced morphology

I will now propose an analysis of the placement of non-finite morphology in German that captures both the well-behaved and the displaced instances. The basic idea is very simple (see Salzmann 2013*b* for an earlier version): The non-finite morphology originates in independent syntactic heads and is associated with its host post-syntactically by means of Local Dislocation, an operation that applies to linear structure and is constrained by adjacency (cf. Embick & Noyer 2001). Concretely, the vocabulary items are inserted into head-final functional heads and therefore always occur after the last verb of the complement of the functional head, thereby deriving the generalization in (20) above. The mechanism that associates the morphology with its host is thus always the same. Crucially, since Local Dislocation applies to linear structure, it can have very different effects, depending on the order in the verb cluster: If the order is strictly descending, the morphology appears to be well-behaved. If, however, the order deviates from the strict (3)<sub>21</sub> order, it will appear to be displaced. Crucially, however, there is thus no displacement operation as such; rather, displacement is only a side-effect. I will first introduce the theory of verb clusters that I presuppose before applying it to displacement.

#### 3.1. Verb cluster formation at PF

In Salzmann (2013*a*) I have proposed a new theory of verb cluster formation. It crucially differs from previous approaches in that complex heads arise after syntax, viz. at PF, via Local Dislocation, i.e. through affixation and reordering under adjacency. Linear order is established post-syntactically. In the first step, specifier, head and complement are ordered relative to one another. This step is still sensitive to hierarchical structure. In the second step, verbal elements can be reordered by cluster formation, viz. Local Dislocation. For the initial linearization, I adopt a flexible system as in Abels & Neeleman (2012) that incorporates ordering statements for all sisterhood relations. These ordering statements can refer to properties of the head and the non-head. The latter is particularly important in languages with verb clusters because non-verbal dependents, which are always linearized to the left of the verb, can be

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a participle as well – basically as in Frisian and the Scandinavian languages, see Fleischer & Schallert (2011: 185). At this point, I do not have sufficient information about PPI in German to assess the possible implications.

treated differently than verbal dependents. I assume that verbal projections in verb cluster/restructuring contexts are linearized to the right of the governing verb. This produces an ascending 123 order. Orders that deviate from 123 arise through verb cluster formation at PF, viz., through complex head formation (= re-bracketing) and inversion at PF and thus represent an instance of Local Dislocation. This mechanism can derive all six logically possible orders. Next to 123, it can derive 132, which involves complex head formation between V2 and V3, viz., 1[32], 321 (complex head formation V3+V2 followed by complex head formation between V1 and [V3+V2]), viz., [[32]1], 213 (complex head formation between V1 and V2), viz. [21]3. 312 and 231 additionally involve string-vacuous cluster formation, viz., rebracketing without inversion: In 312, there is first rebracketing between V1 and V2 followed by complex head formation + inversion with V3: [3[12]]. In 231, finally, V2 and V3 rebracket before the newly formed complex undergoes complex head formation + inversion with V1: [[23]1]. The possible orders in a given variety are determined by linearization parameters. Finally, the coherence/restructuring effects we find with verb clusters are due to the fact that the relevant verbal projections contain less structure (viz., lack a CP- and perhaps also a TP-layer), cf. Wurmbrand (2007). In what follows, I will label all verbal projections as VPs for simplicity's sake even though some may better be classified as functional; for ease of readability, I will also omit the the vP-layer.

In Salzmann (2013a: 100–114) I presented two strong arguments for the PF-perspective: First, cluster formation at PF solves the so-called cluster puzzle: Clause-final verbs in descending order form an impenetrable unit, which follows from their forming a complex head. However, in verb-second structures, which are derived from the verb-final order, parts of the cluster can suddenly be moved: the finite V1 can move to C and VPs with extraposed material that would not be well-formed clause-finally can be topicalized. This is puzzling if complex head formation takes place in syntax – one seems to be dealing with a movement paradox and is forced to adopt excorporation. The problem disappears once cluster formation takes place post-syntactically: It comes too late to block movement in verb-second structures. Second, the cluster formation mechanism makes cross-linguistically correct predictions about the (im)penetrability of the various cluster orders. For instance, while 132 orders allow for non-verbal material between V1 and V3, 312 orders are completely impenetrable (a fact that is more difficult to capture if for instance cluster re-ordering involves VP-movement).

## 3.2. The placement of non-finite morphology

We need one further ingredient for our analysis: I assume that there are separate functional heads for the various non-finite verb forms, viz., there is a head *F* for *zu*, and different heads for participles, *ge*-infinitives and gerunds (cf. also Den Dikken & Hoekstra 1997: 1062). They occur above VP. Morphological selection is thus checked in syntax: A VI that takes a *zu*-infinitive is syntactically combined with an FP hosting the relevant syntactic features (given a post-syntactic approach to morphology, cf. Halle & Marantz 1993, the morphological exponents are inserted late). These functional heads have another crucial property: They are linearized head-finally, i.e., they take their VP-complement to the left. This will have the consequence that non-finite morphology always comes last in the cluster. We are now ready to tackle *zu*-displacement. In a first step, we want to derive both well-behaved 321 cases like (9a) as well as examples with displacement such as (9b) and (9c). I repeat the first two for convenience.

- (25) ohne das Buch {lesen<sub>3</sub> gekonnt<sub>2</sub> zu haben<sub>1</sub>/ haben<sub>1</sub> lesen<sub>3</sub>  
 without the book read.INF can.PTCP to have.INF have.INF read.INF  
 zu können<sub>2</sub> }  
 to can.INF  
 ‘without having been able to read the book’ (321/132 *St. German*)

After the initial linearization, we obtain a right-branching cluster with strictly ascending 123 order; the hierarchically highest verb is boxed, the verb that *zu* will end up on is circled (non-verbal material has been scrambled out of the lexical VP; this is optional in varieties that allow verb projection raising; I omit the functional projection for the participle, see section 7 on the IPP-effect).<sup>7</sup>

<sup>7</sup>Importantly, displacement is only found in transparent/coherent contexts but not with (finite and non-finite) CP-arguments in postverbal position. This follows if the transparent VPs in verb clusters and restructuring contexts are complements while CP-arguments are extraposed and thus end up outside the domain of the non-finite morphology. The same goes for the 3rd construction. See Salzmann (2013b: 91–100) for detailed discussion.



$$(28) \quad [3[12]] \text{ zu} \Rightarrow [3[1+\text{zu}+2]]$$

↑ LD ↓

Finally, in a variety that allows a 12(3) order like (13) and (14), things are particularly simple: The ascending 123 order arises through the initial linearization.  $Z(u)$  is linearized after the verb cluster and then targets the last verb of the cluster.

$$(29) \quad 1 \ 2 \ 3 \ \text{zu} \Rightarrow 1 \ 2 \ \text{zu}+3$$

↑ LD ↓

Note that since the functional heads for non-finite morphology are always linearized after their complement, the vocabulary items will always attach to the last verbal element of the complement. This affects both functional heads outside the verb cluster as in the examples just discussed as well as functional heads selected by V1 as in (13a), (13d), (15) and (16). Note that the placement of the non-finite morphology does not necessarily involve inversion; if the item is a suffix like the gerund, it only rebrackets with the left-adjacent verb. Inversion is thus triggered by the selectional requirements of the vocabulary items.

To summarize, non-finite morphology in German is inserted into functional heads that are linearized after their complement. The morphology is placed by Local Dislocation, an operation that is sensitive to linear precedence and adjacency. Consequently, the morphology is always associated with the

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what type of element can adjoin where. They distinguish between Morphological Words (MWd), which refers to independent heads as well as complex heads, and Subwords (SWd), which refers to terminal nodes of complex heads. Crucially, they argue that MWds can only adjoin to MWds while SWds can only adjoin to SWds. In the case at hand, however, *zu*, an independent head and thus a MWd, adjoins not to the entire complex head but rather only to a segment of the complex head, viz. V2. One possibility to avoid a conflict may be to assume a default rule that adjoins stray affixes to the verbal complex so that they become subwords and can subsequently rebracket and invert with one of the cluster's segments. Alternatively, and this is the solution I will adopt, it may be possible to derive the placement possibilities of elements like *zu* from their selectional properties: Unlike clitics such as the Latin coordinator *-que* 'and' which is category-insensitive, the vocabulary items for non-finite verbal features not only select a category but also specific versions of the category, e.g. a stem. This automatically precludes affixation to more complex elements. To avoid infixation of *zu* into prefix verbs, I will assume that they are combined in syntax and that their internal structure is no longer accessible at PF (cf. *zu verlassen* 'to leave' vs. *\*ver-zu-lassen*); on this see also fn. 13.

last verb of the functional head's complement. The morphology appears well-behaved in (3)<sub>21</sub> orders because in these orders the hierarchically highest verb ends up cluster-final. Displacement, on the other hand, is just a side-effect of cluster orders that deviate from the strict 321 order; there is no displacement rule as such. Rather, there is just a single rule that associates the non-finite morphology with its host. Put more generally, displacement arises from a conflict between the general head-finality of the language (as expressed by the head-final linearization of the functional heads) and (partially) ascending verb clusters. The facts thus all fall out from independently motivated principles: The head-finality of the language motivates the head-final linearization of functional heads. The selectional properties of the vocabulary items for the non-finite morphology (i.e. their affixal nature) determine their exact position; contrary to what was stated above, we thus do not need an explicit rule for their placement. Finally, the various cluster formation options are simply independent properties of a given variety.<sup>10</sup>

One of the major advantages of the PF-approach is that no problems arise for semantic interpretation. This is particularly crucial in the case of participle displacement as the participle arguably contributes to the interpretation of the perfect. In the PPI-construction (15), it must consequently not be interpreted on V3 but rather on V2. Since the morphology is inserted and placed post-syntactically, no problems arise in the present approach: At LF, which interprets the hierarchical structure produced by narrow syntax, the relevant features are located in the correct position; concretely, in the PPI-case, there would be an FP above VP2 for the participle so that the perfective interpretation correctly applies to VP2 and not to VP3.

### 3.3. Against previous accounts

Previous accounts can be divided into syntactic/derivational accounts where *zu* is an independent syntactic element (Sternefeld 1990, von Stechow 1990, Hinterhölzl 2009) and declarative/realizational approaches where *zu* is just a feature of the non-finite complement (Bader 1995, Meurers 2000, Vogel 2009). I will discuss the two types of approaches in turn.

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<sup>10</sup>Displaced morphology may also be compatible with other theories of verb cluster formation; see Salzmann (2013b) for an approach where the verb cluster is first linearized as left-branching and ascending orders arise via VP-inversion at PF. See also the next subsection.

The idea that the position of *zu* depends on the surface order of the verbal complex can be found in previous work as well. For instance, von Stechow (1990: 159) argues that *zu* is generated in INFL and incorporated into the verbal complex after reanalysis (which is taken to be the mechanism that generates complex heads and ascending orders, cf. Haegeman & van Riemsdijk 1986). The account seems to involve lowering/affix hopping of *zu*. It is explicitly assumed that this takes place before PF, which means it should be subject to syntactic locality conditions; as a consequence, one would expect *zu* to end up on the hierarchically highest verb of the cluster and not on the last one. It seems that lowering is sensitive to adjacency in this account, but that is implausible for a syntactic operation (quite apart from the fact that it violates the *c*-command constraint on incorporation). Perhaps the underlying intuition was similar to the Local Dislocation approach proposed here, but given the framework of that time, a solution by means of a PF-operation was apparently not obvious.

A somewhat different proposal is found in Sternefeld (1990: 251), who first argues that it is the rightmost verb that moves to INFL, where *zu* is base-generated. Since movement to INFL follows cluster formation, *zu* ends up on the correct verb (viz.  $V_2$ ). But it remains mysterious why it is not the head of the verb cluster  $V_1$  that moves to INFL as would be expected under a syntactic account where locality constraints apply (i.e. minimality). Sternefeld also considers an incorporation solution as in von Stechow (1990) but points out that this raises problems for *te*-placement in Dutch as in (11) where incorporation would have to precede cluster formation/reordering. The issue is eventually left open, and it remains unclear to what extent the placement of the infinitival particle can be handled in a systematic way both within German and cross-linguistically.

Sternefeld (2006) posits a silent functional head *F* hosting the features for *zu* and assumes that it takes  $VP_1$  as its complement. The feature for *zu* can then migrate, i.e. become a selectional feature of  $V_1$ . Once  $V_1$  combines with  $VP_2$ , the selectional requirements of  $V_1$  can be satisfied by *zu* on  $V_2$  (which is the head of  $V_1$ 's complement). However, this only seems to work for 132 clusters. In 123 clusters, *zu* would end up on  $V_2$  instead of on  $V_3$ . Clearly, the percolation mechanism does not quite work as it still targets the heads of verb clusters. It would have to be iterated in 123 orders to derive the correct result, but this arguably shows that the approach is on the wrong track. Furthermore, it remains unclear how migration can be limited to ascending orders.

The solution that comes closest to the current proposal is the one by Hinterhölzl (2009: 208), who argues that *zu* is a phrasal affix and fuses with the adjacent infinitive at Morphological Form (i.e. at PF). He adopts a theory of verb clusters based on massive (remnant) XP-movement. These movements are triggered by the need for temporal linking and subcategorization checking and target aspect phrases. In the case of *zu*-displacement as in (9b), *zu* is a phrasal affix in the extended projection of V1. A projection including VP2 (with VP3 in the specifier of a head in the extended projection of V2) then moves to SpecAsp2 of V1 while V1 moves from V to Asp1 (Hinterhölzl 2009: 208).

(30) [<sub>Asp1P</sub> V<sub>1</sub>+Asp1 [<sub>Asp2P</sub> [<sub>XP</sub> VP3 V2] Asp2+**zu** [<sub>VP1</sub> \_\_\_1 ]]]

In cases where requirements by V1 are displaced as in (15), the phrasal affix, viz. the participial morphology, is in Asp2 of V2. To obtain the correct result, one has to assume that VP3 moves to SpecAsp2 of V2 while VP2 moves to SpecAsp1 in its own extended domain. Finally, the entire Asp1P of V2 is moved into SpecAsp2P of V1, leading to (31) (Hinterhölzl 2009: 208).

(31) [<sub>Asp1P</sub> V<sub>1</sub>+Asp1 [<sub>Asp2P</sub> [<sub>Asp1P</sub> VP2<sub>3</sub> Asp1 [<sub>Asp2P</sub> VP3 Asp2+**ptcp** \_\_\_3 ]]<sub>2</sub> Asp2 [<sub>VP1</sub> \_\_\_1 \_\_\_2 ]]]

Instead of listing the general objections that can be raised against this type of approach (such as the effort needed to ensure that everything moves into the right specifier), I will only focus on one aspect of the analysis that in my view is highly unattractive: In (31), the participle is in Asp2 and is affixed onto V3 under adjacency. It is assumed that the participle expresses [+past]; however, given the semantics of the construction, it must not apply to VP3 but rather to VP2. To achieve this, Hinterhölzl (2009: 210) proposes a repair strategy that copies the semantic features on Asp2 onto Asp1 and deletes them on Asp2. It is not quite clear to me how this operation is supposed to work, not the least since it seems to apply after vocabulary insertion (for unclear reasons, the author assumes that the participle – rather than the syntactic head – supplies interpretable features like [+past]). We are thus dealing with a copying operation from one head to another that is more reminiscent of narrow syntax than PF. At any rate, the need for a semantic repair operation clearly shows the drawback of a syntactic XP-movement approach to verb cluster formation

and displacement.<sup>11</sup> Next to the repair operation, many other issues remain unclear in Hinterhölzl's approach. The nature of the operation that places the phrasal affixes seems similar to Local Dislocation, but its precise workings are not spelled out so that it is not clear to what extent it can be applied to other cases of (dis)placement. For instance, only 123 and 132 clusters are discussed, how 312 clusters as in (9c) are to be derived remains an open question.

As for the declarative approaches, Meurers (2000: 189–194, 214f.) argues that verbs in the upper-field, i.e. verbs in ascending order, are not regular verbs but functional elements. Not being proper verbs, they cannot be governed nor can they govern themselves. As a consequence, they cannot determine the status of verbs that depend on them, e.g. V1 cannot govern V2 in the 132 order. This not only accounts for the IPP-effect (see the appendix in section 7) but also for *zu*-displacement in 132 orders: The complementizer *ohne* 'without' selects a complement specified for the *zu*-infinitive. Since V1 is not a verb, it is consequently not the head of the verbal projection *ohne* combines with. Instead, the head-final V2 is the head and thus correctly occurs as a *zu*-infinitive; verbs in ascending order are thus ignored in the government chain. The approach is very attractive in that it unifies the IPP-effect and *zu*-displacement; furthermore, no displacement as such has to be assumed. However, the approach fails in one fundamental respect: It is simply not correct that verbs in the upper-field, viz., in ascending order, do not govern: Next to the potential counter-examples Meurers discusses himself on p. 221, there is ample evidence for government by verbs in ascending order, recall the examples with displacement of forms selected by V1: The *z*-infinitive in (13a) and (13d), the participle in (15), the *ge*-infinitive in (16) and the displaced gerund in (47) below. Therefore, the treatment of verbs in ascending order as functional elements cannot be correct.

While Meurers (2000) handles displacement by categorizing verbs in ascending order differently, Bader (1995) and Vogel (2009) instead propose that the feature for the *zu*-infinitive is special. In both cases, it is a feature that is assigned to the entire infinitival complement/the entire phrase and is cru-

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<sup>11</sup>The semantic problem may also obtain in von Stechow (1990) and Sternefeld (1990), depending on where the participle is interpreted. Since incorporation/verb movement takes place in syntax in these approaches, the participle is arguably interpreted in its displaced position, which would lead to the wrong result. Under such assumptions, one is arguably forced to assume that the participle does not contribute to the perfective/past interpretation of the perfect.

cially not borne by the head of the verb phrase (in Bader's HPSG-approach it is a so-called EDGE-feature otherwise used for the placement of clitics). Crucially, the morphological realization of the feature is the result of special realizational rules (Bader) or an alignment constraint (Vogel). Example (32) is a modified version of Vogel's realizational rule<sup>12</sup> and is arguably equivalent to Bader's EDGE-feature realization rule.

- (32) *Zu* is realized on the right-most verbal element *within* the XP bearing the *zu*-feature.

This works for both well-behaved *zu* in descending orders as well as for displacement in ascending orders: The feature is realized on the right-most terminal of the relevant phrase. It thus captures the intuition that the placement of *zu* (and displaced morphology more generally) depends on the surface order within the verbal complex and not on hierarchical relations. As far as I can tell, it can also be extended to the interactions discussed in the following sections. The major difficulties arise with CP-complements and the 3rd construction, as discussed in Salzmann (2013b: 102–106), because the approaches fail to adequately limit downward 'percolation' of the feature. There are two additional drawbacks: First, although such special features that are only present on the maximal projection of a head but not on the head itself avoid the postulation of several functional heads (as my derivational approach is forced to), they also come at a cost: They increase the number of feature types, quite apart from the fact that such features are incompatible with current Minimalist assumptions about phrase structure, viz. Bare Phrase Structure (Chomsky 1995). Second, the rule essentially incorporates the descriptive generalization; it would thus be just as plausible as the converse rule and therefore misses a crucial property of displacement: It is related to the head-finality of the language, an intuition that falls out directly in the approach proposed above. I will consequently adhere to the derivational perspective, although the realizational approaches by Bader and Vogel could probably receive the same degree of descriptive adequacy if worked out in sufficient detail. More arguments for a derivational approach will be presented in sections 5.4 and 5.5 below.<sup>13</sup>

<sup>12</sup>His original formulation on p. 329, which defines *zu*-placement w.r.t. the extended projection of the phrase bearing the *zu*-feature, derives the wrong result in a number of cases, see Haider (2011: 250) and Salzmann (2013b: 103ff.) for discussion.

<sup>13</sup>The realizational approaches including Meurers (2000) may have certain advantages w.r.t.

#### 4. Restrictions on displacement

Displacement is not always possible. The descriptive generalization in (33) provides a good initial approximation.

(33) *Restrictions on displacement*

Displacement is only possible if the non-final verb(s) selects a bare infinitive.

By non-final verb(s) I refer to those verbs of the cluster that do not select the displaced morphology. This can be the highest verb of the cluster as in (13b),

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coordination: Since *zu/z* is a separate head, one might expect it to be able to have scope over a coordination, contrary to fact: Both verbs have to bear *zu/z* (unlike English *to*), cf. also Cooper (1995: 191) and Haider (2011: 237).

- (i) Er hät versproche, \*(z) schriibe und \*(z) telefoniere  
 he has promise.PTCP to write.INF and to phone.INF  
 'He promised to write and phone.'

(*Swiss German*)

This property can perhaps be derived under the realizational approaches if the *zu*-feature is assigned to the &P so that it has to be realized on both conjuncts. Under the derivational approach here, this does not yet follow. However, it should be stressed that the obligatory repetition in coordination is a frequent feature of phonologically/morphologically dependent elements. In other words, typologically, occupying an independent syntactic head does not imply scope over the coordination, see e.g. Romance function words or the Bulgarian definite article in Spencer & Luis (2012: 197, 203).

In V+V-coordination, one finds examples with just one *zu*, but puzzlingly before the entire coordination, cf. e.g. Müller (1999: 156) for an example. The same goes for Dutch *te*, cf. Zwart (1993: 104f.); for evidence from older stages of Dutch, see Hoeksema (1995). Under the current approach, this seems to require the assumption that X<sup>0</sup>-coordination can form impenetrable units just like prefix verbs (cf. *zu verlassen* vs. \**verzulassen* 'to leave'). Alternatively, this construction may involve *te*-deletion in the second conjunct as proposed in Zwart (1993).

The separability of particle verbs (cf. *aufmachen* 'open' → *aufzumachen* 'to open') can be accounted for if they do not form a complex head in syntax (but only at PF, see Salzmann 2013a: 123, fn. 28), an assumption that is generally advantageous since the particles are obligatorily stranded under verb second. The only problem for this view constitute prefix verbs that contain a particle verb. They are inseparable in syntax (they resist verb second) but can take affixes like *zu*, cf. *uraufführen* 'premiere' → *uraufzuführen* 'to premiere'. I am thus forced to assume that they do not form complex elements in syntax and that their immobility is due to different factors.

(13c), (14) or the middle verb V2 in (13a), (13d), (15) and (16) (I will come back to the IPP-cases in (9b) and (9c) in the appendix in section 7 below).<sup>14</sup>

In the rest of this section, I will first introduce a case where displacement fails. This will motivate my treatment of the infinitive as being syntactically absent. In the last part, I will discuss cases where displacement is felicitous even though the non-final verb(s) does not select a bare infinitive. Importantly, the restrictions to be observed follow from the independently established selectional properties of the exponents.

#### 4.1. Selectiveness

At first sight, the free positioning of *zu* is reminiscent of that of clitics: It occurs at the edge of the verb cluster, viz., in second to last position. However, *zu* (as well as the other displaced morphemes) crucially differs from regular clitics in that it has selectional properties. It only attaches to verbs in the bare infinitive. Because of this property, it is sometimes referred to as a phrasal affix, see Vogel (2009) and Hinterhölzl (2009). Given the many problems with the clitic-affix dichotomy (see Bickel et al. 2007), I will refrain from using the terms in the remainder of this paper. What is crucial is that the morphological elements under discussion are dependent and selective but do not (necessarily) attach to the head of the complement of the head they are inserted into.

The selectiveness of *zu* can be illustrated as follows: In some Western Swiss German dialects (e.g. Bernese German), 2-verb clusters with V1 = perfective auxiliary and V2 = participle allow for both a 12 and a 21 order when V1 is finite, see (34a). However, if V1 is non-finite, e.g. when selected by the complementizer *ohni* ‘without’, only the descending order is possible, see (34d). The ascending order is ungrammatical, irrespective of whether *zu* is placed on V1 (i.e. not displaced), see (34b) or whether it undergoes displacement to V2, see (34c) (Raffaella Baechler, p.c.).

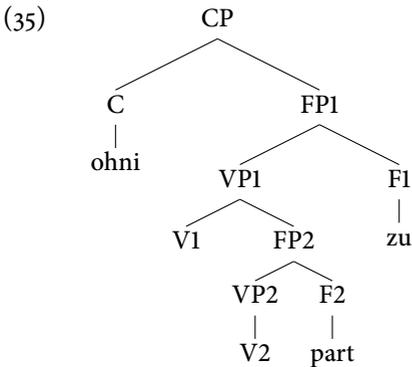
- (34) a. das er s Buech hät<sub>1</sub> gläse<sub>2</sub>/ gläse<sub>2</sub> hät<sub>1</sub>  
 that he the book have.3SG read.PTCP read.PTCP have.3SG  
 ‘that he read the book’

(12/21 Swiss German)

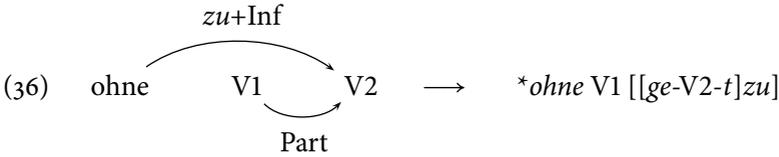
<sup>14</sup>Of course, in more complex clusters, there can be several non-final verbs in the relevant sense.

- b. \*ohni s Buech z ha<sub>1</sub> gläse<sub>2</sub>  
 without the book to have.INF read.PTCP  
 ‘without having read the book’ (12 *Swiss German*)
- c. \*ohni s Buech ha<sub>1</sub> z gläse<sub>2</sub>  
 without the book have.INF to read.PTCP  
 ‘without having read the book’ (12 *Swiss German*)
- d. ohni s Buech gläse<sub>2</sub> z ha<sub>1</sub>  
 without the book read.PTCP to have.INF  
 ‘without having read the book’ (21 *Swiss German*)

The reason is the following: In the syntax, there will be a functional projection above the verb cluster for *z*, selected by *ohni* ‘without’. In addition, there will be another functional projection for the participle selected by V1 between V1 and VP2.



At linearization, the exponents for *part* and *zu* have to be attached cyclically, viz., bottom-up/inside-out, cf. Embick & Noyer (2001). Consequently, in a first step, the participle exponent is attached to the verb (I will treat it as a circumfix for present purposes, but nothing really hinges on this). Since the participle selects a stem, this will be felicitous. However, in the next step, *z* has to be attached. Since *z* is a prefix and selects a bare infinitive (more precisely, the stem, see below), a clash obtains: It cannot be affixed onto the participle. In other words, the derivation crashes at linearization of the complex head derived by Local Dislocation, viz. [[[V]Part]zu]. The failed displacement is schematically represented in (36).

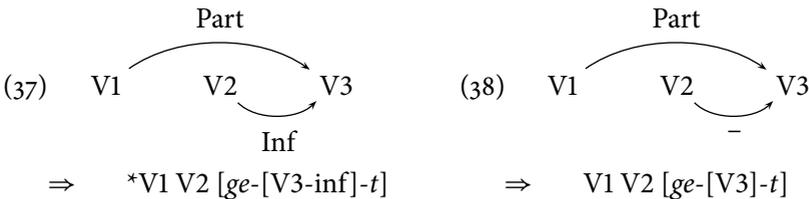


This problem will obtain more generally whenever there is more than one governor with a right-hand FP-complement so that as a consequence there will be more than one clause-final exponent on the final verb of the cluster. Since the selectional restrictions of the morphemes often conflict with each other, this will consequently lead to a clash and a crash of the derivation. Therefore, displacement is necessarily quite restricted. Configurations with more than one element selecting to the right will only be grammatical if the requirements of the non-finite forms are compatible. I will discuss the types where this is systematically possible in section 4.3 below. Before doing so, I will address the special status of the infinitive.

4.2. The infinitive as the default

As mentioned above, displacement is facilitated if the non-final verb(s) select a bare infinitive. In fact, displacement is generally possible in this configuration – for exceptions see section 7 below.

To account for the effect of the infinitive, I propose that infinitival features are not present syntactically, i.e., there is no separate functional projection for them. As a consequence, in ascending orders, verbs selecting a bare infinitive will not contribute an additional clause-final exponent so that a clash at linearization is prevented. Importantly, this assumption is independently necessary to allow for PPI in German as in (15): If there were a functional projection for the infinitive, the infinitive marker would first attach to V3. The displaced participle, selected by V1, could then not be affixed as it selects a verbal stem and not an infinitive, see (37). If, instead, V2 effectively selects nothing, there will only be one clause-final exponent, the participle, which can then felicitously be affixed onto the verbal stem, see (38).



It remains to be explained how infinitive morphology is introduced. This is particularly pressing for morphemes which themselves select an infinitive, viz., *z(u)* as well as the gerund and the *ge*-infinitive, which both morphologically contain an infinitive. I will assume that their vocabulary items have an additional feature triggering insertion of an infinitive morpheme (cf. Halle & Marantz 1993 for other cases of inflectional morphology where this is necessary). Additionally, the infinitive feature is assigned by default to verbs that are not associated with any functional morphemes during the PF derivation. Apart from verbs in descending order as in (6), the default rule is also important for non-final verbs in ascending order (cf. those mentioned at the beginning of this section) because they fail to receive functional morphemes due to displacement of the morphology selected by higher heads. This directly accounts for the generalization that these non-final verbs (in the relevant sense) generally occur in a default form, usually in the infinitive or, especially in the dialects described by Höhle (2006), as supines (for exceptions, see section 5.3 below).

#### 4.3. Combinatorial possibilities

While displacement often fails if there is more than one governor that selects a non-infinitival form in ascending order, it is sometimes possible if the selectional restrictions of the exponents are compatible with each other. There seem to be three basic types.

##### 4.3.1. *V1 and V2 select the same form: Haplology*

In the first type, the two governors select the same form. In the so-called missing-*z* construction described for Bernese German (cf. Bader 1995: 22, 26), there are two *z*-selectors in ascending order, but we find only one *z*, on the last element of the cluster (while V2 appears in the bare infinitive).<sup>15</sup>

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<sup>15</sup>Missing *z* seems to be optional, which can be accounted for if FP2 can undergo extraposition so that it patterns like the 3rd construction in standard German, see Salzmann (2013b: 91–100). According to Cooper (1995: 188f.), missing *z* is limited to Verb Raising cases and is blocked in Verb Projection Raising, i.e., when there is non-verbal material in the verb cluster. However, this claim could not be verified in an informal survey. Furthermore, a google search delivers two counter-examples, see (ia) and (ib).

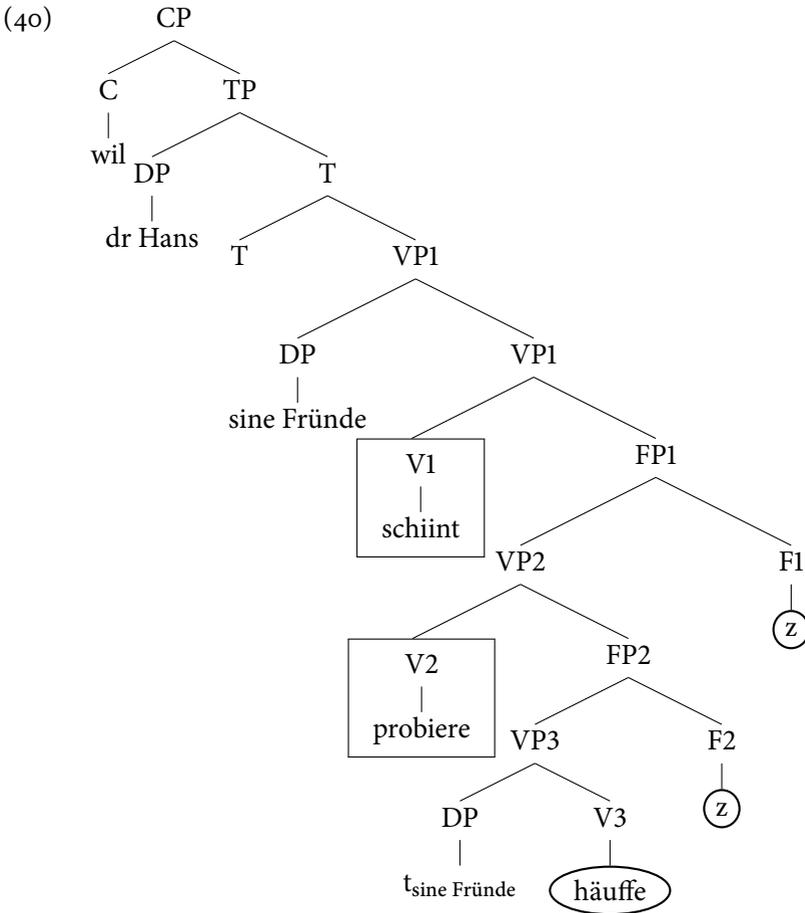
- (39) wüu dr Hans sine Fründe schiint<sub>1</sub>[*zu*] probiere<sub>2</sub>[*zu*] z  
 because the John his.DAT friends seem.3SG try.INF to  
 häuffe<sub>3</sub>  
 help.INF  
 ‘because John seems to try to help his friends’ (Bernese German)

The missing-*z* construction can be accounted for as follows: After the initial linearization, we obtain an ascending verb cluster with two cluster-final functional heads into which *z* will be inserted.

- 
- (i) a. ... ohni öpe jeh mau säuber probiere<sub>1</sub>, Dütsch z rede<sub>2</sub>  
 without PRT ever once self try.INF German to speak.INF  
 ‘without ever trying to speak German oneself’  
 (<http://www.chefkoch.de/forum/2,22,296109/An-alle-CHer-Wir-zelebrieren-den-Kantoenligeist.html>; accessed March 28, 2013)
- b. S Ziel isch nid blibe z’ stah sondern versueche<sub>1</sub> glich z bliebe<sub>2</sub>  
 the goal is not stay.INF to stand.INF but try.INF same to stay.INF  
 ‘The goal is not to make no progress but to try to remain the same’  
 (<http://www.mosiweb.ch/maennerriege/maennerriege.htm>; accessed March 24, 2016)

Another counter-example can be found in the description of the dialect of Bosco Gurin, see Comrie & Frauenfelder (1992: 1058) (the complementizer *fer* selects a *z* as does *tüa/tian*; the infinitive of causative ‘do’ always appears as a *gerund*).

- (ii) Ech ha ts Büach kchöiff, fer ts Chenn tian<sub>1</sub> waldsch z leeran<sub>2</sub>.  
 I have.1SG the book buy.PTCP for the child make.GER Italian to learn.GER  
 ‘I bought the book in order to make the child learn Italian.’  
 (dialect of Bosco Gurin)



Once (40) is linearized, there are two *z* adjacent to the final verb V3. By assumption, haplology reduces them to one *z* and in the final step, Local Dislocation places *z* before V3 (given a cyclic PF-derivation, haplology may in fact rather be an instance of deletion under identity of the higher *z* if in a prior step the lower *z* is affixed onto the verb).<sup>16</sup>

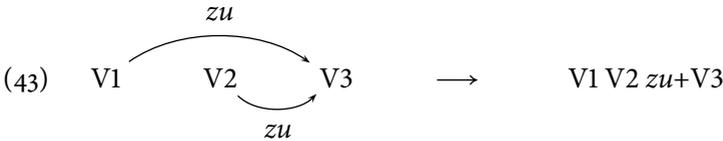
<sup>16</sup>The same haplology effect with the infinitival particle is found in Frisian; while the cluster order is normally strictly descending, the 3rd construction allows for (partially) ascending 312 orders. In (i), both the complementizer *om* and V1 *hoeve* 'need' select a *te*-infinitive. Interestingly, we only find one *te*, crucially before the last verb. The facts follow if there is displacement and haplology (the fact that V1 appears as a bare infinitive and not as a gerund, which is nor-

- (41) a. V1 V2 V3 z z both z's adjacent → haplology: V1 V2 V3 z z  
 b. V1 V2 z+V3 Local Dislocation  
     ↑ LD ↓

Haplology effects are not limited to *z(u)*. In the dialect of Barchfeld, we find haplology of the *ge*-infinitive. In (42), V1 and V2 both select a *ge*-infinitive. While V2 appears as supine, V3 occurs in the *ge*-infinitive, see Höhle (2006: 70).

- (42) ə meçd<sub>1</sub>            lɪwø̃ kend<sub>2</sub>    gə-awwəd<sub>3</sub>  
 I would like.1SG rather can.SUP GE-work.INF  
 ‘I would rather like to be able to work.’ (dialect of Barchfeld)

The haplology effect can be schematically illustrated as follows.



4.3.2. Selectional requirements of V1 and V2 in an inclusion relationship

Haplology also plays a crucial role when two non-infinitival forms are in an inclusion relationship. In the following example from the dialect of Barchfeld,

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mally selected by *te*, suggests that there has been no *te*-deletion), cf. Den Dikken & Hoekstra (1997: 1062) and Eric Hoekstra (p.c.):

- (i) ... om net kontrolearre<sub>3</sub> hoeve<sub>1</sub> te wurden<sub>2</sub>  
 to not check.PTCP need.INF to become.GER  
 ‘in order not having to be checked’ (312 Frisian)

In the standard German 3rd construction, haplology seems to be possible as well in 312 orders, but the facts are subtle and require further empirical verification.

- (ii) ohne das Buch verstehen<sub>3</sub> (??zu) glauben<sub>1</sub> zu können<sub>2</sub>  
 without the book understand.INF to believe.INF to can.INF  
 ‘without believing to be able to understand the book’ (312 Standard German)

Normally, though, the 3rd construction in Standard German involves extraposition and does not show any displacement; in Swiss German, both haplology and extraposition seem to be possible, see Salzmann (2013b).

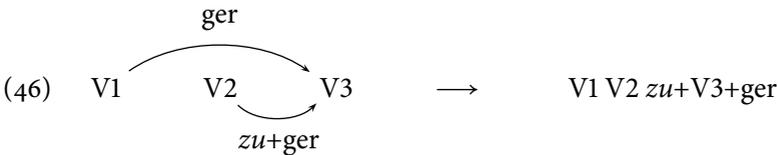
V1 selects a gerund (roughly: A long infinitive) while V2 selects *zu*+gerund. While V2 appears as a supine, V3 occurs with *zu*+gerund, see Höhle (2006: 70).

- (44) s<sub>1</sub> wiβd<sub>1</sub> dəs ned bβγçd<sub>2</sub> tsə dʊ-n<sub>3</sub>  
 she will.3SG this not need.SUP to do-GER  
 ‘She won’t have to do this.’ (*dialect of Barchfeld*)

Given a cyclic PF-derivation, attachment of both non-finite exponents to the verb leads to (45a), which haplology reduces to (45b), leading to a grammatical result (as in (41) above, haplology may be understood as deletion under identity).

- (45) a. [[*zu*[V3]ger]ger] → haplology  
 b. [*zu*[V3]ger]

Displacement under inclusion can be illustrated as follows.<sup>17</sup>



#### 4.3.3. V1 and V2 select forms that attach on different sides: Cumulativity

That the restrictions on displacement depend on the selectional restrictions of vocabulary items can be illustrated most convincingly by the following example from the dialect of Steinbach-Hallenberg: V1 selects gerund and V2 selects *ge*-inf. Since these are marked forms that are not in a subset relationship, one expects a clash. However, the combination is in fact felicitous: V3 bears both the *ge*-prefix of the infinitive as well as the long gerund suffix, see Höhle (2006: 68f., fn. 24).<sup>18</sup>

<sup>17</sup>The reverse situation with V2 selecting a subset of V1 is conceivable as well, but I have not been able to find an example so far.

<sup>18</sup>As pointed out in Höhle (2006), some speakers prefer a variant without the gerund, i.e. a form where the selectional requirements of V1 are suppressed, a pattern discussed in section 5.4.

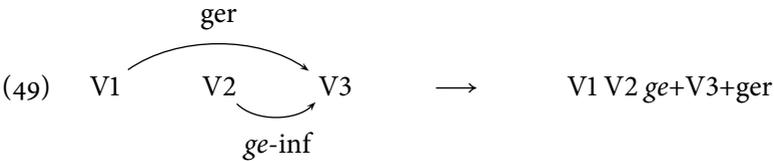
- (47) ich wüür<sub>1</sub> dās net könnt<sub>2</sub> ge-spräch-e<sub>3</sub>  
 I would.1SG this not can.SUP GE-say-GER  
 ‘I couldn’t say this’

(*dialect of Steinbach-Hallenberg*)

Crucially, a clash can be avoided because the exponents attach on different sides of the verb and both select a stem (recall that the infinitival part is inserted via an additional feature; in the present case, as in (45), there will be two such features, which are reduced to one by haplology).

- (48) [[ge-Inf[V3]]ger]

The following figure summarizes the displacement in this configuration.



## 5. Absence of displacement

In this section, I will briefly discuss cases where there is no displacement although the structural condition, viz., an ascending order, is given.

### 5.1. Finite morphology

Given the selectional requirements of finite morphology – it selects for a stem – displacement of finite morphology should only occur if V1 (and V2 in a 3-verb-cluster) selects an infinitive, i.e. nothing. However, displacement with finite morphology is generally unattested, even in ascending orders. There is one famous constructional exception: In Swabian verb clusters with V2 = ‘help’, which normally selects a bare infinitive, displacement *is* possible, cf. Steil (1989: 41).<sup>19</sup>

<sup>19</sup> Another example of this type is described in Schmeller (1821: 379ff.) for Bavarian where V1 is ‘go’ and the finite morphology ends up on V2.

- (50) I hedd            ned denkt,      daß mr der      hãlfa<sub>1</sub>    kochd<sub>2</sub>.  
 I had.SUBJ.1SG not think.PTCP that me that one help.INF cook.3SG  
 ‘I wouldn’t have thought that he would help me cook.’

(*Swabian*)

While it may be unsurprising from a functional perspective that finite morphology is usually not displaced, one still needs a formal implementation. There are essentially two options that derive the correct result: Either there is Agree between the functional head and the target verb as proposed in Adger (2003) and Wurmbrand (2012). Alternatively, the functional head undergoes Lowering, cf. Embick & Noyer (2001), i.e. downward head-movement. Both operations are sensitive to hierarchical structure so that the morphology will end up on the highest verb of the cluster, viz. V1.

## 5.2. *te*-placement in Dutch

As mentioned at the beginning, Dutch systematically differs from German with respect to the placement of non-finite morphology. Unlike *z(u)* in German, the infinitival particle *te* always occurs on the immediately dependent verb even though the order in the verb cluster is usually ascending. In (51), *te*, selected by the complementizer *zonder* ‘without’, occurs on V1.<sup>20</sup>

- (51) zonder het boek te moeten<sub>1</sub> kunnen<sub>2</sub> lezen<sub>3</sub>.  
 without the book to must.INF can.INF read.INF  
 ‘without being able to read the book.’ (123 *Standard Dutch*)

As with finite morphology, the correct result obtains if the placement of *te* is the result of Agree or Lowering. A possible derivation of (51) in the framework adopted here looks as follows: The functional head hosting *te* is lowered onto the highest verb of the verb cluster, see (52). Since this operation is sensitive to

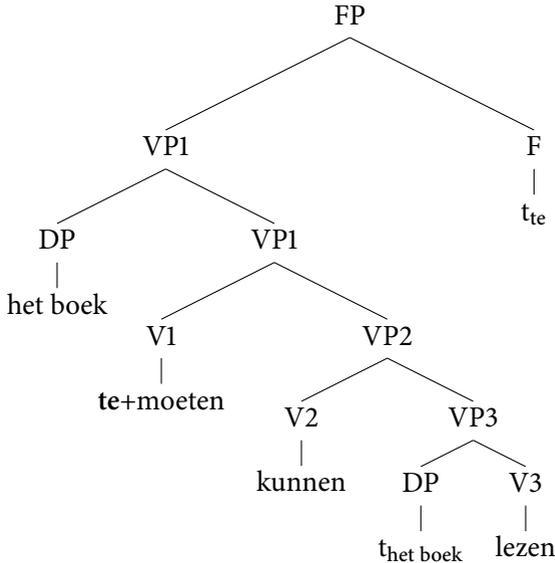
<sup>20</sup>I am aware of one potential case of displacement, so-called *te*-shift: The complementizer *voor* selects *te* and V1 *komen* selects an infinitive. However, *te* occurs on V2, see Zwart (1993: 103) for discussion.

- (i) voor komen<sub>1</sub> te werken<sub>2</sub>  
 for come.INF to work.INF  
 ‘to come and work’

(*dialect of Geel*)

hierarchical relations, possible reordering operations in the verb cluster will not interfere with it.

(52) *VP-inversion*



Note that Agree/Lowering does not take place in all varieties of Dutch: *te* can remain an independent element: *te* can occur before a verbal complex with 231 order, see (53a/b) or before the object in (53c).<sup>21</sup>

- (53) a. mee Valere *te* [[willen<sub>2</sub> [dienen boek kuopen<sub>3</sub>]] een<sub>1</sub>]  
 with Valere to want.INF that book buy.INF have.INF  
 ‘with Valere having wanted to buy that book’  
 (West Flemish; Haegeman 1998: 635)

<sup>21</sup>Interestingly, displacement in Dutch seems to be marginally possible in ascending present participle clusters, see Hoeksema (1993), although at least in earlier stages of the language, non-displacement was possible as well in that construction. In German, ascending participial clusters systematically allow for displacement, see Sternefeld (2006: 661).

- b. Die banke moes oop gewees het, om dit gister te [[kan<sub>2</sub>  
the bank should open been have to it yesterday to can.INF  
betaal<sub>3</sub>] het<sub>1</sub>].  
buy.INF have.INF  
'The bank should have been open to have been able to buy it yesterday.'

(*Afrikaans*; Donaldson 1993)

- c. hest volk genog te heu in schuur bringen?  
have.2SG people enough to hay in barn bring.INF  
'Do you have enough people to bring the hay into the barn?'

(*Gronings*; Zwart 1993: 103)

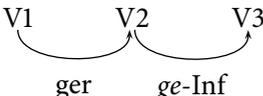
### 5.3. Non-finite morphology faithfully realized

While the morphology is usually displaced in ascending orders in German varieties, there are also cases where the morphology is faithfully realized on the immediately embedded verb. This seems to be the case quite generally in the dialect of Sonneberg, see Höhle (2006: 66). In (54), V1 selects a gerund and V2 selects a *ge*-infinitive. The result is that V2 occurs as a gerund and V3 as a *ge*-infinitive.

- (54) ich waar<sub>1</sub>=sch runtər künn-a<sub>2</sub> gə-reiss<sub>3</sub>  
I will.1SG=it down can.GER GE-tear.INF  
'I will be able to tear it down' (Sonneberg)

Technically, one can assume either Agree F1–V2 and F2–V3 or Lowering of the functional heads F1 and F2 to derive this fact. Note, though, that this pattern seems to be quite rare. According to Höhle (2006), faithful realization seems to be confined to this particular dialect. At this point, I do not know what causes the cross-linguistic variation; to model the variation, it is arguably easier to adopt Lowering instead of Agree as the difference between displaced and non-displaced morphemes can then be expressed by reference to the relevant functional heads.

The lack of displacement is schematically illustrated in (55).

- (55)  *no displacement*

Another case I am aware of are certain 3-verb clusters in Swiss German with 123 order where V1 is a perfective auxiliary and V2 is either ‘hear’, ‘help’, ‘learn’, ‘stop’ or ‘begin’. V2 is realized as a participle and V3 as a bare infinitive. Here is an example with *ufhöre* ‘stop’.<sup>22</sup>

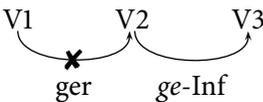
- (56) dass dis Herz vo sälber hät<sub>1</sub> ufghört<sub>2</sub> schlah<sub>3</sub>.  
 that your hart by itself have.3SG stop.PTCP beat.INF  
 ‘that your heart has stopped beating by itself’  
 (<http://gaestebuch.007box.de/index.php?gbname=gb10323&pos=110>; accessed December 30, 2015)

#### 5.4. V3 only realizes requirements of V2, requirements of V1 suppressed

In section 4.3, we saw that marked, i.e. non-infinitival forms can be combined on V3 if they are morphologically compatible with each other. However, we also find a different pattern in this configuration: The requirements of V1 are suppressed. This is illustrated in (57) where V1 selects a gerund and V2 a *ge*-infinitive (as in the example in (47)). While V3 appears as a *ge*-infinitive, V2 occurs as a supine (thus a default form), see Höhle (2006: 68).

- (57) ə wyəd<sub>1</sub>=s ne(d) könd<sub>2</sub> ərāb gə-ris<sub>3</sub>  
 he will.1SG=it not can.SUP down GE-tear.INF  
 ‘He won’t be able to tear it down.’ (Kleinschmalkalden)

To my knowledge, this pattern is rare and generally only arises if V2 selects a marked form as well (i.e. not a bare infinitive, see Höhle 2006: 70, ex. 48 for two further examples from Barchfeld). Schematically, we find the following.

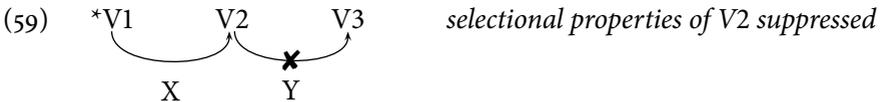
- (58)  selectional properties of V1 suppressed

<sup>22</sup>The infinitive, viz., the IPP-form, is a possibility as well with these verbs, see section 7 below. Another potential case of faithful realization are clusters with V1 = perfective auxiliary and a *zu*-selecting verb as V2. One can find such examples in Swiss German in 123 order with the morphology faithfully realized. However, with *zu*-infinitives, the faithful realization could be due to extraposition, see Salzmann (2013b). Extraposition as the source for faithful realization is unlikely for the two examples in the text because extraposition of bare infinitives is generally taken to be impossible.

The logic of this pattern can be understood once we consider a systematic gap in the placement of non-finite morphology addressed in the next subsection.

### 5.5. A missing pattern

Interestingly, the pattern with the requirements of V1 realized on V2 but those of V2 suppressed does not seem to be attested.<sup>23</sup>



I propose that this pattern as well as the one in section 5.4 follows from cyclicity at PF: Given an inside-out/bottom-up derivation at PF, the functional head F2 (selected by V2) above V3 will first be attached to V3. The second functional head F1 selected by V1 will come next, but cannot attach if it is incompatible with the V3+F2-complex.



If F1 and [F2+V3] are not compatible, there seem to be different possibilities: In some instances, the structure is ungrammatical, i.e. crashes at PF, as in the non-finite ascending clusters in Bernese German, cf. (34c). Alternatively, F1 is deleted as a last resort, cf. (57), i.e. the requirements of V1 are suppressed. Given that due to cyclicity, F2 is always attached before F1, last resort deletion can only affect F1, therefore accounting for the absence of the pattern in (59).

It is not quite clear when last resort deletion is possible and when it is not. For the Bernese data in (34c) one might argue that last resort deletion is blocked because there is a ‘cheaper’ repair, viz. the descending order where no deletion is necessary. Unfortunately, I do not know whether in cases like (57) alternative orders are available. If not, deletion of V1 may indeed be the only option.<sup>24</sup>

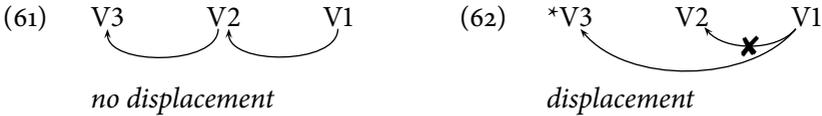
<sup>23</sup>I am only aware of one example, viz. ex. 41 in Höhle (2006: 69) where V1 selects *zu*+gerund while V2 selects a *ge*-infinitive; the result is that V2 appears as a supine while V3 occurs as *zu*+gerund.

<sup>24</sup>Note that last resort deletion may also be an alternative explanation for the haplology patterns presented in sections 4.3.1 and 4.3.2. However, given the possibility of cumulativity in (47), last resort deletion of the requirements of V1 is not sufficient to capture all patterns. Consequently, one arguably needs both compatibility and last resort deletion.

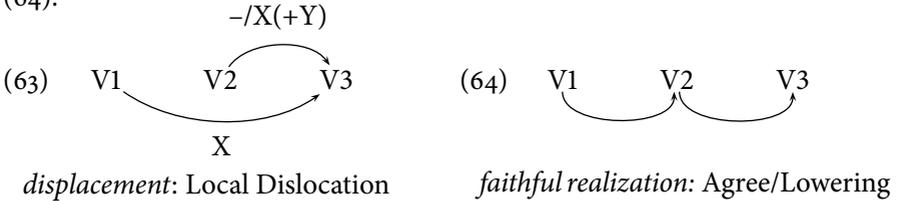
To summarize the possibilities for displacement: Displacement is felicitous if (a) V2 selects an infinitive, i.e., nothing, so that no clash can obtain and only one affix is attached to V3; or (b) if the requirements of V1 and V2 are compatible, cf. section 4.3. Consequently, the requirements of V2 are never suppressed, as expected under cyclicity.

5.6. Summary

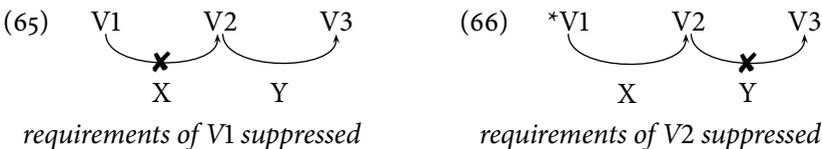
Before concluding the paper, I will briefly list the possible patterns in 3-verb-clusters. The crucial distinction is between ascending and descending orders. In descending orders we find faithful realization of the morphological requirements; displacement is systematically absent.



In ascending orders, however, we find displacement as in (63), depending on the compatibility between the forms selected by V1 and V2. With finite morphology in general, with non-finite morphology in Dutch and with some non-finite morphology in certain German dialects, we find faithful realization, see (64).



Finally, if the requirements of V1 and V2 are not compatible, we find suppression of the requirements of V1, see (65). The reverse pattern, suppression of the requirements of V2, is not found, see (66).



## 6. Conclusion/implications

I have argued in favor of a post-syntactic approach to the placement of non-finite morphology in German. Concretely, there are separate functional projections for all non-finite forms. These functional heads are linearized head-finally, in accordance with the head-final character of German. The vocabulary items are inserted into these functional heads and are associated with their verbal host by means of Local Dislocation, an operation sensitive to linear order and adjacency. As a consequence, the non-finite morphology always ends up on the last verb of the functional head's complement. If the order in the verbal complex is strictly descending, viz., (3)<sub>21</sub>, which in my approach involves two instances of complex head formation at PF, the non-finite morphology will appear to be well-behaved. However, once the order in the cluster deviates from the strictly descending (3)<sub>21</sub> order, we get the impression of displacement; crucially, though, there is no displacement operation. Rather, the morphology is always placed in the same way; displacement is just an illusion created by partially ascending cluster orders. It can be seen as the result of a conflict between the general head-finality of the language and the possibility of (partially) ascending verb clusters (in certain varieties). Importantly, not even a special placement rule needs to be assumed. Rather, Local Dislocation is the result of the dependent/affixal nature of the vocabulary items, i.e. their selectional requirements, which are also sufficient to capture the restrictions on displacement.

The phenomenon clearly argues against pre-syntactic morphology as well as against handling morphological selection by means of upward Agree: The placement of non-finite morphology in German depends on linear precedence rather than hierarchical notions such as c-command and minimality. One of the strongest advantages of the PF-perspective is that the placement has no effect on the interpretation: At LF, the correct hierarchical relations are retained so that the non-finite morphology applies to the correct verb/events.

## 7. Appendix: The IPP-effect

In the displacement cases reviewed so far, V2 (or more generally, non-final verbs), appears in a default form, usually in the infinitive (or, in the dialects discussed in Höhle 2006: 57–63, as a supine). There seems to be an obvious link to the IPP-phenomenon: The middle verb in ascending 3-verb-clusters

with V1 selecting a perfect participle usually appears in the infinitive in Dutch and in many German varieties. The crucial difference w.r.t. the displacement cases is that the participial morphology is suppressed throughout, i.e. V3 occurs in the infinitive (selected by V2), as e.g. in (67).

- (67) *dass er si hät<sub>1</sub> ghööre<sub>2</sub> singe<sub>3</sub>*  
 that he her has hear.INF sing.INF  
 ‘that he heard her sing’ (Swiss German)

Example (67) thus forms a minimal pair with the PPI-case in (15), where V2 also appears as an infinitive but V3 crucially appears as a participle. In section 5.4, I argued that suppression of the requirements of V1 normally only takes place if V2 selects a form other than the bare infinitive. In some dialects suppression of the selectional properties of V1 is possible even if V2 selects a bare infinitive, but only with certain verbs. For instance, in the dialect of Barchfeld, a gerund or a *ge*-infinitive selected by V1 can be suppressed even though V2 selects a bare infinitive (cf. Höhle 2006: 71, ex. 49(ii), 51(i)).

- (68) a. *deə kɔsd<sub>1</sub> ən sɛ:2 {lœY<sub>3</sub> / gə-lœY<sub>3</sub>}*  
 you can.2SG him see.INF run.INF *ge*-run.INF  
 ‘You can see him run.’  
 b. *iç wa:β<sub>1</sub> ən lɔs<sub>2</sub> {Ruf<sub>3</sub> / Rufə<sub>3</sub>}*  
 I will.1SG him let.INF call.INF call.GER  
 ‘I will have [someone] call him.’ (dialect of Barchfeld)

Displacement seems optional with certain V2 (apparently perception verbs), subject to conditions that are not understood, see ex. 49–53 in Höhle (2006). Similar examples are found in Wasungen and Ruhla (cf. Höhle 2006: 69, ex. 42/43).

It is not fully clear how this pattern can be related to those we have established in the rest of the paper. One possibility could be to subsume it under the suppression pattern in section 5.4. One would additionally have to assume that – for reasons not understood – the infinitive can be present syntactically after some verbs/in some varieties so that because of cyclicity, the infinitive attaches first and will consequently block displacement from V1. However, while this correctly blocks displacement of participles selected by V1 as in (34c) and (67) and still allows for displacement of *z(u)* as in (13) and (14) (as it is a superset of the bare infinitive), it fails for the cases in (68) since the *ge*-

infinitive and the gerund should be compatible with the bare infinitive (given the logic about morphological compatibility above). The same goes for an example from Altenburg where V1 selects *zu*+gerund and V2 a bare-infinitive. V3 occurs in the bare infinitive so that *zu* appears to be suppressed, see Höhle (2006: 68, fn. 23) even though *zu* (+gerund) should be compatible with the bare infinitive.

It seems, thus, that there are instances of deletion that cannot be motivated on the basis of morphological incompatibility. This is particularly obvious in the case of IPP because the effect also obtains in 132 clusters as in (69) even though the participial morpheme would be the only one affixed onto V2 (since a potential infinitive morpheme if syntactically present would be affixed onto V3 given cyclicity).<sup>25</sup>

- (69) *dass er es* {*hat*<sub>1</sub> *lesen*<sub>3</sub> *können*<sub>2</sub> / \**hat* *lesen*<sub>3</sub> *gekonnt*<sub>2</sub> }  
 that he it have.3SG read.INF can.INF have.3SG read.INF can.PTCP  
 ‘that he was able to read it’

(132 *Standard German*)

Furthermore, Dutch also displays the IPP-effect even though there is no displacement in the language.

The prospects of unifying the IPP-cases and the lack of displacement in (68) are dim. In the East-Middle German examples in (68), the lack of displacement could be argued to result from deletion of F1 whenever F2 is syntactically present. Attaching several affixes onto V3 would thus be ruled out as a matter of principle with morphological compatibility playing no role. The optionality could then result from the optional presence of InfP. In examples with IPP, one will instead need to assume that participial morphology is deleted systematically in (partially) ascending clusters. Consequently, displacement as in (9b) is still possible as V2 has not received any functional morphemes yet. Importantly, deletion of the participial morphology has to be limited to ascending orders (although there are some exceptions in Austrian German).

To conclude, then, although the IPP-effect in strictly ascending 123 clusters can partly be related to displacement, its occurrence in 132 clusters and in

<sup>25</sup>To make things even more complex, there are clusters with 132/312 and 1432 with V1 = perfective auxiliary that fail to display the IPP-effect. See Meurers (2000: 223) for an example from Standard German with V2 = *glauben* ‘believe’. Swiss German generally fails to show the IPP-effect in the double perfect in 132 and 312 orders, e.g. *hät<sub>1</sub> ghöört<sub>3</sub> ghaa<sub>2</sub>* ‘has heard had’.

Dutch more generally cannot and therefore requires additional assumptions. Despite the progress I believe we have made in understanding the placement of non-finite morphology in German, the IPP-effect thus remains a serious *pièce de résistance*.<sup>26</sup>

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<sup>26</sup> An alternative possibility suggested by data like (56) would be to assume that participial morphology in present-day German (and its dialects) actually undergoes Lowering/is placed by Agree. In Standard German, the affix would be obligatorily deleted in ascending orders before vocabulary insertion (and replaced by the infinitive), in Swiss German this would be optional in ascending orders. Perhaps, the supinal forms found in East Middle German could also be a reflex of that: V2 does receive features from V1, but for some reason, a different exponent than the participle is inserted. Possible evidence for a featural relationship between V1 and V2 in dialects with supines comes from the fact that V1 and V2 sometimes agree in mood, i.e. a different supine is chosen depending on the mood of V1, see Höhle (2006: 58f.).

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# Proxy Control: A new species of obligatory control under modality

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## Abstract

This paper presents evidence from Brazilian Portuguese (BP), Tamil, and dialects of German and Italian for ‘proxy control’, a new species of obligatory control (OC). Proxy control obtains in the scope of deontic modality and bears a clear connection to proxy readings obtained under anaphora (Jackendoff 1992, Lidz 2004) though the nature of the proxy relationship is fundamentally different in both. Formally, proxy control involves a non-exhaustive obligatory control relation between one set of individuals  $i$  and another,  $f(i)$ , that is discourse-contextually related to it. We also provide agreement evidence from floating quantifiers and secondary predication in the proxy control complement in BP and Italian to argue that the proxy dependency must be motivated in the (morpho)-syntax. The theoretical implications of these findings are potentially far-reaching. In addition to widening the typology of possible obligatory control dependencies in natural language, proxy control also poses a strong challenge to movement theories of control (e.g. involving a null comitative PP containing the controller in the controlled constituent, as in Boeckx et al. 2010, a.o.). We thus propose an analysis of the proxy control facts in terms of Landau (2015*b*)’s ‘logophoric’ control, suggesting in particular that the mediating perspectival C head in the control complement encodes a species of deontic modal ( $\text{Mod}_{\text{deontic}}$ ).

## 1. Overview

In the case of obligatory control (OC henceforth), and speaking atheoretically for now, the reference of a local (i.e. in the immediately higher or lower clause)

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and typically c-commanding controller must be either exhaustively or non-exhaustively replicated in that of the controllee, the typically silent subject of the controlled constituent. Example (1) shows us a standard case of exhaustive OC in the complement of *try*: The reference of the controller is identical to that of the controllee. Example (2) show us the two instances of non-exhaustive OC hitherto reported in the literature ((Landau 2013), a.o.) partial control (2a), and split control (2b) — in both, the reference of the controller is properly contained in that of the controllee:

- (1) *Exhaustive OC*:  
Matilda<sub>i</sub> struggled [<sub>EC<sub>i</sub></sub> to guzzle that beer].
- (2) *Non-Exhaustive OC*:
- a. *Partial OC*: Matilda<sub>i</sub> agreed [<sub>EC<sub>i+</sub></sub> to meet at the bar].
  - b. *Split OC*: Matilda<sub>i</sub> asked Lars<sub>j</sub> [about <sub>EC<sub>i+j</sub></sub> splitting that pitcher of beer].

Crosslinguistically, exhaustive control predications have been observed to involve a ‘tighter’ connection between the controlled and controlling clauses with respect to various ingredients of finiteness: tense, aspect, modality, subject reference, etc (Stiebels 2007, Landau 2013). Non-exhaustive OC predications, on the other hand – involving partial control and split control – seem to be more independent with respect to the embedding predicate, for the various aspects of finiteness: i.e. tense, mood, agreement, and subject case and reference.

In this paper, we expand on the typology of obligatory control in natural language by motivating the presence of a new (i.e. hitherto unobserved) form of obligatory control. This type of OC, which we term *proxy control*, seems to obtain exclusively in the presence of deontic modality. The nature of proxy control is best illustrated with a concrete example, as in (3b) below:

- (3) a. **Proxy Control Scenario**: *Johanna is a student helping to organize a student conference. She knows she will not be attending the conference as she will be away. She is simply asking Frau Pohl, who administrates the New Seminar Building, whether the attendees can use the facilities.*
- b. Johanna<sub>i</sub> hat Frau Pohl<sub>j</sub> gebeten, [<sub>EC<sub>f(i)</sub></sub> das Neue  
Johanna has Mrs Pohl asked the new

Seminargebäude für eine studentische Tagung nutzen zu  
seminar building for a student conference use.INF to  
dürfen].

may.INF

‘Johanna asked Mrs Pohl for permission to use the new seminar building for a student conference.’

In (3b), there is a clear referential dependency between the matrix subject *Johanna* and the silent, embedded one. However, this dependency does not quite look like any of the control relationships illustrated in (1)–(2) above. Given the discourse-context, it is clear that Johanna herself will not be using the seminar-building, so the relationship is not one of exhaustive control. But for this same reason, it also does not correspond to one of the cases of non-exhaustive control (i.e. to partial or split control) illustrated above: The referent of the controller, Johanna, is not properly contained in that of the controllee either. What we have here, instead, is a non-exhaustive control relationship where the reference of the controllee is discourse-contextually associated with that of the controller in some way. In the specific case of (3b), for instance, this association is built on the notion that Johanna and the students are part of the same conference organizing committee. Johanna is asking purely *on behalf of* her co-committee members:<sup>1</sup> The controller denotes the former, the controllee the latter.

Informally, therefore, proxy control delineates a non-exhaustive control relationship between an individual and another individual or group of individuals that are (discourse)-contextually related to him/her. Formally, it instantiates a mapping between an individual *i* and a discourse-contextually defined function *f* on *i*, yielding another referent *f*(*i*). Proxy control, incidentally, also has a clear analog in cases of *proxy anaphora* (the name drawing upon the famous Madame Tussaud examples in Jackendoff 1992) and *near reflexives* described in Lidz (2004) and Reuland (2011) which again involves a relationship between an antecedent *i* and an anaphor that is related to that antecedent in some way — thus underscoring the parallel between control and anaphora more generally.

Given the heavy influence of the discourse-context in shaping the identity of the control relationship, it is entirely legitimate to ask whether the proxy control dependency should be encoded extra-grammatically, at the level

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<sup>1</sup>That is, she stands as a *proxy* or representative for them in this matter.

of discourse-pragmatics. However, on the strength of novel evidence from Brazilian Portuguese and Italian showing that the proxy controller can trigger phi-agreement on floating quantifiers and secondary predicates in the control constituent, we will argue that this control dependency must be, at least in part, morphosyntactically instantiated. In particular, we will propose that proxy control should be analysed in terms of mediated ‘logophoric’ control in the sense of Landau (2013), and propose that the mediating logophoric or perspectival C head encodes a species of deontic modal, which we call  $\text{Mod}_{\text{deontic}}$ . In this context, we will also argue that proxy control constitutes a very strong challenge to movement based theories of control (Hornstein 1999 et seq.). Hornstein (2003), Ślodołowicz (2008), Boeckx et al. (2010) and others argue that partial control, the most prototypical case of non-exhaustive OC, may indeed be derived via movement if we assume the presence of a null comitative PP containing the controller in the controlled clause. However, it is extremely difficult to see how such an analysis can be extended to the cases of proxy control at hand where the denotation of the controller need not be part of that of the controllee at all.

## 2. Proxy Control: Empirical nuts and bolts

In this section, we will articulate the precise morphosyntactic and semantic conditions under which proxy control seems to obtain, arguing: (i) that the proxy dependency yields a discourse-contextually defined relationship between one set of individuals and another, (ii) that it obtains only in the scope of deontic modality (e.g. in the context of someone asking someone else for permission on behalf of a third party), which however may be overtly or covertly represented in the controlled constituent, (iii) that although proxy control appears to entail control shift, the two phenomena are strictly orthogonal to one another but frequently co-occur because of their mutual sensitivity to modality, and (iv) that the structural requirement for proxy control entails that for partial control.

### 2.1. Proxy control in Italian, Tamil, and German

Consider the following example from Italian.

- (4) a.  $\text{Giovanna}_i$  ha chiesto alla responsabile $_j$  [di EC $_{i,i+k,f(i)}$ ]  
 Giovanna has asked to.the responsible C  
 poter utilizzare l' aula magna per la visione di un film].  
 may.INF use.INF the lecture hall for the vision of a film  
 'Giovanna asked the person in charge for permission to use the  
 lecture hall to watch a film.'
- b. **Exhaustive Control Scenario:** *Giovanna needs to watch 'The big feast' by Ferreri and write an essay on it. Unfortunately, her DVD-player is broken, so that she has to watch the film elsewhere. She decides to ask the school.*
- c. **Partial Control Scenario:** *Giovanna needs to watch 'The big feast' by Ferreri and write an essay on it with some other classmates. Unfortunately, none of their DVD-players work, so that they have to watch the film elsewhere. She has the idea to ask the school.*
- d. **Proxy Control Scenario:** *The following week is film week in art class. The teacher intends to show 'The big feast' by Ferreri to the class so she sends Giovanna to ask for permission to use the lecture hall. Giovanna, however, will be away that week, so she won't be able to watch the film in the lecture hall along with the teacher and classmates.*

The example above lends itself to different types of control readings. Under the first scenario where Giovanna asks for permission for just herself, we get an exhaustive control reading ( $i \rightarrow i$ ), with the reference of the controller being exhausted by (i.e. identical to) that of the controllee. In the second scenario, where Giovanna asks for permission for herself and her classmates, we get a partial control reading ( $i \rightarrow i+$ ), with the reference of the controller being properly contained in that of the controllee. What is of interest, and novel, is the third scenario, where Giovanna is requesting permission on behalf of her classmates alone, with the discourse-context making it clear that she herself will not be present. Here, we have a proxy control dependency ( $i \rightarrow f(i)$ ) where the referents of the controller and controllee clearly pick out disjoint sets in the discourse context, but nevertheless bear a clear discourse-contextual relationship with one another (specifically, that of membership in the same art class). This is, then, essentially parallel to the German example discussed at the very outset, in (3b).



defined more abstractly or loosely: *how* abstractly or loosely, whether there is an upper bound to these individual concepts that is clearly definable, and/or whether and to what extent this may be parametrized, is a matter that must be decided empirically, and is part of ongoing research.

However, at this stage we can already say concretely that the nature of the proxy relation in the control structures above seems more loosely defined than proxy dependencies of another kind, namely in the realm of anaphora. The latter include the now well-known Madame Tussaud scenario discussed in Jackendoff (1992) involving examples like that in (6a), as well as ‘near reflexives’ (Lidz 2004, Reuland 2011) involving the local binding of an anaphor attached to a ‘self’ or (other) body-part morpheme, as in the Basque example in (6b) (from Schladt 2000 via Reuland & Winter 2009):

- (6) a. (Upon a visit in a wax museum:) All of a sudden Ringo<sub>*i*</sub> started undressing himself<sub>*f(i)*</sub>.  
 b. [aitak bere]<sub>*i*</sub> burua<sub>*f(i)*</sub> hil du  
 father.ERG 3SG.POSS head.NOM.DEF kill have.3SG:3SG  
 ‘[The father]<sub>*i*</sub> killed himself<sub>*f(i)*</sub>.’

In (6a), we have the real Ringo Starr entering the Madame Tussaud museum and starting to undress the wax statue of himself: So the anaphor and the antecedent pick out different individuals in the discourse that are nevertheless related to one another, yielding a relation between *i* (the real Ringo, Beatles drummer) and *f(i)* (the wax statue of Ringo). Reuland & Winter (2009) argue that the same logic may be applied to a sentence like that in (6b): The ‘self’ morpheme is a body-part morpheme that creates a complex anaphor that denotes an individual that is related, but not exactly identical to, the antecedent, yielding again a relationship of the form  $i \rightarrow f(i)$ .

To this basic extent, the proxy relations in anaphora and control seem identical. However, the nature of the proxy in each is very different. To see why, observe that a proxy control reading is impossible in a control structure like that in (7a) below, even though a proxy anaphor is still possible:

- (7) a. (Upon a visit to a wax museum or a theater-performance about the Beatles:) All of a sudden Ringo<sub>*i*</sub> asked [EC<sub>*i*</sub>,\*<sub>*f(i)*</sub> to undress himself<sub>*f(i)*</sub>].

We can take the same Madame Tussaud scenario as in (6a): Here, it is clear that,

although a proxy anaphor reading is still available, the controllee in the control complement must be exhaustively controlled, i.e. it must denote the real Ringo Starr, not his statue. It is all too tempting to attribute the unavailability of a proxy control reading here to the nature of the world: after all, statues cannot function agentively (e.g. undress things). However, even if the discourse-context were changed to involve a potential proxy relation between the real Ringo Starr and an actor playing Ringo Starr (e.g. in a context where Ringo attends a play about the Beatles), a proxy control reading is ruled out, i.e. (7a) cannot have the reading that the real Ringo asked for the actor Ringo to start undressing himself. Only an exhaustive control reading is possible, as illustrated by the referential indices in (7a).<sup>2</sup>

This is a very interesting and potentially significant difference that speaks to the nature and possible structural representation of the proxy dependency in language, to potential differences between control and anaphora — two types of grammatical phenomena that otherwise have at their core the identical property that they both instantiate replication for reference across nominals — and to the interaction of these phenomena with the semantics of *de se* and *de re*. For now, we simply note the existence of this difference and defer further discussion pending more research.

### 2.3. The connection to deontic modality

Returning to the proxy control structures in (3b)–(4a), it is clear that they all involve some sort of permission semantics — more formally, a reading of deontic modality. This has a direct influence on the choice of control predicate that induces proxy control. In the German and Italian dialects we have tested so far, proxy control always seems to appear with predicates that express deontic modality: e.g. Italian *chiedere* ‘ask’, *richiedere* ‘ask, demand’, *pregare* ‘ask, beg’, *promettere* ‘promise’, *assicurare* ‘assure’ or German *bitten* ‘ask’, *anflehen* ‘beg’, *versprechen* ‘promise’, and *versichern* ‘assure’. The proxy-controller in all these cases is the seeker of permission and the proxy-controllee the (potential) receiver/goal.

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<sup>2</sup>More generally, we note that, in proxy anaphora, the proxy anaphora stands as a proxy or substitute for the ‘real thing’ in some way. Such a substitution is less obvious, or at the very least is more abstractly or loosely characterized, in the proxy control structures. In the Tamil example in (5b), for instance, the auto-rickshaw drivers (denoted by the controllee) do not represent or ‘stand in’ for Raman in any clear way.

In light of this claim about the role of deontic modality, the German examples in (8a) may seem problematic: In (8a) the players, but not the coach himself, are cheered for by the fans; in (8b) some other conference participant will get the better room, e.g. her co-organizers, but not she herself:<sup>3</sup>

- (8) a. Der Trainer<sub>i</sub> bat die Fans<sub>j</sub>, [EC<sub>f(i)</sub> mehr Anfeuerung zu  
the coach asked the fans more cheering to  
bekommen].  
receive.INF  
‘[The coach<sub>i</sub>] asked [the fans]<sub>j</sub> [EC<sub>f(i)</sub> to receive more cheering].’
- b. Johanna<sub>i</sub> erzwang, [EC<sub>f(i)</sub> einen besseren Tagungsraum zu  
Johanna compelled a better conference room to  
bekommen].  
receive.INF  
‘Johanna<sub>i</sub> asked [EC<sub>f(i)</sub> to get a better conference room].’

Unlike the proxy control German sentence in (3b), which has an overt permission modal *dürfen* (‘may’) in the control complement, these examples lack such an overt modal. In fact, adding such a modal to (8a) even seems to have the strange effect that the proxy control reading vanishes in favour of an exhaustive one:

- (9) a. [Der Trainer]<sub>i</sub> bat [die Fans]<sub>j</sub>, [EC<sub>i,\*f(i)</sub> mehr Anfeuerung  
the coach asked the fans more cheering  
bekommen zu dürfen].  
receive.INF to may.INF  
‘[The coach]<sub>i</sub> asked [the fans]<sub>j</sub> [EC<sub>i,\*f(i)</sub> to be allowed to receive  
more cheering].’

However, at this stage, it is not at all clear whether such examples constitute genuine counter-examples to the idea that the proxy control dependency is intrinsically tied to a semantics of deontic modality. After all, while there may be no overt permission modal (i.e. *dürfen* ‘may’) in the embedded clause in (8a), it is nevertheless clear that a permission semantics *is* introduced as part of the meaning of the matrix verb *bitten* ‘ask’.<sup>4</sup> Note, in this regard, that the

<sup>3</sup>We thank Barbara Stiebels (p.c.) for bringing this to our attention.

<sup>4</sup>As for (9a), we might surmise that the predicative noun ‘cheering’ be analysed as having an implicit argument ‘for the players’ so that the control relation is forced to be exhaustive. The

overtness of the modal seems to be subject to crosslinguistic variation as well — even just with respect to the four languages considered here. Furthermore, its presence is apparently redundant with a number of predicates, such as ‘permit’, which entail deontic modality. As Tamil (5b) shows, there is no overt modal in the control complement. In Italian, however, the modal, even if seemingly redundant, must be present in the control complement for partial or proxy control readings to obtain.<sup>5</sup> In Brazilian Portuguese the opposite seems to hold. The modal could generally not be present in the control complement, while in German, its presence facilitates proxy control readings according to the German author, though the contrast is not as strong as in Italian. Furthermore, there is disagreement between the speakers of German that were consulted with respect to when the addition of the redundant modal would contribute meaningfully to the sentence. Barbara Stiebels (p.c.) also informs us, based on a brief survey of a German newspaper corpus, that the frequency of such redundant modals is very slim in comparison to examples without them (i.e. juxtapositions as ‘permit-V.INF’ vs. ‘permit-may.INF-V.INF’).

The conditions on the overtness of the modal in the controlled constituent clearly warrant further research. What seems incontrovertible, however, is that there is a semantic interpretation of permission seeking that is involved in all the proxy control structures given here crosslinguistically. For this reason, we will continue to assume that proxy control obtains in the scope of deontic modality and formally exploit this connection in our analysis of these facts.

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proxy reading in (8a) would then arise from the semantics of that noun in combination with the recipient oriented predicate. Such issues clearly need to be investigated more thoroughly, however.

<sup>5</sup>Interestingly, in such cases, clitic climbing of a reflexive clitic *si* from the embedded lexical verb to the embedded modal blocks partial control, yielding exhaustive control so that (i) is ungrammatical.

- (i) \*Il presidente ha permesso al capo reparto [di EC<sub>i+</sub> poter-si anche non  
 the president has permitted to.the chief section C may.INF-REFL also not  
 riunire nel caso in cui dovesse reputar-lo inutile].  
 gather.INF in.the case in which must.SBJV consider.INF-it useless  
 ‘The president allowed the section chief to also not gather in case he considered it  
 useless.’

#### 2.4. Proxy control vs. control shift

Control shift is the phenomenon where a typically subject control predicate shifts to object control or vice versa. Thus, in (10a) involving ‘promise’, the controller is not the matrix subject as is typical but the matrix object whereas in (10b), it is the other way around, so we get subject rather than the standard object control with ‘ask’:

- (10) a. Grandpa promised the children<sub>i</sub> [EC<sub>i</sub> to be able to stay up for the late show].  
 b. Jim<sub>i</sub> asked Mary [EC<sub>i</sub> to be allowed to get himself a new dog].  
 (Landau 2013: 143–144)

The astute reader may have noticed that all the examples of proxy control we have listed so far from German, Italian and Tamil have also involved control shift. Thus, in the German example, repeated below, the (proxy-)controller is the matrix subject *Johanna*, not the matrix object *Frau Pohl*. Crucially, the proxy control reading does not seem to be possible with object control:

- (11) a. **Proxy Control Scenario:** *Johanna is a student helping to organize a student conference. She knows she will not be attending the conference as she will be away. She is simply asking Frau Pohl, who administrates the New Seminar Building, whether the attendees can use the facilities.*  
 b. Johanna<sub>i</sub> hat Frau Pohl<sub>j</sub> gebeten, [EC<sub>f(i)</sub> das Neue  
 Johanna has Mrs Pohl asked the new  
 Seminargebäude für eine studentische Tagung nutzen zu  
 seminar building for a student conference use.INF to  
 dürfen].  
 may.INF  
 ‘Johanna asked Mrs Pohl for permission to use the new seminar-  
 building for a student conference.’

This suggests that proxy control is parasitic on control shift (or vice-versa). However, we will show here that control shift is neither a necessary nor a sufficient condition for proxy control to obtain, i.e. on the one hand, proxy control may obtain even in the absence of control shift, cf. (12a):

- (12) a. **Proxy Control Scenario:** *The following week is film week in art class. The teacher intends to show ‘The big feast’ by Ferreri to the class so she sends Giovanna to ask for permission to use the lecture hall. Giovanna will actually be away that week so that she won’t be able to watch the film in the lecture hall along with the others. Nonetheless, she goes and asks. The secretary promises Giovanna to be allowed to use the lecture hall.*
- b. La responsabile<sub>j</sub> ha permesso a Giovanna<sub>i</sub> [di EC<sub>f(i)</sub>]  
 The responsible has allowed to Giovanna C  
 poter utilizzare l’ aula magna per la visione del  
 may.INF use.INF the lecture hall for the vision of.the  
 film].  
 film  
 ‘The person in charge allowed Giovanna<sub>i</sub> [PRO<sub>f(i)</sub>] to use the  
 lecture hall to watch a film].’

On the other hand, control shift may obtain even in the absence of proxy control — e.g. as a result of passivization in the embedded complement, cf. (13).

- (13) L’ impiegat-a<sub>i</sub> ha pregato il suo collega<sub>j</sub> [di EC<sub>i</sub> essere  
 the employee-F.SG has asked the his colleague.M.SG C be.INF  
 trattat-a con piú rispetto].  
 teated-F.SG with more respect  
 ‘The employee asked her colleague to be treated with more respect.’

The appearance of a dependency between proxy control and control shift, we argue, has to do with the fact that both depend on the presence of modality in the local clause ((Sag & Pollard 1991, Petter 1998) for discussion of control shift),<sup>6</sup> i.e. proxy control entails, not control shift, but modality – in particular, deontic (ability) modality, as we have discussed in detail above, and since certain types of control shift depend on this as well, the appearance of a direct relation between proxy control and control shift is simulated.

<sup>6</sup>The connection to modality is more tenuous with control shift, of course, since as we have just seen, certain types of control shift, as in (13) obtain, not due to modality, but due to passivization.

## 2.5. Proxy control vs. Partial control

Proxy control is very similar to another, better known type of non-exhaustive control – namely the control relationship termed ‘partial control’. Here we thus ask what the logical connection is, if there is any, between the structure(s) that can yield the former and those that can yield the latter.

Concretely, are there structures where we can get partial control but not proxy control? The answer, it turns out, is yes. In (14) (adapted from Landau 2013: 164), only a partial control, but not a proxy control reading is available:

- (14) Il presidente crede [di EC<sub>*i+*, \**f*(*i*)</sub> esser-si riuniti  
 the president believes C be.INF-REFL gathered.M.PL  
 inutilmente la notte scorsa].  
 in.vain the night last  
 ‘The chair believes to have gathered in vain last night.’

Now we ask whether there are any structures where we get proxy control but not partial control. The answer to this is more interesting — it turns out there are not, i.e. without changing their fundamental structure, all the proxy control sentences in this paper could, in principle, also yield a partial control reading given a different discourse-context. To see why, consider the German example we have looked at most recently in (11b) above. The discourse context explicitly states that Johanna (represented by the matrix subject controller *Johanna*) will herself be away, thus precluding a partial control reading. However, under a different discourse-context where Johanna will herself also be attending the conference, (11b) simply yields a run-of-the-mill partial control reading.

In other words, while a partial control reading can be pragmatically ruled out to yield a proxy control reading, it does not seem possible to rule it out semantically (or lexically). Logically, the structural requirement for proxy control entails the structural requirement for partial control. Put another way, the environments that license proxy control are a proper subset of those that license partial control.<sup>7</sup> Not unexpectedly, given this, the predicates that

<sup>7</sup>This is ultimately not that surprising if we think more carefully about the nature of the proxy and partial control dependencies. We might formalize the logical connection between reference under proxy control and reference under partial control as follows: Partial control can be viewed as the function taking the controller and returning itself plus some associated individual(s) *j* (+*k*). One can then think of exhaustive *i* to be the specific instantiation of the function *i+* where *i+* adds the empty set, yielding an identity function. The *i+* function can

license proxy control, at least those tested so far, also seem to be a proper subset of those predicates that have been shown to license partial control, e.g.: factive *regret, surprised, hate, shocked*, attitudinal *believe, think, imagine, deny*, desiderative *want, prefer, yearn, refuse* and interrogative *wonder, ask, interrogate, inquire*.

## 2.6. Summary of properties

Given the detailed descriptive presentation of what proxy control is and is not, in this section, we may summarize its properties as follows. Proxy control is a non-exhaustive control relation between one set of individuals  $i$  and another  $f(i)$ , where  $f$  is a discourse-contextually defined function between the two sets of individuals. As such, proxy control bears a clear relation to other proxy relations holding between individuals, such as proxy anaphora. Nevertheless, the nature of the proxy relationship expressed in proxy control structures seems to be more loosely or abstractly defined than it is for that in proxy anaphora. Specifically, proxy control between an individual and a body-part (or statue or other concrete representation) of that individual seems to be ruled out. Proxy control also entails the presence of a deontic modal, either overt or silent, in the control complement, i.e. there can be no proxy control in the absence of such modality. The controller in such structures is typically the seeker of permission while the controllee is the intended receiver of this permission. Proxy control readings frequently co-occur with control shift, lending the misleading impression that one is fed by the other: however, the connection between the two phenomena is more direct and due to the fact that both proxy control and types of control-shift are conditioned by the presence of modality. Finally, we have shown that the environments that license proxy control also license partial control: while the former can pragmatically rule out the latter, it cannot do so semantically. This conclusion is bolstered by the fact that the predicates that license proxy control seem to be a proper subset of those that license partial control.

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then also be viewed as a specific instantiation of the proxy control function  $f(i)$ , which can (i) take  $i$  and return  $i$ , (ii) take  $i$  and return  $i + j$ , and (iii) take  $i$  and return a set of individuals associated with  $i$ , e.g.  $j + k$ .

### 3. Proxy Control is Obligatory Control

That there are two types of control relation in natural language — termed ‘non-obligatory control’ and ‘obligatory control’ — is well known. Obligatory control may be defined as per the OC signature in (Landau 2013: 33):

- (15) THE OC SIGNATURE –:  
In a control construction [...X<sub>i</sub>...[S PRO<sub>i</sub>...]...], where X controls the PRO subject of the clause S:
- The controller(s) X must be (a) co-dependent(s) [argument or adjunct] of S.
  - PRO (or part of it) [this caveat subsumes cases of partial control as a sub-species of OC] must be interpreted as a bound variable.

Non-obligatory control (Williams 1980), on the other hand, may be negatively defined with respect to these points.

The natural question that arises at this juncture is whether proxy control is a species of obligatory control (OC) or of non-obligatory control (NOC). In fact, we aren’t starting with a blank slate with respect to this question but already have a prediction. Landau (2013) presents diagnostics for bound variable behavior to argue in detail that partial control constitutes a species of OC crosslinguistically with respect to the definition given above. Given our discussion immediately above showing that environments that license proxy control entail those that license partial control, we predict that proxy control, too, should be a species of obligatory control.

Below, we show that this prediction is indeed fulfilled. To this end, we present evidence showing that the controller must be part of the clause that immediately selects the control complement: thus satisfying the co-dependence condition on control in (15) (see also Hornstein 1999 for discussion of this point). We also illustrate that proxy control structures yield only sloppy reading under ellipsis, thus showing that the bound variable condition on the controlled element, given in (15), is also satisfied.

#### 3.1. Proxy controller must be co-dependent of control clause

Here, we illustrate that there is a minimality condition on the proxy control relation, as described in the OC Signature in (15). In particular, the controller

involved in the proxy control relation must be a thematic participant of the clause that directly embeds the control clause. In other words, only one level of embedding is allowed — there is no cyclic or true long-distance control across multiple clauses. This is illustrated by the multiply embedded Italian sentence below, under the ‘proxy-proxy’ scenario given in (16):

- (16) a.  $L'$  insegnante<sub>k</sub> ha pregato Giovanna<sub>i</sub> [di EC<sub>i,\*j,\*k</sub> chiedere  
the teacher has asked Giovanna C ask.INF  
alla responsabile<sub>j</sub> [di EC<sub>f(i),\*f(k)</sub> poter utilizzare  $l'$   
to.the responsible C may.INF use.INF the  
aula magna per  $l'$  assemblea degli insegnanti]].  
lecture hall for the assembly of.the teachers  
‘The teacher asked Giovanna to ask the person in charge for  
permission to use the lecture hall for the teachers’ assembly.’
- b. **Potential proxy-proxy scenario:** *The following week is the teachers’ assembly, generally held in the lecture hall. The teacher who is in charge of organizing the room this time is a bit lazy so she sends a student of hers, Giovanna, to ask for permission for her, and, won’t actually attend the assembly herself.*

In (16), the teacher is an immediate associate of Giovanna and the two share the class as her associates. The discourse-context we have set up pushes a non-minimal proxy control reading between the matrix subject  $l'$  *insegnante* ‘the teacher’ and the innermost embedded subject, across the medial subject. Despite this, such a reading is definitely impossible. Analogous tests for German and Tamil yield the same results.

If the proxy control dependency did instantiate a type of non-obligatory control, such a minimality restriction would be entirely unexpected. The presence of such a restriction, therefore, should already be taken as evidence showing that proxy control instantiates a species of OC.

### 3.2. Bound variable status

A standard test for the bound variable status of pro-forms is whether they yield only sloppy readings or whether they can yield both strict and sloppy readings, under ellipsis. A bound variable is predicted to yield only the former, but a deictic form is compatible with the latter.

When we apply this diagnostic to our proxy control structures, the results are again very clear: only a sloppy reading is possible under ellipsis. Thus, in the Italian proxy control example in (17), the only way to get a strict reading is if Pietro and Giovanna share their  $f(i)$  by virtue of, for instance, happening to be in the same class — this is, of course, nothing but an instance of accidental coreference:

- (17) Giovanna<sub>i</sub> della 3D ha chiesto alla responsabile<sub>j</sub> [di EC<sub>f(i)</sub>  
 Giovanna of.the 3D has asked to.the responsible C  
 poter utilizzare l' aula magna per la visione di un film] e  
 may.INF use.INF the lecture hall for the vision of a film and  
 Pietro<sub>k</sub> della 4F uguale ... [EC<sub>f(k),\*f(i)</sub>].  
 Pietro of.the 4F same  
 'Giovanna from the 3rd D asked the person in charge for permission to  
 use the lecture hall to watch a film and Pietro from the 4th F, too.'

The fact that we can only get sloppy readings under ellipsis in turn shows that the controlled subject in proxy control environments is interpreted as a bound variable, a typical signature of OC.<sup>8</sup>

A different way to illustrate the bound variable status of the controlled element is with structures involving overt quantifier-variable binding, which can also yield proxy control. Thus, in German (18), the proxy control reading survives under a distributive reading of  $i \rightarrow f(i)$ :

- (18) a. *Context:* The DGfS (annual meeting of the German Linguistics Association) is held in Leipzig. The conference is composed of a number of different workshops, each one organized by different work groups. Each work group has a person responsible for organizing the rooms with Mrs Pohl who administrates the lecture building. The room organizers, however, all have so many other

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<sup>8</sup>Italian does not have vP ellipsis so the example in (i) involves TP ellipsis. Nonetheless, the subjects need not be identical, which is the only relevant factor here. See the sloppy reading for a standard example of OC in (i).

- (i) Maria<sub>i</sub> ha cercato [di EC<sub>i</sub>; tagliar-si<sub>i</sub> i capelli] e Gianni<sub>j</sub> uguale [...EC<sub>j,\*i</sub>].  
 Maria has tried C cut-REFL the hair and Gianni same  
 'Maria has tried to cut her hair and Gianni, too (tried to cut his hair).'

duties that they won't get a chance to actually attend the conference and use the rooms themselves.

- b. Jede Organisatorin<sub>*i*</sub> hat Frau Pohl<sub>*j*</sub> gebeten, [EC<sub>*f(i)*</sub> das each organizer has Mrs Pohl asked the Hörsaalgebäude für ihren<sub>*i*</sub> Workshop nutzen zu dürfen]. lecture building for her workshop use.INF to may.INF 'Each organizer has asked Mrs Pohl for permission to use the lecture building for her workshop.'

Similarly, Italian (19) can only mean that each student representative *i* asks on behalf of his or her own class *f(i)*:

- (19) [Ogni rappresentante di classe]<sub>*i*</sub> ha chiesto alla responsabile<sub>*j*</sub> [di each representative of class has asked to.the responsible C EC<sub>*f(i)*</sub> poter utilizzare l' aula magna per la loro<sub>*i*</sub> assemblea may.INF use.INF the lecture hall for the their assembly di classe. of class 'Each class representative asked the person in charge for permission to use the lecture hall for their class assembly.'

### 3.3. Definition of Proxy Control

Based on the discussion in this section thus far, we will now take it to be uncontroversial that proxy control instantiates a new form of obligatory control, and define this phenomenon as follows:

- (20) *Informal definition of Proxy Control*  
Proxy Control involves an obligatory control relation between an individual and another that is discourse-contextually related to it.
- (21) *Formal definition of Proxy Control*  
Proxy Control involves an obligatory control dependency between an individual *i* and a (discourse-contextual) function *f* defined on *i* (yielding *f(i)*).

#### 4. Proxy control is syntactic

There is an ongoing debate in the literature about whether the control dependency should be instantiated in the (narrow-)syntax at all, assuming a Y-modular grammatical architecture (Chomsky 2001 et seq.), whether it should be relegated to the realm of semantics (Chierchia 1989, Culicover & Jackendoff 2001) or, indeed, whether one should posit a systematic distinction between types of control dependency, with some being implemented in the syntax and others only in the semantics (as Wurmbrand 2002 does, for instance). The role of syntax is potentially even more nebulous/in question in structures involving partial or proxy control since the denotation of the controllee in these cases is essentially a function of the discourse-context.

On the other side of the debate, robust morphosyntactic evidence from agreement and anaphora paradigms and complementizer effects from a number of languages (Rizzi 1997, Bianchi 2003, Giorgi 2010, Sundaresan 2012, Nishigauchi 2014, Charnavel 2015, Sundaresan 2016, a.o.) have argued that such discourse-contextual information does indeed interface with the syntactic module systematically and at designated structural ‘access points’. Perhaps more to the point, Landau (2015*b*) presents agreement data from Greek and Turkish to argue that logophoric control is morphosyntactically implemented (though he argues that agreement itself is a PF rather than a narrow-syntactic phenomenon).

Turning specifically to the case of proxy control, the minimality restriction on the proxy-controller, discussed in section 3.1 already suggests that proxy control is sensitive to structural restrictions. However, it is not entirely implausible to derive such a restriction in purely LF-semantic terms. The bound variable status of the controlled subject, discussed in section 3.2 could, similarly, also be derived solely at LF.

In the rest of this section, however, we provide strong evidence in support of the idea that the proxy control (and, by extension therefore, also the partial control) dependency is, in fact, (morpho-)syntactic in nature. To this end, we present below novel evidence involving  $\phi$ -agreement triggered on subject floating quantifiers (FQ) in the control complement in Italian and Brazilian Portuguese (BP, henceforth) and in secondary predicates in BP.

## 4.1. Agreement evidence from floating quantifiers

The problem with silent subjects, of course, is that they are silent: As such, they do not wear their features ( $\phi$  or otherwise) on their sleeve. But in both Italian and BP, floating quantifiers exhibit overt  $\phi$ -agreement with the DP they modify. In control complements in these languages, the floating quantifier associated with the silent, controlled subject can thus be used both to identify the  $\phi$ -features carried by the silent subject and to show that the proxy control relation that yielded these  $\phi$ -features must have happened early enough in the grammatical derivation to then trigger agreement on the floating quantifier.<sup>9</sup>

4.1.1. *Floating quantifiers in Italian*

The Italian examples below all involve the floating quantifier *tutt*- ‘all’, which exhibits  $\phi$ -agreement with the controlled subject, and show that the value of agreement varies according to the gender of the teacher. Thus, in (22a) the floating quantifier can be masculine plural and refer to the teacher and the girls by default, whereas (22b) shows that the floating quantifier can also be feminine plural as the teacher and the girls are all feminine:

- (22) a. Quando [noi ragazz-e]<sub>f(i)</sub> della 4F andiamo in gita, [la  
when we girls-F.PL of.the 4F go.1PL in excursion the  
nostra maestr-a]<sub>i</sub> chiede alla responsabile [di EC<sub>i+,f(i)</sub>  
our teacher-F.SG asks to.the responsible C  
poter fare colazione tutt-i nella stessa sala].  
may.INF do.INF breakfast all-M.PL in.the same room  
‘When [we girls]<sub>f(i)</sub> go on a school trip, [our teacher]<sub>i</sub> asks the  
person in charge for permission [EC<sub>i+,f(i)</sub> to have breakfast all in  
the same room].’
- b. Quando [noi ragazz-e]<sub>f(i)</sub> della 4F andiamo in gita, [la  
when we girls-F.PL of.the 4F go.1PL in excursion the  
nostra maestr-a]<sub>i</sub> chiede alla responsabile [di EC<sub>i+,f(i)</sub>  
our teacher-F.SG asks to.the responsible C  
poter fare colazione tutt-e nella stessa sala].  
may.INF do.INF breakfast all-F.PL in.the same room

<sup>9</sup>Similar strategies have been used in exhaustive control structures with data from Icelandic (Bobaljik & Landau 2009) and Italian and Latin (Cecchetto & Oniga 2004).

‘When [we girls]<sub>f(i)</sub> go on a school trip, [our teacher]<sub>i</sub> asks the person in charge for permission [EC<sub>i+,f(i)</sub> to have breakfast all in the same room].’

The gender resolution rules in Italian given in (23) can now be used to test whether not only a partial control, but also a proxy control reading is possible when the controlled subject refers only to the girls:

(23) *Gender resolution in Italian*

- a. Only males → M.PL
- b. Mixed males and females → M.PL
- c. Only females → F.PL; M.PL by default

The examples in (22) set the empirical baseline for floating quantification agreement in control complements in Italian. The deciding examples are those given in (24). In (24a) the teacher is masculine and his associates all feminine. Here the plural agreement on the floating quantifier is not telling as it could be the result of gender resolution in the partial control reading or the result of a default masculine in the proxy control reading. The sentence in (24b) however, crucially disambiguates: Because the teacher is male, the feminine plural on the floating quantifier can only refer to the fully female group, i.e. the girls, *f(i)*. It is important to note, here, that the adjunct temporal clause containing the DP *noi ragazze* ‘the girls’ can be omitted entirely and just be a part of the salient discourse-context (as indicated by its being enclosed in parentheses).

- (24) a. Quando noi ragazz-e<sub>f(i)</sub> della 4F andiamo in gita, il  
 when we girls-F.PL of.the 4F go.1PL in excursion the  
 nostro maestr-o<sub>i</sub> chiede alla responsabile [di EC<sub>i+,f(i)</sub>  
 our teacher-M.SG asks to.the responsible C  
 poter fare colazione tutt-i nella stessa sala].  
 may.INF do.INF breakfast all-M.PL in.the same room  
 ‘When us girls go on a school trip, our teacher asks the person in  
 charge for permission to have breakfast all in the same room.’
- b. (Quando noi ragazz-e<sub>f(i)</sub> della 4F andiamo in gita), il  
 when we girls-F.PL of.the 4F go.1PL in excursion the

nostro maestr-o<sub>i</sub> chiede alla responsabile [di EC<sub>f(i),\*i+</sub>  
 our teacher-M.SG asks to.the responsible C  
 poter fare colazione tutt-e nella stessa sala].  
 may.INF do.INF breakfast all-F.PL in.the same room  
 ‘When us girls go on a school trip, our teacher asks the person in  
 charge for permission to have breakfast all in the same room.’

#### 4.1.2. Floating quantifiers in Brazilian Portuguese

The same effect can be replicated with floating quantifiers in Brazilian Portuguese (BP) which, just like in Italian, exhibit  $\phi$ -agreement that can co-vary with the  $\phi$ -features of a proxy-controlled silent subject.

Again, gender resolution works so that feminine plural agreement may only refer to a fully female group. This is the case in (25a), which is the crucial sentence. Here a male teacher is the controller, but the agreement on the floating quantifier is feminine plural. This is only possible in a proxy-control scenario. Example (25b) shows that the masculine plural agreement may refer to the girls by default, yielding proxy control, or to the teacher plus the girls, yielding partial control. Example (25c) shows that the invariant form *tudo* can also be used for generic reference so that it can satisfy proxy control, partial control or exhaustive control depending on the context.

- (25) a. Quando [nós garot-as]<sub>f(i)</sub> vamos a uma viagem da escola,  
 when we girl-F.PL go.1PL to a trip of school  
 [nosso professor]<sub>i</sub> pede ao responsável [para EC<sub>f(i),\*i+</sub>  
 our teacher.M.SG asks to.the responsible C  
 tomar-mos café tod-as junt-as ].  
 get.INF-1.PL coffee all-F.PL together-F.PL  
 ‘When [we girls]<sub>f(i)</sub> go on a school trip, [our teacher]<sub>i</sub> asks the  
 person in charge [for permission EC<sub>f(i),\*i+</sub> to have breakfast all  
 together].’
- b. Quando [nós garot-as]<sub>f(i)</sub> vamos a uma viagem da escola,  
 when we girl-F.PL go.1PL to a trip of school  
 [nosso professor]<sub>i</sub> pede ao responsável [para EC<sub>f(i),i+</sub>  
 our teacher.M.SG asks to.the responsible C  
 tomar-mos café tod-os junt-os ].  
 get.INF-1.PL coffee all-M.PL together-M.PL

‘When [we girls]<sub>f(i)</sub> go on a school trip, [our teacher]<sub>i</sub> asks the person in charge [for permission EC<sub>f(i),\*i+</sub> to have breakfast all together].’

- c. Quando [nós garot-as]<sub>f(i)</sub> vamos a uma viagem da escola,  
 when we girl-F.PL go.1PL to a trip of school  
 [nosso professor]<sub>i</sub> pede ao responsável [para EC<sub>f(i),i+</sub>,  
 our teacher.M.SG asks to.the responsible C  
 tomar-mos café tudo junto ].  
 get.INF-1.PL coffee all together

‘When [we girls]<sub>f(i)</sub> go on a school trip, [our teacher]<sub>i</sub> asks the person in charge [for permission EC<sub>f(i),\*i+</sub> to have breakfast all together].’

#### 4.2. Agreement evidence from secondary predication

Secondary predicates in BP, like floating quantifiers, are also overtly marked for  $\phi$ -agreement with a subject or object. Thus, structures involving secondary predication in the control clause, where the secondary predicate agrees with the controlled subject, may be adduced to glean information about the  $\phi$ -featural make-up of this subject. This is illustrated below — the secondary predicate in all these examples is *descalç-* ‘barefoot’ which modifies and  $\phi$ -agrees with the controlled subject:

- (26) a. Quando [nós mulheres]<sub>f(i)</sub> vamos ao centro de meditação,  
 when we women.F.PL go.1PL to.the centre of meditation  
 [nosso diretor]<sub>i</sub> pede ao responsável [para EC<sub>f(i),i+</sub>  
 our director.M.SG asks to.the responsible C  
 assistir-mos ao seminário descalç-os ].  
 assist.INF-1PL to.the seminar barefoot-M.PL  
 ‘When [we women]<sub>f(i)</sub> go to the centre of meditation, [our  
 director]<sub>i</sub> asks the person in charge [for permission <sub>f(i),i+</sub>  
 to attend to the seminar barefoot].’
- b. Quando [nós mulheres]<sub>f(i)</sub> vamos ao centro de meditação,  
 when we women.F.PL go.1PL to.the centre of meditation

[nosso diretor]<sub>i</sub> pede ao responsável [para EC<sub>f(i),\*i+</sub>  
 our director.M.SG asks to.the responsible C  
 assistir-mos ao seminário descalç-as ].  
 assist.INF-1PL to.the seminar barefoot-F.PL  
 ‘When [we women]<sub>f(i)</sub> go to the centre of meditation, [our  
 director]<sub>i</sub> asks the person in charge [for permission EC<sub>f(i),\*i+</sub> to  
 attend to the seminar barefoot].’

The sentence in (26a) has the secondary predicate showing masculine agreement in the control complement. This is compatible with both partial control, where the director asks permission for himself and for the women, and with proxy control, where he asks permission for the women alone, the latter being a case of resolved masculine agreement. The deciding sentence is that in (26b) where the secondary predicate *descalç-* ‘barefoot’ surfaces with feminine agreement. Here, the partial control reading is strictly ruled out: only a proxy control reading, where the director solicits permission for the women alone, is licit.<sup>10</sup>

#### 4.3. Implications of the agreement data

The feminine agreement patterns that go along with the proxy control readings, on the floating quantifier in Italian (24b) and BP (25a) as well as on the secondary predicate in (26b) lead us to two important conclusions. First, since the floating quantifier and secondary predicate reflect the  $\phi$ -features of the controlled subject, it shows that this subject bears feminine  $\phi$ -features. Second, and relatedly, since the features on the quantifier are triggered by agreement, it shows that the proxy control dependency which yielded these features must itself have happened before this agreement took place in order to be able to feed it.

If we assume that  $\phi$ -agreement due to Agree is a narrow-syntactic phenomenon, then proxy control must also happen in narrow syntax before Agree, and if Agree is a post-syntactic PF phenomenon (Bobaljik 2008), then the

<sup>10</sup>In contrast to Italian, the deontic modal in the control complement in BP cannot appear overtly in the above sentences:

- (i) \*Quando nós garot-as<sub>f(i)</sub> vamos a uma viagem da escola, nosso professor pede  
 when we girl-F.PL go.1PL to a trip of school our teacher.M.SG asks  
 ao responsável [para poder-em tomar café tod-as junt-as ].  
 to.the responsible C may.INF-3.PL get.INF coffee all-F.PL together-F.PL

proxy control dependency must have been instantiated earlier at PF or in the narrow syntax. What is clear from these examples, however, is that proxy control cannot be an *exclusively* LF or discourse-pragmatic dependency. In fact, we can be even more specific than that. Given that proxy control clearly *also* has an LF semantic component (given the variable binding involved in the sentences given in section 3.2), we can say that part of the proxy control dependency must be instantiated in the narrow syntax itself.

## 5. Formal analysis of proxy control

Two major syntactically based approaches in the generative tradition to the phenomenon of obligatory control are the movement-based approach of Boeckx et al. (2010) and precedents and the PRO-based one (in the sense of Landau 2015*b* and predecessors thereof). Simplifying greatly, the former claims that OC is the result of thematic A-movement: The controlled subject is an A-copy of the controller. The latter type of analysis, on the other hand, argues that the controller is not internally but externally merged in the matrix clause: The controllee is a distinct null pro-form or ‘PRO’ that stays in situ in the embedded clause and, much like an anaphor (perhaps even exactly like it), is referentially dependent on the controller in the immediately higher clause in some manner (e.g. via Agree).

Having established that the proxy control dependency must be syntactically motivated, we now turn to the question of whether it is more amenable to a treatment under a movement-based or PRO-based approach. To this end, we argue below in section 5.1, that proxy control structures pose a serious challenge to movement based theories of control. On the strength of this, we propose in Section 5.2 that proxy control should be analyzed in terms of mediated logophoric control along the lines of Landau (2015*b*). To capture the dependency of proxy readings with deontic modality, we argue that the perspectival C head that mediates the proxy control dependency in Landau’s system instantiates a species of deontic modal which we label  $\text{Mod}_{\text{deontic}}$ , and conclude the section with sample derivations.

### 5.1. Problems for the movement theory

The major strength of the movement theory of control (MTC) is its theoretical elegance: the thesis that the controller and controllee are simply two links of a

thematic A-chain automatically yields the silence of the controlled element as well as a referential dependence between the two elements.

However, precisely because the controller and controllee are predicted to be identical under such an approach, *non-exhaustive* control dependencies represent a serious challenge (see Landau 2013 for discussion). Simply put, movement of a semantically plural DP from the control complement into the matrix clause cannot make the DP singular, i.e. in the case of partial control,  $\text{Move}(\text{DP}_{i+})$  cannot output  $\text{DP}_i$ . One line of recent alternative analyses proposes that the controlled subject associates with a null comitative PP present in the control complement which in turn licenses the plural/collective interpretation of the controlled subject with plural/collective predicates. The association is proposed to be either the result of adjunction to VP (Hornstein 2003, Ślódowicz 2008, Boeckx et al. 2010, Sheehan 2012, 2014), or of adjunction to the implicit subject to form a Big DP (Rodrigues 2007). Rodrigues (2007)'s analysis involving a null adnominal comitative PP inside the controlled DP is illustrated for the partial control sentence in (27) below:

- (27) The [mob boss]<sub>i</sub> agreed [[<sub>DP</sub> EC<sub>i</sub> [<sub>PP</sub> with ~~[the other mobsters]<sub>j</sub>]]]<sub>i+j</sub> to meet at the hideout as planned].~~

Note that the controller and controllee are still identical in (27), just as desired: i.e. they instantiate an exhaustive control dependency due to A movement. The non-exhaustive reference yielding an effect of partial control is not part of this movement chain at all but is independently contributed by the (posited) presence of the comitative PP inside the controlled DP. This is a clever way to derive partial control under a movement-based approach, in light of the challenges described above (though see Landau 2007 and especially Landau 2016a for a number of arguments against the null comitative approach).

As a null hypothesis, proxy control and partial control should receive the same treatment. However, a null comitative analysis such as that described above will patently fail when extended to the cases of proxy control discussed here. An immediate problem is that proxy control simply cannot be expressed via a comitative relationship — recall again the discussion on the nature of the proxy relation, in section 2.2. But an even more devastating problem is that the individual denoted by the controller need not be a member of the set of individuals denoted by the set of controllees. For the MTC, this would mean that there can be no DP with reference *i* in the control CP that moves to

the matrix clause. Put another way, the reference of the DP that moves has to be  $f(i)$ , and the control relation between the DP and its A-moved copy needs to be  $i \rightarrow f(i)$ . In other words, the tail and head of the A-movement chain have to have different referents, a clear problem. Even if this seemingly insurmountable issue were to be somehow circumvented, the MTC would still have an additional problem: namely if  $i$  and  $f(i)$  do not link to the same DP after all, where would the DP with reference  $f(i)$  move to from the control CP?<sup>11</sup>

The discussion thus far has shown that proxy control structures pose a serious challenge to movement based approaches of control. We will thus reject a movement-based analysis of the proxy control facts in favor of a PRO-based analysis of these constructions, following in particular (Landau 2015*b* and precedents).

## 5.2. Non-exhaustive control as logophoric control

For Landau (2008, 2015*b,a*), exhaustive OC obtains when there is a direct Agree relation between the controller and controllee (= PRO) – yielding a ‘predicative control’ dependency. Non-exhaustive OC, on the other hand, obtains as a kind of *mediated ‘logophoric’ control* (Landau 2015*b*): i.e. it is an Agree relation that is mediated via one (or more) intervening C heads in the control clause. Below, we will adapt Landau’s analysis of logophoric control to yield the proxy control dependencies described thus far. Landau argues that logophoric control involves two chains of Agree dependency: The first involves a variable binding relationship between the controller and a perspectival *pro* variable – denoting the *Author* or *Addressee* of the control predicate – in the specifier of a

<sup>11</sup> An MTC-minded derivation solving this particular problem may look like this: The DP with reference  $f(i)$  starts out as the subject of the embedded clause. It then (sideward-)moves to merge with a P in the matrix clause licensing an oblique role with the meaning of ‘for/on behalf of’. The connection between  $i$  and  $f(i)$  would then occur in the matrix clause because the ‘on behalf of’ PP is associated with the seeker of permission. The PP can then either remain implicit or, as is in fact possible, be pronounced. One major problem exists with such a solution: Unless such a derivation can be sensibly restricted to only these cases of proxy control, opening up the possibility of such a derivation will necessarily lead to massive overgeneration. Basically, it would allow  $i \rightarrow f(i)$  control relations across the board, with any kind of control complement, and with any kind of thematic role, as e.g. a sentence like (i).

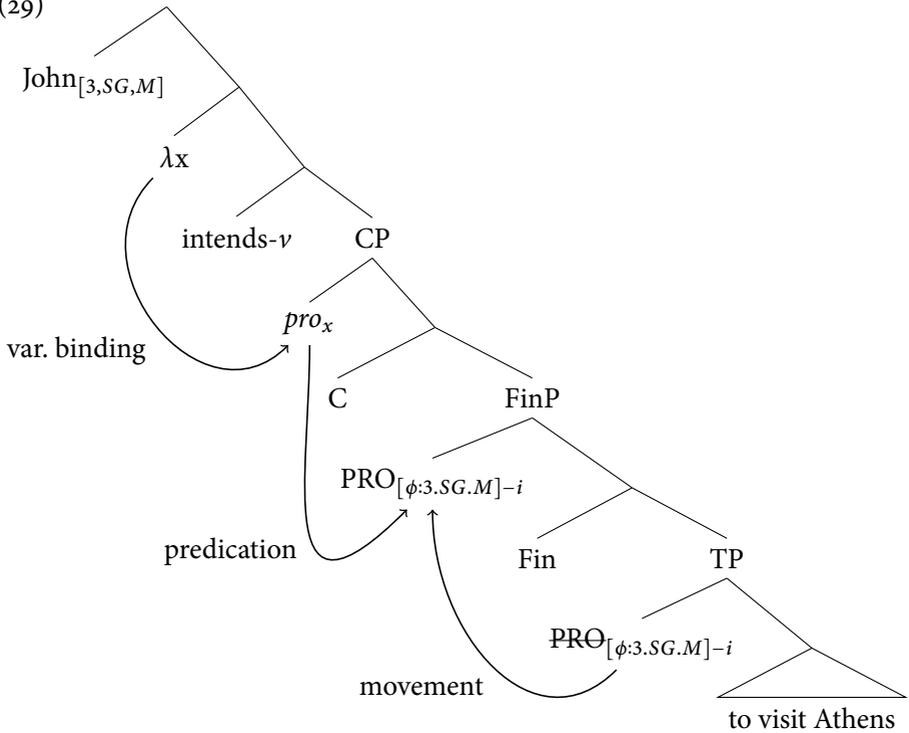
- (i) \*John<sub>i</sub> told the boy<sub>j</sub> on behalf of his friends<sub>k</sub> EC<sub>k</sub> to go home.

logophoric/perspectival complementizer (containing the coordinates of an ‘internal logophoric center’ as in Bianchi 2003 or a ‘perspectival center’ as in Sundaesan 2012) inside the control CP. The second involves a predicational relationship, modelled as Agree, between this variable and a PRO in the complement selected by the perspectival complementizer.

The sentence in (28) below would involve a logophoric control dependency which is thus implemented as in (29):

(28) John intends to visit Athens.

(29)



## 5.3. Deriving proxy control as logophoric control

We now have all our puzzle pieces assembled together. Below, we will offer a preliminary formal analysis of the following core conclusions: (i) Proxy Control is a kind of obligatory control that is derived along the lines of Landau's logophoric control model described above (ii) Proxy Control always and only obtains in the presence of deontic modality in the control complement: Thus, the control predicate must select a CP that encodes information about deontic modality.

The most elegant way to combine the conclusions in (i) and (ii) is to propose the following. Following prior work (cf. Bhatt 2006, Hacquard 2006), we propose that this reading is encoded on a (potentially covert) deontic modal head that lives in a species of C (call it 'Mod') in the left periphery of this CP. This same  $\text{Mod}_{\text{deontic}}$  head is equivalent to Landau (2015*b*)'s logophoric/perspectival C head<sup>12</sup> in that it is the head that mediates the control dependency between the controller DP and the PRO in Spec, TP (see Cinque 1999, Hacquard 2006 for arguments that deontic (necessity and ability) modalities occur above T and Fin).

Consider now a proxy control sentence as in (12b), repeated below:

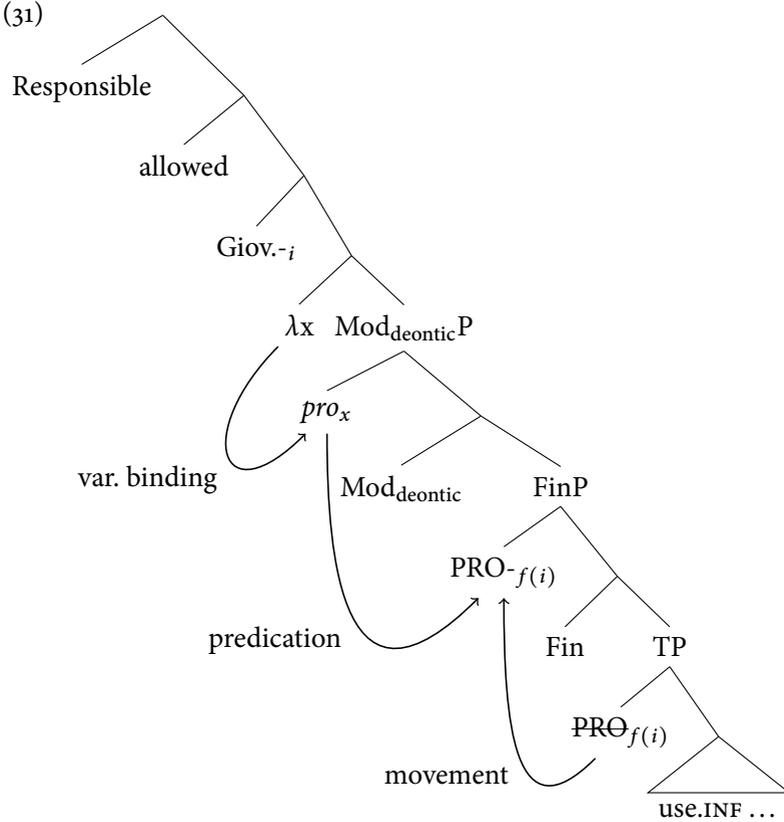
- (30) La responsabile<sub>j</sub> ha permesso a Giovanna<sub>i</sub> [di EC<sub>f(i)</sub> poter  
The responsible has allowed to Giovanna C may.INF  
utilizzare l' aula magna per la visione del film].  
use.INF the lecture hall for the vision of.the film  
'The person in charge allowed Giovanna to use the lecture hall to watch  
a film.'

The derivation for (30) proceeds as follows:  $\text{Mod}_{\text{deontic}}$  encodes the semantics of deontic ability modality (with a contextually determined force): The *pro* operator it selects in its Spec thus always represents the *Addressee* of the permission coordinate associated with  $\text{Mod}_{\text{deontic}}$  (i.e. the (potential) Receiver of permission).<sup>13</sup> The *pro* is now variable bound in the immediately superordinate

<sup>12</sup>To this end, it might make sense to think of  $\text{Mod}_{\text{deontic}}$  as a potentially parametrized instantiation of the Persp head in Sundaesan (2012). We leave this as an open question for the moment.

<sup>13</sup>We may additionally have to assume that the actual modal predicate *poter* in this sentence is either externally or internally merged into Mod. Either way, it is clearly associated with it. We leave this issue open for the present.

clause – with the effect that it is anteceded/controlled by the *Addressee* of permission, namely *Giovanna*. In the complement/controlled clause, the *pro* enters a predicational relationship with the PRO in Spec, FinP in the complement of Mod. By transitivity, this yields an indirect/mediated dependency between PRO and *Giovanna*. The derivation looks like that in (31) below:



We assume, crucially, that it is the presence of the medial Mod<sub>deontic</sub> head in the control complement that makes non-exhaustive control (including the  $i \rightarrow f(i)$  proxy control relation) possible — though we remain agnostic for now about the precise technicalities of its implementation. The idea, simplifying and condensing greatly, is that the C layer is an ‘access point’ for discourse-contextual information (see, for instance, Rizzi 1997, Cinque 1999, Bianchi 2003, Giorgi 2010, a.o.), including information pertaining to different flavors of

modality (see e.g. Ramchand 2012, von Stechow 2006, a.o.). Thus its presence must be assumed in order for non-exhaustive control relations like partial control (which may be formalized as a relation between an individual *i* and a contextually-defined group of individuals properly containing that individual – i.e. *i*+) to be made to work (see also the brief discussion of ‘context extension’ in Landau 2015b: 77, Pearson 2013.<sup>14</sup> Further empirical support for this position is provided by the fact that proxy control in (30) is indeed only possible with the presence of the deontic modal predicate *poter* – though an exhaustive control dependency is possible without it:<sup>15</sup>

- (32) La responsabile<sub>j</sub> ha permesso a Giovanna<sub>i</sub> [di PRO<sub>f(i)</sub>  
 The responsible has allowed to Giovanna C  
 ??/\*(poter) utilizzare l’ aula magna per la visione del film].  
 may.INF use.INF the lecture hall for the vision of.the film  
 ‘The person in charge allowed Giovanna<sub>i</sub> [PRO<sub>f(i)</sub> to use the lecture  
 hall to watch a film].’

## 6. Conclusion and open issues

In this paper, we have provided data from Brazilian Portuguese, German, Italian, and Tamil for a new kind of non-exhaustive obligatory control (OC) that we have termed *proxy control*. Proxy control, we have argued, obtains only in the scope of deontic modality and instantiates a control dependency

<sup>14</sup>Even more recently, Landau argues that the non-exhaustive nature of partial control reference is due to a mismatch between the morphological and semantic  $\phi$ -features on PRO (Landau 2016b).

<sup>15</sup>In fact, also the partial control reading in (i) is impossible without the additional modal *poter* – which is exactly what we predict, given the discussion of the relationship between partial and proxy control dependencies in Section 2.5. Interestingly, too, clitic climbing of the reflexive *-si* from the lexical verb to the modal verb in the control complement is only permitted with the exhaustive reading:

- (i) Il presidente ha permesso al capo reparto [di EC<sub>i+</sub> \*(poter) anche non  
 the president has permitted to.the chief section C may.INF also not  
 riunir-si nel caso in cui dovesse reputar-lo inutile].  
 gather.INF-REFL in.the case in which must.SBJV consider.INF-it useless  
 ‘The president allowed the section chief to also not gather in case he considered it  
 useless.’

between one set of individuals  $i$  and another set of individuals that are discourse-contextually related to it — namely,  $f(i)$ . To this extent, it essentially parallels proxy relations discussed in the realm of anaphora (Jackendoff 1992, Lidz 2004, Reuland & Winter 2009, Reuland 2011), although the nature of possible proxy relations in each is fundamentally different. We have also proposed that the environments in which proxy control occurs are a proper subset of those that license partial control. Such a conclusion then predicts that proxy control instantiates a species of OC rather than NOC, since partial control itself encodes an OC relation (Landau 2013). This prediction is confirmed: Empirical diagnostics involving proxy control structures in Italian and German show that the controller must be a co-dependent of the control clause (i.e. in the immediately superordinate clause) and the controllee must be a bound variable, thus satisfying the two hallmarks of OC constructions crosslinguistically. Turning next to the not unreasonable question of whether proxy control should be entirely implemented in the semantics and/or in discourse pragmatics alone, we answered the question in the negative by providing evidence showing that proxy control dependencies could feed morphosyntactic agreement that was overtly expressed on floating quantifiers and secondary predicates in Brazilian Portuguese and Italian. In the section immediately above, we showed that proxy control poses a serious challenge to the MTC: In particular, a null comitative analysis such as that proposed for partial control structures cannot obviously be extended to the cases of proxy control discussed here, both because the referent denoted by the controller is not contained in the set of individuals denoted by the controllee, and because the proxy relation is not comitative in nature. We have thus proposed that proxy control, like partial control and non-exhaustive control more generally, be treated as an instance of logophoric control via a mediating C head in the sense of Landau (2015*b*,*a*). Specifically, we argue that this intervening C head is a (potentially covert) deontic Mod<sub>deontic</sub> head in the control complement, which is then associated with the modal predicate (silent or overt) in this clause in some way. This then yields the desired dependency between proxy control and deontic modality in the control clause.

Many issues still need to be ironed out; others remain entirely unaddressed. Given that we have reported data on a new grammatical phenomenon, this is to be expected. With respect to the former, it remains to be clarified exactly how the  $\phi$ -features of the controllee in the proxy dependency are formally determined. The possible types of proxy reading available for proxy control structures and the extent to which these are subject to variation crosslinguistically also needs

to be empirically clarified. With respect to the latter, it is entirely unclear at this stage how our proxy reading sentences relate to issues of *de se* and *de re*. For instance, if the actual controller *i* herself does not need to be involved in the actual control scenario, as in the proxy control structures discussed here, what implications do these have for issues of *de se*? And how (if at all) do the differences between proxy control and proxy anaphora, discussed with respect to the Madame Tussaud examples in (6a) vs. (7a) play into this?

Further typological research also needs to be undertaken to nail down the types of predicates that license proxy control readings crosslinguistically. For instance, there is preliminary evidence from German that the availability of a proxy control reading is capable of being restricted not only by the choice of predicate in the selecting clause but also in the controlled constituent itself. This is illustrated in the sentences below — the availability of proxy control is more restricted/marked when the embedded predicate is *hören* ‘hear/listen’ but entirely licit when it is *nutzen* ‘use’.<sup>16</sup>

- (33) a. %Der Student<sub>*i*</sub> bat die Verantwortliche, EC<sub>*f(i)*</sub> den Vortrag  
the student asked the responsible the lecture  
im Neuen Seminargebäude hören zu dürfen.  
in.the new seminar building hear.INF to may.INF  
‘The student asked the person in charge for permission to listen to  
the lecture in the new seminar building.’
- b. Der Student<sub>*i*</sub> bat die Verantwortliche, EC<sub>*f(i)*</sub> den Hörsaal  
the student asked the responsible the lecture-hall  
im Neuen Seminargebäude nutzen zu dürfen.  
in.the new seminar building use.INF to may.INF  
‘The student asked the person in charge for permission to use to  
the lecture-hall in the new seminar building.’

These issues and others are matters of ongoing research.

<sup>16</sup>We thank Hubert Truckenbrodt (p.c.) for bringing this kind of example to our attention. The German author among us agrees with Truckenbrodt on the existence of a contrast but not on its extent and feels, rather, that the contrast between (33a) and (33b) is not that large. More native speakers must clearly be consulted on this point.

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