



# ConSOLE

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## ConSOLE XXXII:

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## Contents

<i>Alia Alatassi</i>	1
The acquisition of French object clitics by 12 children: effects of age of onset	
<i>Núria Bosch</i>	16
The case of Rita: incipient expressive negation in Catalan and Spanish proper nouns	
<i>Lulu Guo</i>	41
Different omission mechanisms in an A-not-A coordination: backward deletion vs. forward ellipsis	
<i>James Morley</i>	60
Chamorro's person-animacy restriction, inertness and dynamic feature gluttony	
<i>Emanuela Li Destri</i>	85
Through sociolinguistic lens: the periphrastic construction “motion verb + a + infinitive” in Italian	
<i>Liam McKnight</i>	108
Commonalities between syntactic and phonological search algorithms: towards a domain neutral formulation of minimal search	
<i>Giacomo Presotto</i>	133
On the morphosyntax of Spanish (object) relative clauses	
<i>Leonardo Russo Cardona</i>	156
Defective voice in Italian tough-constructions	
<i>Zeqi Zhao</i>	181
A new perspective to mei-dou puzzle in Mandarin	
<i>Timea Szarvas</i>	195
On reconstruction in German ATB movement and the optimization of experimental designs	
<i>Felicitas Andermann</i>	213
Inverse marking as morphological movement: the case of Potawatomi	
<i>Gautam Ottur</i>	234
Linear asymmetries and the syntax of serialization: against an antisymmetric approach	

<i>Nikola Moore</i>	248
More misery is coming: negative concord (not) as a form of agree in West Slavic	
<i>Basita Biswas &amp; Moumita Mukherjee</i>	261
Processing of pseudo-affixes in words and on-words: a study on Bangla prefixes	
<i>Khairul Mondal &amp; Moumita Mukherjee</i>	273
Redefining basic orthographic syllable structures (BOSS) in an akshara-based orthography: evidence from two experiments in Bangla	

# The acquisition of French object clitics by L2 children: The effects of onset

Alia Alatassi

This study seeks to investigate how the differences in age of acquisition (AoA) for sequential learners affect the acquisition of French object clitics. To answer this question, 16 anglophone children were tested, who are second language (L2) French learners (8-11 years old, mean age 9-year-old). Participants are enrolled in immersion schools in the Greater Toronto Area (Peel, North York and Milton). Results for the elicited production task show that the production of object clitics is even lower in our group when compared to the sequential and simultaneous bilinguals in Strik et al. (2015).

## 1. Introduction

This study seeks to investigate the effects of age of onset (i.e. age of first exposure) on the acquisition of French by comparing children learning a second language (L2) with different age of onset (AO). Specifically, it wishes to address how the differences in age of acquisition (AoA) among sequential learners affect the acquisition of French object clitics. Additionally, it aims to determine whether those children have a knowledge of the position of the clitics as well as of verb movement in French. To answer these questions, 16 L2 French learners (aged 8-11 years, mean age 9-year-old) were tested with English as the majority language. Children are enrolled in French immersion schools in the Greater Toronto Area. Time of exposure to French varies between 2-6 years.

To address the first research question, an elicited production task, based on Strik et al. (2015), was used with children who have been exposed to French starting at age 6 in the French immersion system, with English as their main language. For the second research question, a preference task involving both strong pronouns and pronominal clitics was used. Results for the elicited production task show that the production of object clitics in the assessed group is even lower compared to the sequential and simultaneous bilinguals in Strik et al. (2015). As for the preference task, results indicate that participants respond at chance with respect to the correct position of the pronominals ( $P > .05$ ,  $p = .523$ ;  $t = -.655$ ).

## 2. Syntactic analysis of French object clitics

This study focuses on the acquisition of object clitics, which is a category of words that has proven to be challenging for second language learners (Paradis 2004). Object clitics, such as *le*

and *la*, replace direct objects and are placed before the verb. In the sentence *Elle le boit* ‘She is drinking it.ACC.MASC.SG’, *le* replaces *le lait* (‘the milk’).

Contrary to strong pronoun *it*, object clitic represents a deficient element since it cannot appear in surface argument position, be modified, or be coordinated (Cardinaletti & Straka 1999). In fact, Roberts (2010) proposes that it lacks the nP lexical phase since it represents  $\phi$ <sup>min/max</sup> rather than D<sup>min/max</sup>. Moreover, it is suggested that the movement of clitic in minimal head v\* is motivated by the lack of distinction between the verb and clitic in terms of  $\phi$ -features (active and transitive). As a result, the clitic can adjoin to v\* and form a minimal head in Romance languages.

Since direct object pronouns in English behave like DP, their cliticization toward (v\*) is not possible. Therefore, the acquisition of French object clitics for anglophone children represents a challenge. It involves acquiring two aspects: first, there is a need to learn how to place a weak category that resembles a definite article (*le, la*) in preverbal position (non-base position), second, they are required to use the correct clitic in terms of gender and number (Agree domain). The object clitic *le* is used to replace singular masculine DPs, while *la* is used to replace singular feminine DPs.

### 3. Previous studies

#### 3.1 The effect of age on second language acquisition

The Critical Period Hypothesis (CPH) (Lenneberg 1967) suggests that there is a negative correlation between AO<sup>1</sup> and nativelike acquisition. While some empirical studies have confirmed this hypothesis (Asher & Garcia 1969; Johnson & Newport 1989; Munro & Mann 2005), others have demonstrated that nativelike acquisition is possible after the age of 16 (Birdsong & Molis 2001). There is a disagreement, therefore, about defining the window of opportunity for achieving nativelike acquisition. According to Meisel (2008; 2010; 2011), child L2 acquisition starts when first exposure to the L2 occurs between age 4 and 7/8, whereas first exposure below age 3 corresponds to simultaneous bilingual acquisition.

Weber-Fox & Neville (1995) test 61 adult English bilinguals who were exposed to English at different stages of development, namely, 1-3; 4-6; 7-10; 11-13; and after 16 years of age. Event-related brain potentials (ERP) and behavioural responses were recorded as participants read sentences that included semantic anomalies and three types of syntactic violations. While semantic anomalies showed similar brain responses in early and late bilinguals, syntactic violations demonstrated more distributed patterns in late bilinguals.

At the same time, recent experimental studies show that the effect of AoA is selective, depending on the domain. While there is a positive correlation between age and performance on lexical tasks, age could have a negative correlation on morphosyntax. Marinis & Chondrogianni (2010) report a positive correlation between AO and performance on a standardized lexical task in English for Turkish/English bilinguals (mean age 7;8, AO 2;6-5). The authors believe that cognitive maturity improves vocabulary development. Unsworth et al. (2014) examine the effect of AO on gender marking by comparing English/Greek and English/Dutch bilinguals. They compare early L2 learners who acquired L2 before age 4 and late L2 learners who acquired L2 after age 4. While AoA had some role for both simultaneous and successive bilinguals learning Greek, it did not for those learning Dutch. The authors

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<sup>1</sup> Age of onset (AO) and Age of Acquisition (AoA) represents the age when child was first exposed to L2.

explain this by the late acquisition of Dutch gender marking for monolingual children. In other words, the group difference is related to the properties of Greek, rather than to age of onset. Therefore, effect of AO could not be generalized across all language domains or languages.

### 3.2 *Effect of age on learning object clitic*

Recent empirical studies indicate that age of onset of an L2 after age 4 leads to differences compared to both monolingual and bilingual simultaneous acquisition (Herschensohn 2000; Schwartz 2004). Veríssimo et al. (2018) demonstrate that AoA has a stronger effect on grammatical inflection than on derivational priming. Specifically, when language acquisition started after age 5, priming from inflected forms started to weaken and be less nativelike. This could explain why, in contrast to lexical categories, the acquisition of functional categories, such as French object clitics, can be problematic for both monolingual first language learners (Jakubowicz & Rigaut 2000) and second language learners (White 1996). These categories are deficient at the semantic level, as they fulfil grammatical functions.

For bilingual children who are simultaneously exposed to two languages from birth, there is a consensus that they go through similar developmental stages as monolingual children acquiring the same languages, and they can attain native competence in each of their languages, given sufficient exposure. Interaction between the two languages occurs but is restricted (Meisel 1989; De Houwer 1990; Paradis & Genesee 1996). Rothweiler (2006) examines the course of development of three Turkish children acquiring German as L2 (AoA 2;10-4;5). The study demonstrates that these children can distinguish between first language (L1) and L2 in terms of word order. While Turkish and German both follow a subject-object-verb order (SOV) in subordinate clauses, word order differs in declarative main clauses. German follows a V2<sup>2</sup> word order where the conjugated verb has to occupy the second slot relative to the subject and object resulting in either SVO or OVS orders. Turkish maintains the SOV word order in both declarative main and subordinate clauses. The study demonstrates that bilingual children who are exposed to two languages simultaneously at an early stage are able to treat them as two distinct systems in terms of morphosyntax.

White (1996) examined two anglophone children (average chronological age of 5) who were exposed to French as a second language in a French daycare in Montreal for a period of 20 months. Data from spontaneous production indicate instances of clitic omission or clitic drop. The author concluded that the acquisition of direct object clitic is similar for L1 and L2 children at age 5. When children start using anaphoric object pronouns after acquiring subject pronouns, their use does not reflect major errors in terms of form and position. This demonstrates L2 children who are exposed to French at an early stage, before age 6, interpret object pronouns as clitics at an early stage of their acquisition.

Prévost (2006) uses the data from White (1996) to analyse the licit and illicit omission of object clitics in French.<sup>3</sup> The spontaneous production data show that cases of illicit and licit null objects decrease after 20 months of exposure for both children. This coincides with producing object clitics correctly, and conjugating verbs properly (the end of root infinitive

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<sup>2</sup> In German, the conjugated verb follows the second slot (V2) word order in declarative main clauses. The conjugated verb needs to be placed in the second slot in the sentence relative to subject and verb.

<sup>3</sup> Contrary to English, French permits null object structures that could be recovered through either a DP or a clitic. This is possible only if the object is previously mentioned in the discourse through a declarative clause or a question (Cummins & Roberge 2005).

period) (Prévost 1997). Prévost (2006) relates clitic drop to computational complexity that requires children to place direct object clitic in a preverbal position.

An elicited production task was used by Grüter & Crago (2011) and Strik et al. (2015) to examine L2 acquisition of French object clitics. Grüter & Crago (2011) examine the effect of L1 transfer in child L2 learners of French by comparing Spanish-speaking and Chinese-speaking children. Spanish learners omitted clitics less frequently (6.2%) in comparison to Chinese-speaking children (43.7%) and produced more clitics (68.6% versus 42.3%). Despite the similarities between the two groups in terms of age (8) and length of exposure to French (2;11-3;1), Spanish-speaking children performed better in the elicited production task. This confirms the positive role of transfer from L1 Spanish to L2 French in the acquisition of direct object clitics. Strik et al. (2015) divided L2 children based on their nature of exposure. Sequential bilinguals were exposed to French after English at age 4, while simultaneous bilinguals were exposed to English and French at the same time at age 3 (mean age 3-5). The dominant response for both groups was null object at 60%.

Granfeldt & Schlyter (2004) compare the acquisition of Swedish-speaking adults learning French as second language with that of bilingual children (French-Swedish) aged 2-4 years. While spontaneous production confirms that children possess the capacity to use object pronouns correctly starting at age 2, data suggests that adults go through learning stages where they use strong pronouns in postverbal position, as illustrated in (1) and (2):

(1) Il dit lui. (1;5 months of learning)  
'He says him'

(2) Je veux manger toi  
'I want eat you' (Granfeldt & Schlyter 2004:(354))

Then, they used object clitics in the postverbal position and finally they use the correct object clitic in preverbal position (3) and (4)

(3) Je peux le faire. (2,10 months of learning)  
'I can it do'

(4) J'ai... j'ai le vu.  
'I have... I have it seen' (Granfeldt & Schlyter 2004:(355))

In sum, previous studies show that the most frequent error among L2 preschool children (age 3-5) is the omission of the pronominal object clitic, while errors in the placement or the form of the object clitic are relatively rare among them but represent a stage of learning among L2 adults (White 1996; Granfeldt & Schlyter 2004; Paradis 2004; Grüter 2005; Hawkins 2009). As a result, it becomes important to determine the steps of acquisition of L2 children who start learning French at 6. Would they commit an omission error similar to preschool children or a placement error similar to L2 adults? In an attempt to investigate the effects of age of onset, it is essential to compare L2 children of different age of onset and to investigate other means to test children's knowledge. This is because previous research is almost exclusively based on the



study of production (either elicited or spontaneous), comparing L2 children to monolinguals, simultaneous bilinguals, or adults.

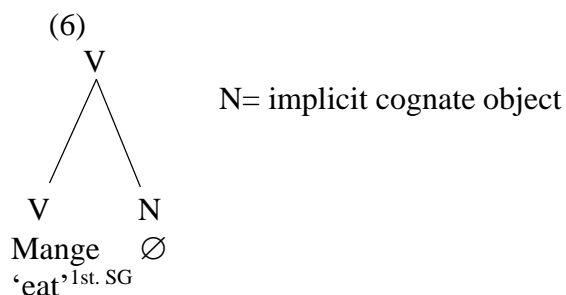
### 3.3. Object omission in child L2 French

Previous studies assign different justifications for clitic drop (the null object structure) in child L2 French (5).

- (5) Il mange  $\emptyset$ .  
 ‘He is eating  $\emptyset$ .’

Prévost (2006) proposes processing capacity limitation as a justification for the null object structure. In other words, placing the direct object clitic in a preverbal position represents a costly computational operation for children. As children’s cognitive capacities mature after 20 months of exposure, they will produce direct object clitic in the correct position.

According to Pérez-Leroux et al. (2008), children’s object omission is not a result of processing limitation. Rather, it represents an overgeneralization of implicit object to referential use based on Universal Grammar (UG), as shown in the VP structure in (6), where N is an implicit cognate object.<sup>4</sup> In other words, children go through stages, as explained in (7), to acquire direct object clitics in French. Stage I (7a) involves producing broad semantic range and referential properties. In this stage, learners produce a referential null direct object or a clitic. As children are exposed to input, they will learn the proper characterization of s-selection for a given verb. At this stage, they will be able to distinguish between a clitic context and a null object context (7b).



S-selection →

(Pérez-Leroux et al. 2008:385)

- (7)
- a. Stage I:
- V N
- V N<sub>i</sub>
- Clitic or pronoun acquisition (early)*
- b. Stage II:

<sup>4</sup> According to Cummins & Roberge (2005), transitivity in VP is a syntactic property that contains an object position that could be expressed or not. When not expressed, transitivity is expressed through a null object in VP.

V N

Cl V *pro*<sub>i</sub>*Contextual experience blocks the null object N<sub>i</sub>*

(Pérez-Leroux et al. 2008:386)

Grüter & Crago (2011) conclude that object clitic omission in child L2 French is related only to language production and cannot be attributed to referential null objects in the learners' interlanguage grammar (UG). The authors use a psycholinguistic model of syntactic encoding, inspired by Ferreira (2000), to assert that omission results from an asymmetry between the receptive capacity of the child that rejects referential null objects, and the production capacity that continues to omit object clitics. Furthermore, the study relates production deficiency to a limitation in working memory. In sum, object omission in child L2 French could be either explained as the initial state of UG or a production problem that could not be related to the underlying grammar of the child.

#### 4. Current study

This study wishes to investigate the effect of age on the acquisition of French object clitics by comparing children who start learning French at 6 years old (point C in Figure 1) with those who start learning French at daycare at the age of 4 (point B) analyzed by Strik et al. (2015). As previous studies focused mainly on L2 acquisition at the preschool age (between 3-5), there is a need to investigate the effect of age on the acquisition of functional categories after age 5, which represents the point where grammatical inflection starts to weaken (Veríssimo et al. 2018). This study investigates whether children's acquisition at this point (point C) resembles that of preschool children (point B) or adults (point D) in terms of the error.

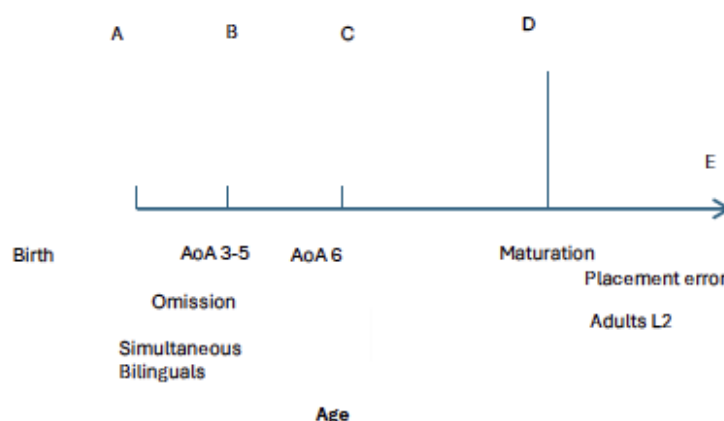


Figure 1 Research questions

#### 4.1 L2 acquisition during late childhood

It is important to investigate L2 acquisition starting at age 6 because this group of children is at a disadvantage in terms of AoA and length of exposure. In comparison to early L2 children (AoA 3-4), late learners who start learning L2 French at age 6, have a weaker morphosyntax competence (Veríssimo et al. 2018). In addition, late-learners-children receive a shorter period of cumulative exposure in comparison to adult learners. In other words, children at point C of Figure 1 are at a disadvantage compared to early-learners-children at point B and adults who are placed at point D on the age continuum.

The first research question addresses differences in the AoA of sequential learners with respect to the acquisition of French object clitics.

RQ 1: How do children who are exposed to L2 French at age 6 differ from those who are exposed to L2 French between the ages of 3-5?

To answer this question, I use the same elicited production task as Striket al. (2015) but with children who have been exposed to French starting at age 6 in the French immersion system, with English as their first language.

The second research question pertains to whether these children have a knowledge of the grammatical position of the clitic as well as of verb movement in French.

RQ 2: Do late learners of L2 French have the knowledge of the grammatical position of the clitic as well as verb movement in French?

As explained earlier, in French, object clitics maintain a preverbal position as they are weak and do not have the same status as a DP. In contrast, object pronouns in English maintain a surface position after the verb. French has strong V-features that allow the verb to move to the left of *pas* in negation in order to verify the agreement and the tense in inflection phrase (IP): *les filles (ne) prennent pas les bonbons*. Conversely, features are weak in English. As a result, the verb movement takes place in *Logical Form* and it is, therefore covert: ('girls are **not** taking the candies'). Therefore, negation affects word order in French but not in English (Prévost & Paradis 2004).

If children are unable to distinguish between English and French in terms of clitic and verb placement, it means that their initial state of acquisition of object clitics remains English. Therefore, L1 transfer might occur while acquiring French. They will place the clitic in a postverbal position. Based on (Veríssimo et al. 2018):

H1: L2 children (AoA 6 years) will have an acquisition of French object clitics that is similar to L2 adults. Therefore, they will produce object clitics in a postverbal position in the elicited production task.

H2: L2 children (AoA 6 years) do not have the knowledge of the grammatical position of the French object clitics relative to the verb as they have an acquisition that is similar to L2 adults (Granfeldt & Schlyter 2004).

#### 4.2. Methodology

##### 4.2.1. Participants

I tested 18 anglophone (average age 9 years) children registered in French immersion schools in Greater Toronto Area (Mississauga, North York, and Milton), as shown in Table 1. The age

of onset for all participants was 6 years, as they started being exposed to French as L2 in first grade. Data were analyzed for 16 children only, as two participants had to be excluded due to insufficient responses. While all children are registered in a French immersion program, they vary in terms of the quantity of input received at school. Participants in the Milton and Peel school boards receive their education in French 50% of the time, while those in North York receive all their schooling in French. Participants were recruited via a flyer and word of mouth and were tested in both the elicitation and preference tasks following the consent of their caregivers.

	L2 Participants N=16 Mean age (SD) Age range
Mean age when tested in years	9;0 (0;9) 8-11
Length of exposure in years	3;0 (1;1) 2-6
Age of onset in years	5;8(0;6) 3;5-6

Table 1 Participants

### 4.3. Tasks

#### 4.3.1. Elicitation task

To verify the first hypothesis, participants were tested with an elicitation task adapted from Strik et al. (2015). This task assessed children's capacity to produce the object clitic (*le, la*), by presenting them with a question like *Qu'est ce que la tortue fait avec le lait?* ('What is the turtle doing with the milk') and a corresponding image. Children had to answer the question by using the appropriate pronoun. The task was composed of eight transitive verbs, such as *manger* ('to eat'), *boire* ('to drink'), *couper* ('to cut'), *lire* ('to read'), *frapper* ('to hit'), *pousser* ('to push'), *chatouiller* ('to tickle') and *lecher* ('to lick'). The stimuli were divided between animate and inanimate objects, 4 masculine and 4 feminine. Additionally, three distractor items were included for a total of 11 items. An example of an item with an inanimate object is presented in (8) and Figure 2.

(8) *Qu'est-ce que la tortue fait avec le lait?* 'TRANSLATION'

- Target Response : *Elle le boit.* 'She it drinks.'
- DP Response: *Elle boit le lait.* 'She drinks the milk.'
- Null Object Response: \**Elle boit.* 'She drinks.'

(Strik et al. 2015)



Figure 2 Example of a stimulus with an inanimate object (Strik et al. 2015)

#### 4.3.2. Grammatical preference task

To verify the transfer hypothesis from English (L1) to French (L2) a grammatical preference task was used. The grammatical preference task intends to verify children's syntactic knowledge through a binary choice (i.e. grammatical or \*ungrammatical) (McDaniel et al. 1996). The first part of the task tests the children's capacity to distinguish between French and English with respect to the position of the verb with negation. I used four transitive verbs: *pousser* ('to push'), *frapper* ('to hit'), *manger* ('to eat') and *lire* ('to read') with animate objects and inanimate objects in masculine and feminine. The task included one practice item and one distractor for a total of 6 items. An example is shown in example 9 and Figure 3.

(9) Examiner: *Le garçon est fâché contre son chien, mais il ne veut pas lui faire du mal.*  
*Est-ce-qu'on dit?*

Examiner: 'The boy is angry with his dog, but he does not want to hurt him.'

'What would we say?'

- a. \**Le garçon ne pas frappe son chien.* (\*The verb is not raised) 'The boy does not hit the dog.'
- or
- b. *Le garçon ne frappe pas son chien.* (Target Response) (The verb is raised before *pas*) 'The boy does not hit the dog.'



Figure 3 Inanimate masculine object

The second part of this task verifies the transfer from English to French with respect to the position of object clitic. Choosing a postverbal position instead of the target preverbal position confirms a transfer from L1 English to L2 French. I included four transitive verbs: *chatouiller* ('to tickle'), *lécher* ('to lick'), *frapper* ('to hit') and *pousser* ('to push') with animate and inanimate objects masculine and feminine. Based on Granfeldt & Schlyter (2004) where adults second language learners of French use strong pronouns, both strong and clitic pronouns have been included. I incorporated five questions with an element of distraction, two questions with object clitics and two with strong pronouns. Examples 10 and Figure 4 illustrate the preference task with a masculine animate object and the strong pronoun *lui*.

(10) Examiner: *Le garçon voulait jouer avec son père, pour le faire rire.*  
*Est-ce qu'on dit?*

Examiner: 'The boy wanted to play with his father to make him laugh.'  
 'What would we say?'

- a. *Le garçon le chatouille.* (Target Response) 'The boy him tickles' (Clitic pronoun)  
or
- b. \**Le garçon chatouille lui.* 'The boy tickles him' (Strong pronoun)



Figure 4 Masculine animate object, strong pronoun

#### 4.2.3 Results

Table 2 presents the result for the elicited production task from this study (first line) in comparison to results from same task from Strik et al. (2015). The first line shows that the production of object clitics in this study is significantly lower (3%) compared to that of sequential (12%) and simultaneous bilinguals (20%) in Strik et al. (2015). The table demonstrates that the dominant response was DP (65%), followed by null objects (27%), other responses<sup>5</sup> (13%), clitics (3%) and strong pronouns (2%).

<sup>5</sup>Other included responses in English and "I don't know".

	CL	DP	Null	Strong pronoun	Other
French L2 this study (AoA 6)	3	65	17	2	13
Sequential bilinguals (AoA 3-5) (L2) (Strik et al. 2015)	12	20	56	N/A	12
Simultaneous bilinguals (AoA 3-5) (Strik et al. 2015)	20	12	61	N/A	8

Table 2 Results of this study compared to results from Strik et al. (2015) in percentages

In fact, when examining individual responses from children, only two participants produce object clitics. Those two children do not present any commonality in terms of age, language experience or school. The overall preferred response among the participants is lexical DP, *le frère*, ('the brother') instead of *le* in (11).

- (11) La fille pousse le frère.  
'The girl pushes the brother.'

(Elicited Production Task, participant 3)

In terms of verbal responses, out of 101 verbs, 27.4% were verbs in infinitive form, with less than half of these being Root Infinitives). There is no correlation between the use of verbal infinitive forms and either age or experience in French. Results from the preference task show that participants respond at chance with respect to the correct position of the pronominals ( $P > .05$ ,  $p = .523$ ;  $t = -.655$ ). This indicates that their responses do not reflect comprehension of the noncanonical position of object clitics. In addition, this confirms that they do not possess a comprehension of direct object clitics in their underlying grammar.

However, participants seem to demonstrate a better comprehension of verb movement with negation, achieving an average of 72% correct responses (Table 3). A non-parametric Wilcoxon test<sup>6</sup> confirms that the difference between the average of the two tests is statistically significant ( $P < .05$ ,  $p = .032$ ;  $Z = -2.146$ ). Individual analysis shows that participants who performed above chance had received more exposure to French at both school and home, as well as longer overall exposure. In general, the results show that these children did not yet/fully acquire the syntax of object clitic placement while they were on their way of acquiring the properties of verb movement in French.

	Correct responses	Incorrect responses
Pronominal placement	44%	56%
Verb movement	72%	28%

Table 3 Results of the preference task (percentages)

<sup>6</sup> Shapiro Wilk test demonstrates that the average correct responses of preference task was not normally distributed. As a result, we used a non-parametric test.

## 5. Discussion

While previous studies reports that bilingual and L2 children (AoA 3-5) omits object clitics (Strik et al. 2015) and L2 adults produce position error and strong pronouns (Granfeldt & Schlyter 2004), DP responses indicate that L2 children (AoA 6) do not possess the capacity to use pronouns to replace DP. This confirms that exposure to L2 before age 5 has a positive effect on grammatical acquisition (Veríssimo et al. 2018), despite the longer time of exposure for late learners. In fact, children with AoA of 6 years have a length of exposure of three years, while children with AoA between 3-5 years have a length of exposure of nine months. Nevertheless, individual analyses indicate that the amount of input in school and or home could compensate for late AoA for some participants. In other words, the effect of AoA is constrained by grammatical domain and by linguistic environment, namely the quantity of input.

Given that late L2 learners are still using DP when asked to produce object clitic and are unable to distinguish between English and French in terms of the noncanonical position of the object clitic: S-clitic object-V, it is safe to conclude they are using their L1 during their acquisition of this functional category. This is contrary to early learners of French and monolinguals, who start their acquisition of French object clitics with null object phase. Nevertheless, DP production could be a strategy of response to the elicitation context in all learners, as reported by Scheindes et al. (2021).<sup>7</sup>

As a result, this paper proposes that patterns of acquisition of object clitics among late learners of French (AoA 6) are distinct in comparison to those of early learners of French and adult learners. As L1 English represents the initial state of L2 acquisition they are unable to recognize the existence of a category that resembles definite article *le, la*. In addition, they are unable to recognize that this category is placed before the verb, contrary to the SVO structure of English. They may require longer exposure to French in school to complete the acquisition of French object clitic.

### 5.1 Source of functional categories for L2-late learners of French

Following Grondin & White (1995), this paper argues that L2-late learners of French, who start acquiring the language at age 6 in a non-francophone environment, have access to the syntactic domains of DP and IP, as reflected by the DP responses and the conjugated verbs. Nevertheless, they are on their way to acquire the CP domain, which represents functional projections, such as direct object clitics (Prévost & Paradis 2004)<sup>8</sup>. Their comprehension of verb movement in French, in addition to their production of subject clitics *il* reported in (12), demonstrates that they have some knowledge of functional categories in French. Nevertheless, their knowledge of functional categories in French is still at the beginner stage since they are unable to pronominalize DP to produce target response, as shown in (13). In addition, they do not have syntactic knowledge of clitic grammatical position. In other words, L2 late learners of French

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<sup>7</sup> When comparing typically developing French-speaking L2 children and monolingual French-speaking children with specific language impairment, Scheindes et al. (2021) reported that DP was a common response in the elicitation task, but not in spontaneous production. Nevertheless, DP did not represent a dominant response in their study.

<sup>8</sup> In generative models of grammar, sentence structure consists of lexical and functional categories. Lexical category projection NP and VP are associated with nouns and thematic verbs, and functional categories are associated with a complementizer phrase (CP), verbal inflections (inflection phrase, IP) and determiners (determiners phrase, DP).



have limited access to functional categories in French that will quantitatively improve over time through extended exposure (White 1996), as shown by individual analysis to produce the target structure of direct object clitics.

- (12) Il                      boit                      le lait.  
 He<sub>NOM.MASC.SG</sub> drinks<sub>3RD.SG</sub> the milk<sub>DP</sub>.  
 ‘He drinks the milk.’

(Elicitation Task, Participant 9)

- (13) Il                      le                      boit  
 He<sub>NOM.MASC.SG</sub> it<sub>ACC.MASC.SG</sub> drinks<sub>3RD.SING</sub>.  
 ‘He drinks it.’

(Target Response)

De Cat (2020) recognizes that bilingual children aged 5-7 need to be exposed to 32-35 months to a given language to perform like monolinguals in terms of morphosyntax. This conclusion is based on a sentence repetition task, as taken from Marinis & Armon-Lotem (2015). De Cat’s advanced statistical model will guide my next research project. I aim to determine the threshold of exposure needed for late learners of L2 French to perform like native speakers or early L2 learners in terms of producing direct object clitics in French.

## 6. Conclusion

This study tested 16 late learners of L2 French (aged 8-11, Mean<sub>age</sub> = 9) with English as the majority language, in immersion schools in the Greater Toronto Area, to analyse the effects of AoA on the production of French object clitics. Results show that late learners of L2 French differ from both adults and early learners in terms of their acquisition of French object clitics. Longer periods of exposure might be needed in order to learn (1) how to replace DP with the proper pronoun and (2) the proper placement of French object clitics.

I recognize that the analysis is limited given the small sample. Additionally, the elicitation task might have been challenging to understand for L2 learners. Scheidnes et al. (2021) advance that DP responses instead of clitics in the elicitation task represent a strategy of avoidance for some L2 learners. Further research is needed to better understand the effect of age on acquisition on second language acquisition of morphosyntax in late learners of French, while also accounting for the role of the linguistic environment, particularly the quantity and quality of input.

## Abbreviations

1 <sup>st</sup>	First person	L1	First Language
3 <sup>rd</sup>	Third Person	L2	Second Language
ACC	Accusative Case	MASC	Masculine
AoA	Age of Acquisition	NOM	Nominative Case
AO	Age of Onset	NP	Nominative Phrase
CP	Complementizer Phrase	S	Subject
DP	Determiner Phrase	SG	Singular
IP	Inflection Phrase	O	Object
		V	Verb

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## The case of Rita

### Incipient expressive negation in Catalan and Spanish proper nouns

Núria Bosch

This paper introduces a previously undescribed phenomenon in Catalan and Spanish: several proper nouns and person-referring DPs appear to have grammaticalised into negative indefinites with expressive functions (here, *Expressive Pseudo (Negative) Indefinites*, EPIs). I centre on *Rita*, the proper noun which most prototypically allows these readings. I summarise *Rita*'s syntactic distribution and compare it to Negative Concord Items, Polarity Items and squatives. I show that *Rita*, like other EPIs, patterns as a syntactic class of its own and conclude that EPIs' merit further scrutiny. I finish with some implications for the typology and diachrony of expressive language and negative indefinites.

#### 1. Introduction

This paper describes a colloquial and widespread use of (a limited set of) proper nouns and person-referring expressions in Catalan and Spanish, with particular focus on the proper noun *Rita*. The main observation at stake is the phenomenon whereby some (proper) nouns can function as apparent negative indefinites, with expressive, speaker-attitude-oriented functions. The basic pattern is outlined in (1).<sup>1</sup>

- (1) a. *Això s'ho creurà Rita.* [Catalan]  
this CL.REFL=CL.DO= believe.FUT.3SG EPI  
'Nobody is going to believe this / There's no way I'm going to believe this.' (lit. 'Rita is going to believe this').

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<sup>1</sup> The judgements presented in this paper are from Central Catalan and Peninsular Spanish varieties, including, primarily, my own judgements, supplemented by consultation with other native speakers. Whenever examples/translations for the two languages are provided together separated by a slash, the Catalan item/expression is provided first, followed by the Spanish one. Finally, when *Rita* and other proper nouns are intended as negative-indefinite-like elements in the examples provided, they will be glossed as EPI, to indicate that they are not intended as (literal) proper nouns.

- b. *Esto se lo va a creer Rita.* [Spanish]  
 this CL.REFL= CL.DO= go.3SG to believe.INF EPI  
 ‘Nobody is going to believe this / There’s no way I’m going to believe this.’ (lit. ‘Rita is going to believe this’).

For brevity, I will refer to these person-referring nouns/DPs behaving (partly) like negative indefinites as *Expressive Pseudo (Negative) Indefinites* (or EPIs, for short). However, I will not commit to a specific formal analysis of them here. Henceforth, too, when the EPI *Rita* is being discussed, it will be written in block capitals as *RITA*, to signal it is not being used as a proper noun.

In this paper, I introduce the patterning of these thus-far undiscussed EPIs, centering on *RITA*, one of the most frequently used EPI in these languages. Section 2 begins by describing this novel empirical phenomenon and compares the behaviour of *RITA* to already-existing categories of negation/polarity items; namely, Negative Concord Items, Polarity Items and squatives. I show that *RITA* only partly overlaps with these existing categories, constituting a class of its own whose patterning is nonetheless constrained. Data from other EPIs beyond *RITA* – such as *ta mare/ta madre* ‘your mother’, *Déu/Dios* ‘God’ – is also provided, demonstrating that *RITA*-type expressions are a broader phenomenon. EPIs are shown to display inter-item variation in degrees of grammaticalisation, with *RITA* being more advanced than other EPIs in the varieties of Catalan and Spanish studied here. I summarise the data presented in section 3 and conclude that EPIs’ *sui generis*, yet systematic, distribution merits further scrutiny.

Taboo words and common nouns more broadly are well-studied as sources of expressive (grammaticalised) forms of negation (see, e.g., Horn 2001, and many sources since). However, literature on *proper nouns* and *person-referring* expressions similarly undergoing polarity- or negation-oriented grammaticalisation is, to the best of my knowledge, almost non-existent (though proper nouns are known to take on expressive, quasi-pronominal uses; see, e.g., Collins & Postal 2012, and subsequent work, and Song et al. 2023). The overall contribution of this paper is thus an empirical and descriptive one: to provide one such case study of *proper nouns* resembling (expressive) negative indefinites. Section 4 also offers a comparison with other crosslinguistic constructions that resemble Catalan and Spanish EPIs. Section 5 concludes.

## 2. Describing *Rita*: the data

In this section, I describe the syntactic distribution of EPIs. I begin by outlining the basic characteristics of the phenomenon, including, but not limited to, *RITA*. Subsequently, I restrict the focus to *RITA* only, as the most prototypical and widely used EPI: I compare the syntactic behaviour of *RITA* in some varieties of Catalan and Spanish to existing polarity/negation categories, namely Negative Concord Items (NCIs), Polarity Items (PIs) and squatives. At the end, I come back to other proper nouns and DPs that display similar behaviour to *RITA* and point out some of their distributional differences.

## 2.1. General observations

The phenomenon in this paper is outlined below. Broadly, we can observe that proper nouns and person-referring DPs, such as *Rita* or Cat. *ta mare* ‘your mother’ (a colloquial, contracted form of *la teva mare*, ‘the.FEM your.FEM mother’), appear to receive a similar interpretation to negative indefinites like *nobody*. These items are generally used in main-clause contexts (2), often accompanied by the sentential negator and the Negative Concord Item *ni* (‘not’ even). More rarely, they can also be embedded (see 13 and 18 below).

- (2) a. *Si segueixen així, aprovarà Rita.* [Catalan]  
 if continue.3PL like.this pass.FUT.3SG EPI  
 ‘If they continue like this, nobody will pass (the exam) / they won’t pass the exam.’
- b. *Pues vendrà el Papa de Roma a arreglar* [Spanish]  
 well come.FUT.3SG the Pope of Rome to fix.INF  
*las cosas.*  
 the things  
 ‘Well, nobody is going to come to fix this / I’m not coming to fix this.’<sup>2</sup>
- c. *Això (no) ho farà (ni) Déu.* [Catalan]  
 this not CL.DO= do.FUT.3SG not.even God  
 ‘No one is going to do this.’
- d. *Perdona’m, però les redaccions te les farà ta*  
 forgive.IMP=CL.DO but the essays CL.IO= CL.DO= do.FUT.3SG your  
*mare.*  
 mother  
 ‘Sorry, but I’m not doing these essays / no one is doing these essays.’<sup>3</sup>

There is a preference for EPIs to be subjects, as exemplified above. When they function as external arguments, EPIs are usually postverbal in both languages (note that Catalan and Spanish both readily allow VS orders; e.g., Ordóñez 1998; 2007, Alexiadou & Anagnostopoulou 2001). This is also the case because, often, other constituents will have been topicalised and will appear in sentence-initial position (2c-2d). Pre-verbal subject EPIs face important restrictions, which I turn to in the next section (subsection 2.2.1). Nonetheless, EPIs can be used as internal arguments, albeit much more marginally, as the next example shows.

- (3) *?(No) convidaré (ni) Rita a la festa.* [Catalan]  
 not invite.FUT.1SG not.even EPI to the party  
 ‘I’m not inviting anyone to the party / There’s no way I’m inviting anyone/them to the party.’

EPIs are expressive, encoding the attitude of the speaker. They contribute an additional layer of expressive meaning and speaker attitude: the speaker is emphasising a negative attitude towards the likelihood of what is conveyed in the proposition, cf. paraphrases like ‘There’s no way

<sup>2</sup>Retrieved 2 March 2024, from <https://x.com/LauritaRMadrid/status/185108997504909313?s=20>.

<sup>3</sup>Retrieved 2 March 2024, from <https://x.com/AnaFerrerS/status/521411305102929920?s=20>.

anyone/I'm doing this' or 'I'm not doing this'. It can also be interpreted as signalling a negative speaker attitude towards past events, e.g., Sp. *No se presentó Rita a la reunión* '(I'm criticising that) (absolutely) no one turned up to the meeting'. The following quote about RITA from the newspaper *La Razón* sheds some light on the origin of the expression and the 'I'-centred nature of RITA:

The figure of Rita la Cantaora remained for posterity in Spanish popular culture, not so much for her work as a singer and dancer, but because of an expression that became a popular proverb. Apparently, her passion for the work was such that she was willing to perform wherever she was asked, regardless of the money she earned for performing, and even to perform additional shows, whether asked by the owner of a 'tablao' or the organizer of a private party. She was so famous that even her own colleagues recommended her services when they were not offered enough money to perform themselves. In this way, the expression *que lo haga Rita la Cantaora* 'let Rita la Cantaora do it' was coined to refer to all those occasions in which one is not willing to perform an action.<sup>4</sup>

EPIs can only make reference to a person, collective or animate being. Importantly, however, they have flexible person-indexing: the participants/agents involved in the action/event reported need not include the speaker and/or addressee and can refer to a 3rd person. This is observed in the translations provided here, which can involve all of 1st, 2nd or 3rd person subjects. What reading is obtained depends entirely on the context in which it is uttered and what the most likely reference of RITA is. Henceforth, then, any translations with, e.g., a 1st/2nd person pronoun should not be taken as unambiguous/definitive; they could also very often be translated with a 3rd person subject (and vice versa), if the context is appropriate. What is systematic in their interpretation is the negative *speaker*-oriented attitude conveyed with EPIs, which is absent in canonical negative indefinites like *nobody*.

The set of EPIs is crucially limited: the most common example is the proper noun RITA (referring to a 19th century Spanish flamenco singer also known as *Rita la Cantaora*), but other EPIs with similar behaviour are commonly found: *el Papa de Roma* ('the Pope of Rome'), *Déu/Dios* ('God'), *te/ta/la teva mare* and *tu madre* ('your mother'), *el teu pare/tu padre* ('your father'), among others. I restrict focus in this paper to RITA, but these are briefly discussed in subsection 2.4. Importantly, not all (proper) nouns in these languages can function as negative indefinites in the way shown above: e.g., Sp. *Esto lo hará Juan* cannot read as  $\approx$  'Nobody will do this', it can only be interpreted as 'This, John will do it'. The availability of the expressive negation-type reading is restricted to a limited set of proper nouns and person-referring DPs.

An alternative (more literal) reading of the sentences above, where each of these DPs/nouns refers to a specific person (e.g., *Rita* referring to a person with this name), is nonetheless possible.<sup>5</sup> Generally, the felicity of the possible readings (literal and EPI) is determined by both context and intonation (e.g., emphasis; see subsection 2.2).

Overall, RITA's linguistic status appears unlike canonical proper nouns in Catalan and Spanish: on the one hand, RITA is taking on grammatical functions, namely an apparent rise in

<sup>4</sup> My own translation from the following Spanish newspaper article: [https://www.larazon.es/cultura/historia/quien-fue-rita-cantaora-que-mencionamos-cuando-trabajo-nos-gusta\\_2024012865b5fca3c3cb30000108c092.html](https://www.larazon.es/cultura/historia/quien-fue-rita-cantaora-que-mencionamos-cuando-trabajo-nos-gusta_2024012865b5fca3c3cb30000108c092.html). Retrieved 2 March 2024.

<sup>5</sup> Note that in Catalan the proper noun reading is harder to obtain for *Rita* as the personal article that accompanies proper nouns in the language is, for most varieties, systematically absent when RITA is used as an EPI.

more pronominal and negative/quantificational interpretations, and expressive functions, on the other, indicated via the encoding negative speaker attitude (see Traugott 1989, on (inter)-subjectification). Its original reference (an individual named *Rita*) has also been bleached, and it is losing syntactic attributes associated with more lexical categories (e.g., nouns). The latter point is exemplified by the loss in Catalan of the personal article before *RITA*. Its loss is significant in signalling some grammaticalisation: proper nouns *mandate* a preceding personal article in Catalan (but not in Spanish), either *en/el* (masculine) or *la/na* (feminine), e.g., *la Rita*. The EPI *Rita*, on the other hand, cannot take an accompanying personal article in most varieties.<sup>6</sup> Altogether, these divergences from canonical proper nouns invite a finer-grained study of *RITA*'s distribution.

With this in place, the next section makes an initial attempt at describing the syntactic patterning of these EPIs, taking *RITA* as the primary empirical focus, and compares *RITA* to existing negation/polarity categories.

## 2.2. *Rita and other negative and polarity items*

This section compares the distribution of *RITA* with NCIs, PIs and squatives. Judgements are drawn only from my own varieties of Catalan and Spanish<sup>7</sup> (and other consultants' judgements that agree with my own). Important points of inter-speaker variation will be pointed out nonetheless. This will show that *RITA* is likely at a more advanced stage of grammaticalisation in varieties like my own, compared to other speakers consulted. However, the task of obtaining a more systematic picture of the distribution of *RITA* across other speakers and varieties remains ongoing. A more comprehensive survey among Catalan native speakers can be found in Bosch (2024), corroborating the trends described in this paper (see also footnote 22). Space considerations preclude an in-depth exposition of its results.

### 2.2.1. *Rita and NCIs*

Negative dependents, as summarised by Giannakidou & Zeijlstra (2017), can be categorised in at least two ways: 'strong' NPIs, and 'weak' NPIs, to be defined below. I begin by outlining why EPIs are *not* NCIs or 'n-words', a subset of strong NPIs (Laka 1990), despite sharing several distributional patterns with them. The following definition of NCIs from Giannakidou & Zeijlstra (2017:7) forms our starting point:

- (4) N-words (or Negative Concord Items): an expression  $\alpha$  is an n-word iff:
- a.  $\alpha$  can be used in structures that contain sentential negation or another  $\alpha$ -expression,

<sup>6</sup> A small minority consultants of Central and Balearic varieties reported that *RITA* must still retain the personal article *la* (or *na*, in Balearic Catalan) in their varieties. It is also worth noting that inter-item variation across EPIs exists as well, suggesting all EPIs may not be grammaticalised to the same extent (I take this up again in subsection 2.2 and subsection 2.4). In contrast to *RITA*, EPIs such as Cat. *en Pere Vamba* (not discussed here), *do* take the personal article and furthermore cannot drop it, even if used in this expressive, negative-related construction.

<sup>7</sup> For Catalan, a Central Catalan variety, primarily influenced by the region of *el Ripollès* (province of Girona), a transition area between Central Catalan and Northern Catalan (Rosellonese), but also influenced by the more central *Osona* region (province of Barcelona). Similarly for Spanish, my variety is a Peninsular Spanish variety, more specifically a variety of the Catalanian Spanish dialect. All consultants shared a similar linguistic background, namely, Central Catalan and Catalanian Spanish varieties.



- yielding a reading equivalent to one logical negation; and
- b.  $\alpha$  can provide a negative fragment answer (i.e., without the overt presence of negation).

The above summarises how n-words are licensed in so-called *antiveridical* contexts, namely negative contexts. Weak Polarity Items (such as English *anything*), on the other hand, occur in *non-veridical* contexts. These include antiveridical (i.e., negative) contexts and additionally, contexts with questions, conditionals, modal verbs, imperatives, generics, habituals and disjunctions (see Giannakidou 2002:33, for further detail).

I will now discuss *RITA*'s grammaticality in *antiveridical* contexts, and compare it to NCIs in Catalan and Spanish. I identify (minimally) four points of divergence between *RITA* and NCIs. *Non-veridical* contexts with *RITA* are discussed in the next section (subsubsection 2.2.2).

An indication that the distribution of *RITA* is partly unlike NCIs comes from its behaviour with sentential negation. First, consider the interplay between NCIs and negation in Catalan and Spanish (5). As these are non-strict Negative Concord languages, their NCIs do not always co-occur with the negative marker; whether or not they do is conditioned by the position of NCIs: postverbal NCIs *must* co-occur with a preceding negative marker in both languages (5a). Pre-verbal NCIs *cannot* co-occur with sentential negation in Spanish (5b); in Catalan, they need not, but they optionally can (5c) (see also Giannakidou & Zeijlstra 2017, for a review on Negative Concord languages).

- (5) a. *\*(No) vino nadie.* [negative doubling; Spanish]  
 not come.PST.3SG n-body  
 'Nobody came.'
- b. *Nadie (\*no) vino.* [no negation with pre-verbal NCIs]  
 n-body not come.PST.3SG  
 'Nobody came.'
- c. *Ningú (no) menja.* [optional negation with pre-verbal NCIs; Catalan]  
 n-body not eat.3SG  
 'Nobody eats.'

On the other hand, *RITA* is most commonly used *without* sentential negation, even if postverbal. Some contexts in which *RITA* would be very natural are given below:

- (6) a. *N'estic farta. El farà Rita aquest projecte.* [Catalan]  
 CL.REFL=be.1SG fed.up.FEM CL.DO= do.FUT.3SG EPI this  
 projecte.  
 project  
 'I'm fed up. I'm not doing this project / there's no way I'm finishing this project'.
- b. *Los perros de los vecinos solo hacían que ladrar esta noche. Evidentemente, ha dormido Rita.* [Spanish]  
 the dogs of the neighbours only do.IMPF.3SG that  
 talk.INF this night obviously AUX.HAVE.3SG sleep.PTCP EPI  
 'The neighbours' dogs were barking constantly last night. Obviously, we couldn't sleep at all.'

For *some* speakers, including myself, *RITA* is nevertheless compatible with sentential negation. However, there is significant inter-speaker variation in this respect: in a simple poll among 39 Catalan native speakers,<sup>8</sup> 17 (46%) accepted sentences like (7a) with *RITA*; the remaining 22 (54%) would not utter these examples (see Bosch 2024 for the results of a significantly more expanded survey). (7) offers some examples of postverbal *RITA* with negation, including one taken from social media interactions.

- (7) a. *No s'aixecarà* *Rita demà.* [Catalan]  
 not CL.REFL=wake.up.FUT.3SG EPI tomorrow  
 'There's no way we're waking up (on time) tomorrow.'
- b. *No vindrà* *Rita al gimnàs!*  
 not come.FUT.3SG EPI to.the gym  
 'Nobody is going to come to the gym / I'm not coming to the gym!'
- c. *Lo de la multa no se lo cree* [Spanish]  
 the of the fine not CL.REFL= CL.DO= believe.INF  
*Rita la Cantaora.*  
 EPI  
 'As for the fine, nobody is believing this / I'm not going to believe this.'<sup>9</sup>

For those speakers that disallow sentential negation with *RITA*, the structure can only be remediated either by dropping the negator or by adding the minimiser *ni* 'not even' before *RITA*. This stands to reason, insofar as *ni* behaves like an NCI in Catalan/Spanish, and so can be licensed by the negative marker (Espinal & Llop 2022).

Therefore, some speakers can sanction negative markers with *RITA* (and without *ni*) postverbally. *RITA* is accepted without negation by most speakers that allow its expressive use. It also most naturally occurs without the sentential negation marker or with sentential negation and the NCI *ni*, even in its most common postverbal position. This is clearly different from NCIs, which *require* negation when postverbal.

Secondly, *RITA* is subject to positional restrictions which do not apply to Catalan/Spanish NCIs. *RITA* is preferably postverbal and, if preverbal, it must be focalised and receive emphatic prosody (8). As (8b) shows, this latter option is also available to non-EPI *Rita*, i.e. a structure with focalised preverbal *Rita* could also be concerned with an individual named *Rita*. This appears to true for all EPIs, see subsection 2.4.<sup>10</sup>

- (8) a. *\*?Rita trobarà feina aquí.* [Catalan]  
 EPI find.FUT.3SG work here  
 Intended: 'Nobody will find a job here' (alternative reading: 'Rita will find a job here').<sup>11</sup>

<sup>8</sup> The majority were Central Catalan speakers, with a minority from Western areas of Catalonia.

<sup>9</sup> Retrieved 2 March 2024, from <https://x.com/AgoneyCarmel/status/1326535312193937409?s=20>.

<sup>10</sup> This preverbal restriction could feasibly elucidate a point not addressed earlier, namely why *preverbal RITA* does not readily take negation even in speakers that permit negation with postverbal *RITA*. My own judgements, which readily permit postverbal *RITA* with negation, indicate that this construction appears ungrammatical (e.g., *\*RITA no vindrà demà* 'There's no way anyone is coming tomorrow').

- b. **RITA** trobarà feina aquí.  
 EPI find.FUT.3SG work here  
 ‘NOBODY will find a job here / There’s no way I’ll find a job here’ OR ‘RITA will find job here (not someone else).’

At least in Catalan and Spanish, NCIs generally do not mandate focalisation in preverbal position (although cf. Giannakidou 2001, on the emphatic NCIs *TIPOTAS* and *KANENAS* in Greek). Compare, for example, the sentences below, which can be uttered with neutral prosody, but are not natural with initial focus.

- (9) a. **Cap/??CAP** dels estudiants va presentar els [Catalan]  
 none of.the students AUX.PST.3SG hand.in.INF the  
*deures a l’hora.*  
 homework at the.hour  
 ‘None of the students handed in the homework on time.’
- b. **Nadie/??NADIE** se podía creer que las [Spanish]  
 no-one CL.REFL= can.IMPF.3SG believe.INF that the  
*medusas inmortales existieran.*  
 jellyfish immortal exist.SUBJ.IMPF.3SG  
 ‘No one could believe that immortal jellyfish existed.’

Postverbal subjects are known to display focal properties in both languages (i.a., Belletti 2004; Ortega-Santos 2008; Forcadell 2013); the above suggests preverbal *RITA* appears to have *retained* this requirement, unlikely canonical preverbal (topical) subjects in these languages. Plausibly, then, *RITA*’s mandatory focus position is indicative of its interaction with discourse features, a common characteristic of expressive items.

Thirdly, *RITA* differs from ‘prototypical’ NCIs with respect to *absolutely/almost* modification. NCIs in various Romance languages permit *absolutely/almost* modifiers under negation (see Quer 1993; Giannakidou 2000). This does not carry over to *RITA*, with or without sentential negation. Contrast (10) and (11).

- (10) a. *No he vist absolutament/quasi ningú.* [Catalan]  
 not AUX.HAVE.1SG see.PTCP absolutely/almost no-one  
 ‘I have seen absolutely/almost no-one.’
- b. *No he visto absolutamente/casi nadie.* [Spanish]  
 not AUX.HAVE.1SG see.PTCP absolutely/almost no-one  
 ‘I have seen absolutely/almost no-one.’

<sup>11</sup>Although odd and only marginally acceptable in Catalan because of the lack of personal article. The same holds for (8b).

- (11) a. *\*(No) he vist absolutament/quasi Rita.* [Catalan]  
 not AUX.HAVE.1SG see.PTCP absolutely/almost EPI  
 Intended: ≈ ‘I have seen absolutely/almost no-one.’
- b. *\*(No) he visto absolutamente/casi Rita.* [Spanish]  
 not AUX.HAVE.1SG see.PTCP absolutely/almost EPI  
 Intended: ≈ ‘I have seen absolutely/almost no-one.’

Finally, as noted earlier, *RITA* is expressive in nature, conveying negative speaker attitude towards an event or action. This is unlike canonical NCIs (and other types of negative indefinites more broadly, such as NPIs or negative quantifiers), which can be uttered in discourse-neutral contexts (see 5 above).<sup>12</sup>

However, there are respects in which the behaviour of NCIs and *RITA* align substantially, notwithstanding inter-item variability with other EPIs (which I briefly address in subsection 2.4). Particularly, many antiveridical contexts allow *RITA*. This concerns (i) licensing via neg-raising predicates, (ii) negative spread, (iii) ability to provide negative fragment answers and, less clearly, (iv) *without*-clauses. In all cases, *RITA* appears grammatical at least for the speakers studied.

I consider first neg-raising predicates. These predicates comprise a restricted set of matrix verbs (*think, believe, suppose, etc.*), which have two important properties in the present context: structures with neg-raising predicates have been shown to involve raising of negation from the embedded to the matrix clause (see Hoeksema 2017, for a review) and, concomitantly, they can license NPIs in the embedded clause, due to the negator that originates in the same clause (12a). Non-neg-raising predicates, on the other hand, do not license NPIs (12b).

- (12) a. I **don’t think** he lifted **a finger** to help. [neg-raising predicate]  
 b. \*I **don’t mean** that he lifted **a finger** to help. [non-neg-raising predicate]

The contrast in (13) exemplifies the grammaticality of *RITA* with neg-raising predicates (13a) vis-à-vis its ungrammaticality with predicates that do not involve neg-raising (13b). This behaviour is expected of NCIs (and NPIs more generally); these require licensing by a clause-mate negation when postverbal and this negation can move to a higher clause iff it contains a neg-raising verb (as in 13a). Note that, as with other antiveridical contexts below, this generally only holds of speakers who accept (7).

- (13) a. *No crec que vingui* [neg-raising predicate; Catalan]  
 not think.1SG that come.SUBJ.3SG  
*Rita.*  
 EPI  
 ‘I don’t think (absolutely) anyone will come / I think (absolutely) no one will come.’

<sup>12</sup> The clear tendency for *RITA* to surface as a subject (subsection 2.1) would also be another factor that makes *RITA* distinctly non-NCI-like.

- b. \**No dic que vindrà* [non-neg-raising predicate]  
not want.1SG that come.FUT.3SG

**Rita.**

EPI

‘Intended: I am not saying that anyone/no-one came.’

Additionally, *RITA* displays an ability to license lower NCIs, matching the second component of the definition of NCIs in (4a), namely ‘ $\alpha$  can be used in structures that contain [...] another  $\alpha$ -expression’. Examples with pre-verbal (focalised) *RITA* and a lower NCI turn out, again, to be grammatical, at least in these varieties of Catalan.

- (14) a. *A aquest ritme, RITA aprovarà* [negative spread; Catalan]  
at this rate EPI pass.FUT.3SG

**cap examen.**

no exam

‘At this rate, nobody will pass any exams / there’s no way anyone is passing any exams.’

- b. ??*Esto huele fatal. RITA se va a comer* [Spanish]  
this smell.3SG terrible EPI CL.REFL= go.3SG to eat.INF

**nada.**

nothing

‘This smells terrible. There’s no way we’re eating any of this.’

In Catalan and Spanish (and non-strict Negative Concord languages more generally), a pre-verbal n-word can sanction a postverbal one, without requiring sentential negation; a construction termed *negative spread*. This is the case in Sp. *Nadie comió nada* ‘Nobody ate anything’ (lit. ‘nobody ate nothing’). (14a), then, effectively illustrates that *RITA* occurs in negative spread structures in Catalan. At a surface level, the extent to which (14a) features negative spread could be contested, insofar as negative spread is generally taken to require a negative item (often assumed to be endowed with [NEGATIVE] or similar) to license the postverbal NCI. This may be unexpected of *RITA prima facie*, given its proper-noun origin. However, note the following contrast between *RITA* and other proper nouns in Catalan: *RITA* can sanction a postverbal NCI, but, crucially, proper nouns in Catalan (e.g., *Joan*) systematically cannot. They require accompanying sentential negation (see 15).

- (15) *A aquest ritme, en Joan \*(no) aprovarà cap examen.* [Catalan]  
at this rate the John not pass.FUT.3SG no exam

‘At this rate, John won’t pass any exams.’

Equally crucially, examples without sentential negation like (14) are *not* grammatical if *RITA* is postverbal (e.g., *A aquest ritme, aprovarà cap examen Rita*). This suggests *RITA*’s preverbal position (where it c-commands *cap*) can license the NCI in these speakers, but not in its lower postverbal position.

Note, importantly, that negative spread appears more degraded in Spanish, relative to Catalan, according to my own and other consultants’ judgements (14b). It is possible this disparity

between Catalan and Spanish judgements may hold for other examples given in this section, such as (8) or (13). I leave it to future work to compare judgements across both languages for all the tests discussed in this paper.

Setting this point aside, the above suggests the formal make-up of *RITA* is distinct from canonical proper nouns in the language. Potentially, the former may have acquired (or may be acquiring) some inherent negative force or negation-related formal features, which sanction these constructions, at least in the Catalan variety discussed here (I come back to this in section 3).

Thirdly, EPIs can provide negative fragment answers, given appropriate contexts. This is, again, like Catalan/Spanish NCIs, which can serve as negative fragments, e.g., Cat. *Qui s'ha menjat el pastís? Ningú* 'Who ate the cake? Nobody'. (Weak) NPIs, on the other hand, cannot, cf. English *Who did you talk to? \*Anybody*.

- (16) A: *Qui vindrà a córrer?* [isolated answer; Catalan]  
 who come.FUT.3SG to run.INF  
 'Who is going running (with me)?'  
 B: *Rita!* (*Amb aquesta calor...*).  
 EPI with this heat  
 'Nobody! / I'm not coming! (given this heat...).'

The final antiveridical context I will discuss is *without*-clauses, which are antiveridical and thus license NCIs (Giannakidou 1999), as below.

- (17) a. *El partit es va acabar sense que* [Catalan]  
 the match CL.REFL= AUX.PST.3SG finish.INF without that  
*els equips concedissin cap gol.*  
 the teams concede.SUBJ.IMPF.3PL no goal  
 'The match ended without the teams conceding any goal.'  
 b. *Intenta levantar-te sin despertar* [Spanish]  
 try.IMP get.up.INF=CL.REFL without wake.up.INF  
*a nadie, por favor.*  
 DOM no-one for favour  
 'Try to get up without waking up anyone, please.'

Eliciting judgements of *RITA* (or other EPIs) for these contexts is, however, not straightforward, as they rarely occur in these constructions and consultants judge them as artificial. My own judgements and some of my consultants' suggest, however, that *without*-clauses can probably allow EPIs given an appropriate context, like the one below:

- (18) A: *A en Joan el devia veure marxar* [Catalan]  
 DOM the John CL.DO= should.IMPF.3SG see.INF leave.INF  
*tothom, no?*  
 everyone no  
 'Everyone must have seen John leave, right?'

B: *Què va! El tio va marxar sense que se*  
 INTJ the guy AUX.PST.3SG leave.INF without that CL.REFL=  
*n'adonés Rita!*  
 CL.PART=notice.SUBJ.IMPF.3SG EPI

‘Not at all! The guy (somehow) managed to leave without anyone/a single person noticing!’

In summary, then, *RITA* matches the distribution of NCIs to a significant extent, due to its compatibility with antiveridical contexts: namely, sentential negation (for some speakers), neg-raising predicates, negative spread (in Catalan, at least), negative fragments and, possibly, *without*-clauses. However, this is only a partial match: recall that *RITA*'s behaviour with respect to sentential negation is *distinct* from NCIs. NCIs are *licensed* by and require sentential negation (or another antiveridical operator); *RITA* *permits* negation for a subset of speakers, but is grammatical without it for any speaker who has this construction. Specifically, then, *RITA* differs from canonical NCIs in these languages in four important respects: (i) its grammaticality *without* sentential negation when postverbal; (ii) its pre-verbal focalisation requirement; (iii) its incompatibility with *absolutely/almost* modification; and (iv) its expressive, speaker-attitude-oriented nature.<sup>13</sup>

### 2.2.2. Rita and weak (N)PIs

Having established in the previous section that EIs are not (fully) strong NPIs (of the n-word kind), I now turn to *RITA*'s status relative to (weaker) Polarity Items (PIs) and its acceptability in non-veridical contexts. A broad definition of Polarity Items (encompassing strong and weak) is given below (Giannakidou 2001:669).

(19) A linguistic expression  $\alpha$  is a *polarity item* iff:

- a. The distribution of  $\alpha$  is limited by sensitivity to some semantic property  $\beta$  of the context of appearance; and
- b.  $\beta$  is (non)veridicality, or a subproperty thereof:  $\beta \in \{\text{veridicality, non-veridicality, antiveridicality, modality, intensionality, extensionality, episodicity, downward entailment}\}$ .

As discussed until now, strong NPIs appear with antiveridical contexts, whilst weak NPIs appear in a wider array of non-veridical and non-negative contexts. As I will demonstrate, *RITA* does not fit the typology of weak PIs.

A PI analysis of EPIs proves unfeasible due to one key aspect, its (in)compatibility with non-veridical contexts. Consider the examples below as non-veridical contexts where PIs are licensed in both Catalan and Spanish:<sup>14</sup>

<sup>13</sup> Another potential divergence includes argument structural restrictions. I do not discuss these here due to space considerations, but see the survey data in Bosch (2024).

<sup>14</sup> Note that some of the items given as PI examples above are the same as the NCIs discussed so far (e.g., Cat. *ningú, res.*). See Espinal & Tubau (2016) and Tubau et al. (2023) on this point: they analyse Catalan items like *ningú* as cases of lexical ambiguity/homophony between two separate homophonous items, an NCI and a PI (see also Garzonio & Poletto 2023, on this context, who treat similar NCIs in Italo-Romance as non-homophonous items with a wider range of licensing environments).

- (20) a. *Si tienes cualquier problema, por favor* [conditional; Spanish]  
 if have.2SG any issue for favour  
*llámame.*  
 call.IMP=CL.IO  
 ‘If you have any issues, please call me.’
- b. *Que vol res?* [interrogative; Catalan]  
 that.INT want.3SG anything  
 ‘Does s/he want anything?’
- c. *Ho va veure abans que ningú ho veiés* [before]  
 it AUX saw before that anybody it see.SUBJ.3SG  
 ‘S/he saw it before anybody did.’ (Tubau et al. 2023:12)

Crucially, EPIs do not overlap with PIs in any of these contexts, as they are ungrammatical (see 21).

- (21) a. \**Si truca Rita, avisa'm.* [conditional; Catalan]  
 if call.3SG EPI warn.IMP=CL.DO  
 Intended: ‘If anyone/nobody calls, let me know.’
- b. \**Que vindrà Rita?* [interrogative]  
 that.INT want.3SG EPI  
 Intended: ‘Is anyone/nobody coming?’
- c. \**Lo vio antes que se* [before; Spanish]  
 CL.DO= see.PST.3SG before that CL.REFL=  
*diera cuenta Rita.*  
 give.IMP.F.SUBJ.3SG count EPI  
 ‘S/he saw it before anybody realised.’

Therefore, *RITA* is not licensed under non-veridical contexts, in contrast to PIs. This then disqualifies *RITA* as a subclass of the definition in (19).

### 2.2.3. *Rita and squatitives*

I finish the empirical discussion on *RITA* by briefly considering its behaviour relative to other expressive forms of negation/polarity items, specifically to so-called *squatitives* (Horn 2001). These are English expressions of scatological origin (*jackshit*, *(diddly) squat*, *fuck-all*, etc.). They have taken on negative force via Jespersen’s Cycle, a diachronic cycle whereby the original (single) marker of negation (often weakened) is strengthened through some additional word (e.g., minimisers such as *a drop*, *a crumb*). This new reinforcer can in turn take over as the negative marker proper, leading to the loss of the original negative marker. *Squatitives* are thought to be undergoing the cycle at present, given they can appear both in the presence of sentential negation (as reinforcers) or in its absence (as the main marker of negation), without interpretive differences, as shown in (22):



- (22) a. I didn't sleep **squat** last night.  
 b. There have been a couple of veterans who have done **squat** since they've been here.  
 (Horn 2001:186)

In the first case (22a), squatitives behave like NPIs (e.g., English *anything*). In the second (22b), they bring their own negative force, behaving more like negative quantifiers (e.g., English *nothing*).

Squatitives are licensed in antiveridical contexts, like NCIs. Examples in (23), from Thoms et al. (2017), illustrate their behaviour with sentential negation, neg-raising and negative spread:

- (23) a. He doesn't know **jackshit/fuck all**. [sentential negation]  
 b. He knows **jackshit/fuck all**.  
 (24) a. I don't think he brought **jackshit**. [neg-raising predicate]  
 b. \*I didn't say he brought **jackshit**. [non-neg-raising predicate]  
 (25) **Nobody** said **fuck all**. [negative spread]  
 (Thoms et al. 2017)

On the other hand, squatitives cannot be licensed in non-veridical and non-negative contexts on an NPI reading (e.g., *anything, anyone*) or PI reading (e.g., *something, someone*):

- (26) a. \*Did he say fuck all?  
 b. \*The last person to say fuck all was John. (Thoms et al. 2017)

The squatitives in (26) are only grammatical if intended as negative quantifiers (e.g., English *nobody*), in which case uses such as those above are licit. Vulgar indefinite DPs in Catalan and Spanish, such as *una merdaluna mierda* 'shit', parallel with squatitives, although they remain comparatively understudied: they can appear with/without the negator (without the NCI *ni*, in questions (with a NQ-reading) and in negative fragments (see §23.5 in Tubau 2020).

The foregoing is sufficient to probe the extent to which squatitives pattern like *RITA*, both in English and Cat./Sp. I suggest, again, that *RITA* only partly overlaps with squatitives. On the one hand, squatitives are licensed in antiveridical contexts (see 23), as also seems to be the case for *RITA* for the Cat./Sp. varieties considered here. The Janus-nature of squatitives (allowing both absence and presence of preceding negators) is shared with some Catalan/Spanish speakers, as is the inter-speaker variability with respect to the presence/absence of negation.<sup>15</sup>

However, squatitives are not person-referring, whilst all EPIs do necessarily refer to a person/human collective. Squatitives can surface in non-veridical contexts with a negative quantifier (NQ) reading (but *not* on an NPI/PI reading). This stands in contrast to *RITA*, which is

<sup>15</sup> Notably, however, the distributions of absence/presence of negation across speakers are opposite in squatitives vs *RITA*: squatitives, and postverbal negators generally, are grammatical with negation for all speakers, and without negation only for some; the opposite holds of *RITA*, suggesting a distinct grammaticalisation pathway. I leave these important diachronic comparisons aside in this paper.

not accepted in, e.g., interrogatives, even if the intended interpretation is a NQ reading. Cat. \**Ha vingut Rita?* is ungrammatical, and cannot read as either ‘Did anyone/someone come?’ (PI reading) nor ‘Did nobody come?’ (NQ reading) (see also 37 later for other EPIs).

Additionally, squatitives permit *absolutely* modification (27), unlike *RITA* (subsection 2.2.1), and they do not have systematic positional restrictions; they can appear both preverbally and postverbally, without any other constraints, such as focalisation or emphatic prosody (subsection 2.2.1):

- (27) a. He knows absolutely **fuck all** about this. [absolutely modification]  
 b. He kens absolutely **nihin** about this.

(Thoms et al. 2017)

- (28) I published this a year ago and **fuck all** has been done.<sup>16</sup> [pre-verbal squatitives]

Squatitives, then, share some of the NCI-like behaviour of *RITA*, namely licensing in antiveridical contexts, as well as their expressive nature. However, they differ in the possibility of *absolutely/almost* modification, in their licensing in non-veridical contexts, in whether they refer to individuals/people and in their positional preferences/restrictions.

### 2.3. Interim summary

So far, this paper has centred on one EPI, *RITA*, in some varieties of Catalan and Spanish. I have shown that it can be licensed in a range of antiveridical contexts (sentential negation,<sup>17</sup> neg-raising, negative spread, negative fragment answers, *without*-clauses), paralleling some of the behaviour of NCIs. Nonetheless, I concluded that *RITA* still only partly overlaps with existing classes of polarity/negation items (specifically, NCIs, PIs and squatitives), given its behaviour with non-veridical contexts and *absolutely*-modification, among others. Before summarising the entire empirical presentation in more detail in section 3, I now briefly describe how *RITA*’s behaviour contrasts with other EPIs exemplified in (2).

### 2.4. The behaviour of EPIs beyond Rita

The general behaviour observed in *RITA* – namely, its ability to function partly as a negative indefinite with speaker-attitude-oriented interpretations – is also displayed in a wider range of proper nouns and person-referring DPs in Catalan and Spanish, as briefly outlined in (2). These are what we referred to initially as Expressive Pseudo (Negative) Indefinites (EPIs). Here, I limit myself to illustrating that EPIs are a broader phenomenon in Catalan and Spanish (observed beyond *RITA* itself) and I compare some of the behaviour of other EPIs with *RITA*. Based on their syntactic distribution, I show that *RITA* is plausibly at a more advanced stage of grammaticalisation compared to other EPIs, which behave unlike *RITA* in several respects.

<sup>16</sup>Retrieved 2 March 2024, from [https://x.com/Vltra\\_MK/status/1653762970072272899?s=20](https://x.com/Vltra_MK/status/1653762970072272899?s=20).

<sup>17</sup> In this context, it is misleading to speak of ‘licensing’ proper, insofar as *RITA* is grammatical without negation and so does not actually *require* ‘licensing’ by negation.

Some illustrations of EPIs outside *RITA* are repeated below from (2):

- (29) a. *Pues vendrá el Papa de Roma a arreglar las cosas.* [Spanish]  
 well come.FUT.3SG the Pope of Rome to fix.INF  
 the things  
 ‘Well, nobody is going to come to fix this / ‘I’m not coming to fix this.’<sup>18</sup>
- b. *Això (no) ho farà (ni) Déu.* [Catalan]  
 this not CL.DO= do.FUT.3SG not.even God  
 ‘No one is going to do this.’
- c. *Perdona’m, però les redaccions te les farà ta mare.*  
 forgive.IMP=CL.DO but the essays CL.IO= CL.DO= do.FUT.3SG your  
 mother  
 ‘Sorry, but I’m not doing these essays / no one is doing these essays.’<sup>19</sup>

(29) illustrates the primary constructions in which all EPIs can be found and are grammatical, namely positive affirmative sentences where the EPI is postverbal and/or negative affirmative sentences with the accompanying NCI *ni*.<sup>20</sup> As far as (29) is concerned, then, other EPIs pattern interchangeably with *RITA*. In contrast to *RITA*, however, the broader range of EPIs appears generally ungrammatical (or, minimally, much more degraded) in antiveridical contexts. Observe the behaviour of the EPIs above with sentential negation in these dialogues, where the intended interpretation is one of single negation:

- (30) a. *\*No lo va a comprar tu madre.* [Spanish]  
 not CL.DO= go.3SG to buy.INF EPI  
 Intended: ‘No one is going to buy this / I’m definitely not buying this.’ Alternative readings: ‘Your mother will not buy this.’
- b. *\*No es saltarà classe Déu!* [Catalan]  
 not CL.REFL= jump.3SG class EPI  
 Intended: ‘No one is skipping class / I’m definitely not skipping class.’ Alternative readings: ‘God is not skipping class.’

Unlike *RITA*, these items categorically cannot appear under the scope of negation and receive a single sentential negation reading, in contrast to *RITA* in (7), where a single negation reading was possible. They have to occur without sentential negation (as shown in 30) or with the NCI *ni* as a preceding minimiser. The latter option is illustrated below:

<sup>18</sup>Retrieved 2 March 2024, from <https://x.com/LauritaRMadrid/status/185108997504909313?s=20>.

<sup>19</sup>Retrieved 2 March 2024, from <https://x.com/AnaFerrerS/status/521411305102929920?s=20>.

<sup>20</sup>Note that not all speakers will readily use all of the EPIs presented in this paper. Nonetheless, with respect to the observation above, the point still holds that, generally, native speakers’ use of the EPIs in their system is most commonly found in this type of construction.

- (31) a. *No lo va a comprar \*(ni) tu madre.* [Spanish]  
 not CL.DO= go.3SG to buy.INF not.even EPI  
 ‘No one is going to buy this / I’m definitely not buying this.’ Literal readings: ‘Not even your mother will buy this.’
- b. *No es saltarà classe \*(ni) Déu!* [Catalan]  
 not CL.REFL= jump.3SG class not.even EPI  
 ‘No one is skipping class / I’m definitely *not* skipping class.’ Literal reading: ‘Not even God is skipping class.’

Crucially, however, if a sentential negator is used (without *ni*) and the context is appropriate, then the reading can become one of *double negation*. Compare (30) with (32), where supporting context has been added:

- (32) A: *Tienes demasiados videojuegos, no te compres el nuevo FIFA. Guarda el dinero para otra cosa.* [Spanish]  
 have.2SG too.many videogames not CL.IO= buy.SUBJ.2SG  
 the new FIFA save.IMP the money for other thing  
 ‘You have too many videogames, don’t buy the new FIFA game. Save this money for something else.’
- B: *\*¡No lo va a comprar tu madre! Llevo tiempo esperándolo.*  
 not CL.DO= go.3SG to buy.INF EPI bring.1SG time waiting=CL.DO  
 Intended: ‘No one is going to buy this.’ Alternative reading: ‘I’m going to buy it anyway (regardless of what you are telling me)! I’ve been waiting for it for a long time’ (double negation reading).

- (33) A: *Fes el favor d’anar a classe aquesta tarda, que tens examen divendres.* [Catalan]  
 make.IMP the favour to-go.INF to class this  
 afternoon that.CONJ have.2SG exam Friday  
 ‘Please go to class this afternoon, you have an exam on Friday.’
- B: *\*No es saltarà classe Déu! Jo ja no puc més.*  
 not CL.REFL= jump.3SG class EPI I already not can.1SG  
 more  
 Intended: ‘I’m definitely *not* skipping class.’ Alternative reading: ‘I’m skipping class for sure (regardless of what you are telling me), I’ve had enough’ (double negation reading).

Notice that, with additional context, the examples in (30) now permit double negation readings in the speakers consulted.

Overall, then, the availability of a single negation reading with sentential negation appears to be a feature of *RITA* for some speakers. It does not carry over to other EPIs, which either ban sentential negation or, in certain contexts, receive double negation readings. Assuming that

the uses of *RITA* with negation are diachronically more recent,<sup>21</sup> it suggests higher degree of grammaticalisation for *RITA*, vis-à-vis other items, as noted earlier.

This point is again endorsed by other EPIs' behaviour with neg-raising predicates and negative spread. These are similarly degraded, as with sentential negation above:

- (34) a. \**No creo que venga el Papa de Roma.* [neg-raising; Spanish]  
not think.1SG that come.SUBJ.3SG EPI

Intended: 'I don't think anyone will come / I think no one will come / there's no way anyone will come, etc.' Alternative reading: 'I don't think the Pope of Rome will come.'

- b. \**No crec que ho solucioni ta mare això* [Catalan]  
not think.1SG that CL.DO= fix.SUBJ.3SG EPI this

Intended: 'I don't think anyone will fix this / I think no one will fix this / there's no way anyone will fix this, etc.' Alternative reading: 'I don't think your mother will fix this.'

- (35) a. ?\**TA MARE aprovarà cap examen.* [negative spread; Catalan]  
EPI pass.FUT.3SG no exam

Intended: 'There's no way I/we/anyone is passing any exams.'

- b. \**EL PAPA DE ROMA limpiará nada.* [Spanish]  
EPI clean.FUT.3SG nothing

Intended: 'I'm not cleaning any of this / no one is going to clean anything.'

They only pattern alike in negative fragment answers, where EPIs *can* serve as negative fragments:

- (36) A: ¿*Quién piensa solucionar esto?* [fragment answer; Spanish]  
who think.3SG fix.INF this

'Who is going to fix this?'

B: ¡*Tu madre / el Papa de Roma / Dios!...*

EPI

'No one! / I'm not going to do this', etc.

That these EPIs are licit as negative fragment answers and lead to double negation readings should not be taken to suggest that their behaviour should be derived syntactically following the treatment of other polarity/negation items that pattern similarly in these contexts, such as negative quantifiers (e.g., English *nobody*; see Weir 2020; Espinal et al. 2023, for a review). In other words, EPIs' grammaticality in (only) these two contexts does not imply they are acquiring or have acquired any (inherent, syntacticosemantic) negative force, e.g., that they bear [NEG] and have a negative universal quantifier semantics. The interpretation in (36) could be a pragmatic by-product, as I speculate in the following section, and *not* a result of a change in these EPIs' featural/formal status. From this pragmatic perspective, *tu madre* and others are interpreted as

<sup>21</sup> Possibly supported by the fact that there is little attestation of these uses with Google Search or on Twitter/X, while the use without negative markers is widely attested.

≈ *nobody* by virtue of their expressive nature and use conditions. Namely, *tu madre*, *el Papa de Roma*, etc., are felicitously used only if the speaker feels negatively about a certain proposition/event; whence an interpretation such as ‘I’m not doing this’ could be achieved for negative fragments, without needing to resort to a change in their formal content. Double negation interpretations could, potentially, receive a similar treatment, where the negative interpretation provided by the sentential negation would be ‘cancelled out’ by this, also negative, pragmatic inference. This stands in contrast to the discussion in subsection 2.2.1 on *RITA*, which did invite an analysis where it is acquiring some negative force. Its behaviour with neg-raising and negative spread lead to this tentative conclusion, as both constructions are generally analysed as requiring a negation-related feature of some kind on the relevant item to sanction them.

Therefore, EPIs beyond *RITA* do not behave at all like NCIs or squatives, bar in negative fragments, which are plausibly a pragmatic, *not* syntactic, result. Similarly like *RITA*, they are also sharply ungrammatical in non-veridical contexts where PIs are licensed, as shown below:

- (37) a. \**Si ve Déu a la botiga, avisa'm,* [conditional; Spanish]  
 if come.3SG EPI to the shop warn.IMP=CL.DO  
*que surto a fer un encàrrec un moment.*  
 that.CONJ go.out.1SG to make.INF an errand a moment

Intended: ‘If anyone/nobody comes to the shop, let me know, I’m going out for a moment to run an errand.’

- b. \**Que vindrà ta mare a posar* [interrogative; Catalan]  
 that.INT come.FUT.3SG EPI to put  
*pau?*  
 peace

Intended: ‘Is anyone/nobody going to come to calm things down?’

Overall, other EPIs are only licit in affirmative contexts without sentential negation and as negative fragment answers. Thus, *RITA* is singled out, in the present Cat./Sp. varieties, as an EPI potentially further advanced in the process of grammaticalisation and pragmaticalisation, shown primarily by its behaviour in antiveridical contexts. The broader range of EPIs diverge significantly in distribution from *RITA*, and also do not pattern as NCIs, PIs or squatives. However, they share with *RITA* their expressive, speaker-attitude dimension, as well as bleaching from a lexical item (a proper noun denoting a *specific* individual) into an item acquiring pronominal and quantificational functions. The next section summarises the conclusions extracted so far.

### 3. Summary and discussion

Taking stock, then, the above showed, by using *RITA* as the central case study, how EPIs differ from NCIs, PIs and squatives, despite sharing some of their traits. The key data came from *RITA*’s interaction with antiveridical and non-veridical operators, its positional restrictions and its general expressive and speaker-oriented nature. Some inter-item and inter-speaker variation with *RITA* and other EPIs was also pointed out, outlining how *RITA* seems more grammaticalised than other EPIs for several speakers.

Firstly, we have observed *RITA* is licensed in at least five antiveridical contexts. For the varieties studied here, (i) it permits sentential negation, (ii) negative spread, (iii) it is licensed with neg-raising predicates (but *not* with non-neg-raising ones), (iv) it can provide negative fragment answers and (v) it can appear in *without*-clauses. These hold for speakers where grammaticalisation of *RITA* seems fairly ‘advanced’. There appears to be significant inter-speaker variation in this domain,<sup>22</sup> as shown briefly for judgements with sentential negation. Most importantly, however, its most common use does *not* feature an accompanying sentential negator. This pattern holds across all speakers of Catalan and Spanish consulted, whether ‘advanced’ or not. In other words, sentential negation is *not* required to ‘license’ *RITA*, unlike with NCIs. *RITA* also does not permit *absolutely/almost* modification and requires focalisation preverbally. Based on these observations (among others), I argued that *RITA* only partly parallels NCIs and squatitives. *RITA* also falls outside the remit of prototypical PIs, as it is ungrammatical with non-veridical operators. Table 1 synthesises these observations.

Importantly, *RITA*’s behaviour with negative spread and negative fragment answers is suggestive: elements permitting these structures (NCIs, notably) are sometimes analysed as contributing negation themselves (Giannakidou 2002; Weir 2020; Tubau et al. 2023). This thus raises the question of whether (some) EPIs, e.g., *RITA*, are truly specified as inherently negative in the syntax (e.g., bearing [NEG] and contributing a negative semantics), or alternatively, if a non-negative approach to NCIs is adopted, if *RITA* bears an uninterpretable [ $\mu$ NEG] feature (per Zeijlstra 2004, *et seq.*). This would help explain *RITA*’s availability in negative spread and negative fragment answers (Giannakidou 2002).

Alternatively, it is conceivable that the negation-like reading in EPIs could stem (at least partly) from a pragmatic/semantic after-effect (*not* from EPIs’ featural content), as briefly discussed in subsection 2.4. Namely, the negative attitude in EPIs may be associated by convention and the felicity of EPIs is determined by its use conditions, e.g., ‘*RITA* is felicitously used if the speaker feels negatively about a certain event, utterance, action, etc.’. A semanticopr pragmatic account of EPIs’ negative ‘flavour’ could help explain the behaviour of EPIs beyond *RITA*, which are only allowed as negative fragments, among all the antiveridical contexts examined (subsection 2.4). However, whether this ‘pragmatic after-effect’ is sufficient to derive, for example, negative spread with *RITA* is far from clear. Possibly, then, (at least some) EPIs may indeed be acquiring some negative properties (the precise nature of which remains open, see Espinal et al. 2023 for a review of approaches).

Taken together, the empirical contribution of this paper then raises the need for a model that can incorporate the behaviour of *RITA* and EPIs, within and across speakers, and it expands the range of case studies on expressive material and its syntactic distribution, presenting a novel phenomenon where *proper nouns* are seemingly acquiring some (expressive) negative/quantificational uses.

<sup>22</sup> More profiles of participants appear to exist; I have set them aside due to space considerations. Bosch (2024) presents an acceptability judgement survey with 460 participants who use *RITA* (out of 1,344 complete participant responses), probing the effect of antiveridical contexts and sentence positions (pre-verbal/post-verbal *RITA*) on the acceptability of *RITA*. The results uncover at least 3 distinct profiles of participants with systematic behaviour. Briefly, these included: (i) the least permissive group, Group 1, which licensed *RITA* only following the NCI *ni* (34%, 155 participants), but no other contexts; (ii) Group 2 extended acceptability with both post-*ni RITA* and veridical/affirmative contexts, but rejected *RITA* with antiveridical contexts (37%, 168 participants); and (iii) Group 3, the focus of this paper, accepts *RITA* in most/all of the contexts presented (including, therefore, *antiveridical* contexts; 19%, 87 participants).

	NCIs	PIs	Squatitives	RITA
Licensing via antiveridical operators	✓	✓	✓	Some
Licensing via non-veridical operators	✗	✓	✗	✗
Pre-verbal focalisation requirement	✗	✗	✗	✓
Embeddability	✓	✓	✓	✓
<i>Absolutely/almost</i> -modification	✓	✓	✓	✗
Expressivity	✗	✗	✓	✓
Speaker-attitude orientation	✗	✗	✗	✓

Table 1. Comparison of the behaviour of NCIs, PIs, squatitives and Rita

#### 4. Crosslinguistic comparison

Besides determining the precise formal status of EPIs and their possible origin, future work should also investigate whether similar constructions exist in other languages and to what extent they overlap with the EPIs discussed here. I finish this paper by giving a brief crosslinguistic comparison with structures similar to EPIs.

Some Romanian structures with *dracul* ('the demon/devil') appear to be used with comparable functions to *RITA*. Similarly, *Bulă* (a name for a fictional stock character) is used to refer to a 'generalised silly character/person', often in jokes. This is illustrated in the following dialogues:

- (38) A: *Ai văzut cât de multe lungă* [Romanian]  
 AUX.HAVE.2SG see.PTCP how of very long  
*e tema de la matematică?*  
 the homework of the maths  
 'Have you seen how long the homework for maths is?'  
 B: *Da, sunt 30 de probleme...*  
 yes are 30 of problems  
 'Yes, there are 30 problems...'  
 A: *Dracul le va face.*  
 devil.the CL.DO= will.3SG do.INF  
 'The devil will do them.' (Sergiu Petrușca, p.c.)

- (39) A: *Bucătăria miroase îngrozitor. Cine duce gunoiul?*  
 kitchen.the smell.3SG horrible who take.3SG garbage.the  
 'The kitchen smells horrible. Who takes the garbage out?'  
 B: *Bulă duce gunoiul...*  
 Bulă take.3SG garbage.the  
 'Bulă takes the garbage out...'



A: *Așa mă gândeam și eu, Ionut este neglijent ca de obicei.*  
 then CL.REFL= think.IMPF.1SG and I Ionut is negligent as-usual  
 ‘That’s what I thought, Ionut is neglectful as usual.’ (*Bulă* ≈ ‘no one will do something’,  
 but both Speaker and Addressee have a specific ‘silly’ person in mind that they know  
 won’t do it (Ionut)) (Sergiu Petrușca, p.c.)

So-called ‘Demonic Negation’ in Irish (after McCloskey 2009, 2018) also displays parallels with *RITA*-type sentences, being a type of emphatic negation with *dheamhan* (‘demon’). However, its distribution is distinct: it can appear in two forms ‘DemNeg + XP’ and ‘Bare DemNeg’ (40a and 40b below, respectively) and is generated in CP, according to D’Antuono (2024) (see D’Antuono’s paper for further details). Its interpretation also varies from the EPIs discussed. Demonic Negation, according to D’Antuono, is a semantic expression of *sentential* negation.

- (40) a. *Dheamhan duine a bhuaileann sé.* [DemNeg + XP; Irish]  
 demon person that hits he  
 ‘Not one person does he hit.’
- b. *Dheamhan a mbuaileann sé aon duine.* [Bare DemNeg]  
 demon that hits he any person  
 ‘Indeed, he doesn’t hit anybody.’ (D’Antuono 2024:2)

The German expression *einen/den Teufel tun* ‘do a/the devil’ (abbreviated as TT) is similarly used for emphatic rejection (41), as summarised in Sailer (2018).

- (41) *Ich werde einen/den Teufel tun, dir zu helfen.* [German]  
 I will.1SG a/the.ACC devil do.INF you to help.INF  
 ‘I’ll be damned if I help you / I will certainly not help you.’ (Sailer 2018:402)

The parallels with *RITA* are again only partial: TT is analysed as contributing a negative conventional implicature, which entails the negation of the proposition; this resembles the proposals above for EPIs. However, there are various points of divergence between TT and EPIs. Among other aspects, the expression is analysed as a Positive PI by Sailer, as it cannot occur under the scope of negation. This is unlike *RITA*, for some speakers, but like the rest of EPIs. TT furthermore requires a *personal agent* as the subject, which is also the subject of second part of the construction (the *zu*-clause). This person-referring aspect of TT is shared with EPIs (which are very often also agents), but EPIs do not have a set subject of the activity in the proposition, even if the structure is strongly speaker-attitude-oriented (it can be a 1st, 2nd or 3rd person, given an appropriate context, subsection 2.1).

Other examples of proper nouns undergoing some bleaching include Italian nouns *Tizio*, *Caio* and *Sempronio* (originally denoting three Roman politicians), which are now used to indicate any person taken as an example (Valentina Colasanti, p.c.; see also the placeholder names Spanish *fulanito/a* and *zutanito/a* or English (*little*) *John Doe*). These however have not taken on negative interpretations, unlike EPIs.

- (42) *Già, queste sanzioni che vanno bene per tizio ma non* [Italian]  
 yes these sanctions that go.3PL well for Tizio but not  
*per Sempronio. Chissà sulla base di cosa viene presa la*  
 for Sempronio who.knows on.the basis of what come.3SG take.PTCP the  
*decisione.*  
 decision

‘Yes, these sanctions are good for some people but not for others. Who knows on what basis the decision is made.’<sup>23</sup>

### 5. Conclusion

In this paper, I presented a previously undescribed phenomenon in Catalan and Spanish – proper nouns that have undergone some formal change and have started to take on an expressive role partly resembling the behaviour of negative indefinites, dubbed here ‘EPIs’. With particular focus on *RITA*, I have compared their behaviour to existing polarity/negation categories: NCIs, PIs and squattives. However, I concluded that they pattern as a *distinct*, though partially overlapping, class. This, I argued, makes EPIs a linguistically peculiar phenomenon, worthy of further study. These results, albeit highly preliminary and exploratory, have some theoretical implications, insofar as they may open new research avenues on diachronic sources of polarity/negation items and expand our grasp of grammaticalisation/pragmaticalisation pathways of expressive material.

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<sup>23</sup>Retrieved 2 March 2024, from <https://x.com/lamanuzzicri/status/1711714877562146826?s=46&t=fui1wVRJTim3v2iCMFnjdW>.

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# Different omission mechanisms in an A-not-A coordination

## Backward deletion vs. forward ellipsis

Lulu Guo

This paper explores the derivation mechanism of A-not-A questions, one of the four types of interrogatives in Mandarin Chinese. Most previous literature has adopted Huang's (1991) modular approach to explain the various subtypes of A-not-A questions either through *reduplication* or *Anaphoric Ellipsis*. However, Huang's approaches leave unexplained a set of theoretical issues, e.g., the nature of negation in A-not-A questions. Building on Huang (1991), I argue for a unified analysis of the different A-not-A variants, i.e., the syntax of A-not-A questions is an asyndetic coordination (no coordinators between conjuncts), and the different A-not-A variants are derived from either *backward deletion* or *forward ellipsis*.

### 1. Introduction: Huang's (1991) proposal

The A-not-A question is a type of question with a similar interpretation to a yes-no question, in which the surface form consists of a repeated predicate, one of which is negated (Hagstrom, 2006). The affirmative and the negative parts are juxtaposed without a coordinator and the whole interrogative requests the addressee to choose between the given affirmative and negative alternatives (Huang et al., 2009). The complete A-not-A patterns with a transitive verb are shown as follows (Huang, 1991:306):

- (1) a. *Full-size A-not-A question*  
Tā [xǐhuān zhèběn shū] [bù xǐhuān zhèběn shū]?  
he like this.CL book not like this.CL book  
'Does he like this book or doesn't [he] like this book?'
- b. *Without the object on the left conjunct*  
Tā [xǐhuān] [bù xǐhuān zhèběn shū]?  
he like not like this.CL book  
'Does he like or not like this book?'

- c. *Only having the first syllable of the initial constituent on the left conjunct*  
 Tā [xǐ-] [bù xǐhuān zhèběn shū]?  
 he li- not like this.CL book  
 ‘Does he like or not like this book?’
- d. *Without the object on the right conjunct*  
 Tā [xǐhuān zhèběn shū] [bù xǐhuān]?  
 he like this.CL book not like  
 ‘Does he like this book or not [like]?’

(2) *Answers*

- a. Xǐhuān.  
 like  
 ‘like.’
- b. Bù xǐhuān.  
 not like  
 ‘dislike.’

All the A-not-A variants in (1) have the same semantic meaning. Either the verb or the first syllable of the (initial) constituent can appear alone in the left-hand side A-not-A coordination (see (1b) and (1c)). On the right-hand side A-not-A coordination, in contrast, deletion cannot be made below the word level, which is different from the case shown on the left-hand side in (1c). The licit sequence for deleting the object on the right conjunct is shown in (1d).

Due to the different patterns of the left and right conjuncts, Huang (1991) argues against Wang’s (1967) proposal that all the A-not-A forms are derived from the successive application of Conjunction Deletion, namely the deletion of one of the identical items in either backward or forward direction (Huang et al., 2009). Instead, Huang assumes that the A-not-A question should be divided into two types, [V-not-VP] and [VP-not-V], and analyses them in different ways. To be concrete, the [V-not-VP] type is exemplified by (1b) and (1c), showing the possible string is missing from the VP preceding the negator, whereas the [VP-not-V] type is exemplified by (1d), showing the possible string is missing from the VP following the negator.

Huang (1991; Huang et al., 2009) argues for a *modular approach* to analyse the different derivation mechanisms of the [V-not-VP] and [VP-not-V] forms. Huang proposes that the [V-not-VP] structure involves a *reduplication operation*. The input to this operation is the verbal sequence following the functional category Q (Huang et al., 2009:253)<sup>1</sup>.

- (3) [IP [NP Tā][...[Q<sub>[+A-not-A]]][VP<sub>[V xǐhuān]]][NP zhèběn shū]]]</sub></sub>

The underlying structure for reduplication in (1) is a simplex sentence *Tā xǐhuān zhèběn shū* ‘he like this.CL book’ in (3). Q, which Huang refers to as a phonetically realised INFL component (henceforth the A-not-A operator), optionally copies an initial portion of the verbal element that follows it. A second operation inserts the negation marker *bù* ‘not’ between the two identical copies. In (4), I go through the various possible derivations in this system (following Huang, I will gloss the first syllable *xǐ-* in *xǐhuān* as *li-* in *like*, although *li-* in *like* is not even a syllable):

<sup>1</sup> The verbal sequence immediately attaching to Q can be not only verb phrases, but also adjective phrases, modal/auxiliary phrases.

- (4) The reduplication in the [V-not-VP] type of the A-not-A question
- a. Copying the sequence immediately after the A-not-A operator
- (i) ...(*xǐ-*)<sub>copy</sub> (*xǐhuān zhè-běn shū*)<sub>base...</sub>  
li- like this-CL book
- (ii) ...(*xǐhuān*)<sub>copy</sub> (*xǐhuān zhè-běn shū*)<sub>base...</sub>  
like like this-CL book
- (iii) ...(*xǐhuān zhè-běn shū*)<sub>copy</sub> (*xǐhuān zhè-běn shū*)<sub>base...</sub>  
like this-CL book like this-CL book
- b. Inserting the negator between the identical copies
- (i) ...(*xǐ-*)<sub>copy</sub> **bù** (*xǐhuān zhè-běn shū*)<sub>base...</sub>?  
li- not like this-CL book
- (ii) ...(*xǐhuān*)<sub>copy</sub> **bù** (*xǐhuān zhè-běn shū*)<sub>base...</sub>?  
like not like this-CL book
- (iii) ...(*xǐhuān zhè-běn shū*)<sub>copy</sub> **bù** (*xǐhuān zhè-běn shū*)<sub>base...</sub>?  
like this-CL book not like this-CL book

For example, if the A-not-A operator copies the first syllable of its following VP constituent, and the negation is inserted between the two copies after reduplication, the sequence then is *xǐ-bù xǐhuān zhèbēn shū* in (1c).

Turning to the [VP-not-V] form, Huang proposes that it is derived from a base-generated coordination [VP-not-VP], and that the second VP in the coordination undergoes reduction under Anaphoric Ellipsis (AE). It applies invariably forward and deletes the object *zhèbēn shū* ‘this book’ in (1d), repeated below as (5) (the omitted material is marked by ~~strikethrough~~ in following examples):

- (5) Tā xǐhuān zhèbēn shū bù xǐhuān ~~zhèbēn shū~~?  
he like this.CL book not like this.CL book  
‘Does he like this book or not [like]?’

As Huang points out, AE actually exists as a remedy for the inadequacy of Conjunction Reduction (CR) in explaining the different lengths of reduction. CR is subject to the Directionality Constraint, proposed by Ross (1967), which holds that if the retained identical material appears on a right branch, the reduction applies backwards, whereas when the retained identical material appears on a left branch, the deletion applies forward. However, CR does not apply to explain [VP-not-V] patterns since (1d) violates the Directionality Constraint, in which the residual *zhèbēn shū* ‘this-CL book’ in the antecedent clause appears on a right branch. In this case, the backward reduction should be applied, whereas the deletion in (1d) is forward. For this reason, Huang (1991) employs AE rather than CR to capture the [VP-not-V] form.

There is no doubt that Huang’s (1991) proposal is the most influential analysis of the A-not-A question in the generative literature. Most following literature within generative grammar addressing A-not-A puzzles has adopted his proposal, especially with regard to the derivation of different A-not-A variants (Ernst 1994; Law 2006; Hagstrom 2006; Huang 2008). However, Huang’s theory about the different derivational sources of A-not-A variants is not flawless in terms of the empirical predictions and theoretical claims it makes. In the next sections, I will list the full-fledged A-not-A patterns with ditransitive predicates, and describe the asymmetries between the A-not-A patterns on the left and right conjuncts. On this basis, I will critically

analyse the theoretical issues of Huang's proposal, and then turn to my own proposal, which appeals to *prosodically conditioned deletion* applying to the left-hand side of A-not-A questions, and to *syntactically conditioned ellipsis* on the right-hand side.

## 2. The asymmetries of A-not-A patterns on the left and right conjuncts

The following shows the A-not-A omission paradigms, where A-not-A questions have ditransitive predicates. I adhere to the PF-deletion account and assume that the omitted elements still have a full syntactic representation, but they just remain unrealised at PF. To begin with, the full-size pattern of the A-not-A question is as follows:

- (6) The full-size sequence  
 Zhāngsān [zèngsòng Lǐsì yí gè qiú] [méi zèngsòng Lǐsì yí gè qiú]?  
 Zhangsan give Lisi one-CL ball not give Lisi one-CL ball  
 'Did Zhangsan give Lisi one ball (as a gift) or not give Lisi one ball (as a gift)?'

On the left conjunct, there are *three* licit omission patterns. First, the lower object can be deleted separately:

- (7) SUBJ + [V(AB<sup>2</sup>) + OBJ1 + ~~OBJ2~~] + [NOT + V(AB) + OBJ1 + OBJ2]  
 Zhāngsān [zèngsòng Lǐsì] [méi zèngsòng Lǐsì yí gè qiú]?  
 Zhangsan give Lisi not give Lisi one-CL ball  
 'Did Zhangsan give Lisi or not give Lisi one ball (as a gift)?'

Second, both two objects can be deleted together:

- (8) SUBJ + [V(AB) + ~~OBJ1 + OBJ2~~] + [NOT + V(AB) + OBJ1 + OBJ2]  
 Zhāngsān [zèngsòng] [méi zèngsòng Lǐsì yí gè qiú]?  
 Zhangsan give not give Lisi one-CL ball  
 'Did Zhangsan give or not give Lisi one ball (as a gift)?'

Third, both two objects and the second syllable of a bisyllabic predicate can be deleted together:

- (9) SUBJ + [V(AB) + ~~OBJ1 + OBJ2~~] + [NOT + V(AB) + OBJ1 + OBJ2]  
 Zhāngsān [zèng-] [méi zèngsòng Lǐsì yí gè qiú]?  
 Zhangsan gi- not give Lisi one-CL ball  
 'Did Zhangsan give or not give Lisi one ball (as a gift)?'

However, deleting either the complete verb phrase or only object 1 is disallowed on the left conjunct:

- (10) a. \*SUBJ + [V(AB) + ~~OBJ1 + OBJ2~~] + [NOT + V(AB) + OBJ1 + OBJ2]  
 \*Zhāngsān [∅] [méi zèngsòng Lǐsì yí gè qiú]?  
 Zhangsan not give Lisi one-CL ball  
 Intended: 'Did Zhangsan give or not give Lisi one ball (as a gift)?'

<sup>2</sup> It indicates the two syllables of a bisyllabic predicate.



- b. \*SUBJ + [V(AB) + ~~OBJ1~~ + OBJ2] + [NOT + V(AB) + OBJ1 + OBJ2]  
 \*Zhāngsān [zèngsòng yí gè qiú] [méi zèngsòng Lǐsì yí gè qiú]?  
 Zhangsan give one-CL ball not give Lisi one-CL ball  
 Intended: ‘Did Zhangsan give one ball (as a gift) or not give Lisi one ball (as a gift)?’

For the right side, A-not-A patterns are comparatively more constrained, and the licit omission patterns on the right conjunct only have *two* occurrences: first, both two objects need to be elided together:

- (11) SUBJ + [V(AB) + OBJ1 + OBJ2] + [NOT + V(AB) + ~~OBJ1~~ + ~~OBJ2~~]  
 Zhāngsān [zèngsòng Lǐsì yí gè qiú] [méi zèngsòng]?  
 Zhangsan give Lisi one-CL ball not give  
 ‘Did Zhangsan give Lisi one ball (as a gift) or not give?’

Second, the whole verb phrase can be elided together, only leaving the negator intact:

- (12) SUBJ + [V(AB) + OBJ1 + OBJ2] + [NOT + ~~V(AB)~~ + ~~OBJ1~~ + ~~OBJ2~~]<sup>3</sup>  
 Zhāngsān [zèngsòng Lǐsì yí gè qiú] [méi(yǒu)]?  
 Zhangsan give Lisi one-CL ball not  
 ‘Did Zhangsan give Lisi one ball (as a gift) or not?’

Nevertheless, on the right, neither object 1 nor object 2 can be deleted individually:

- (13) a. \*SUBJ + [V(AB) + OBJ1 + OBJ2] + [NOT + V(AB) + OBJ1 + ~~OBJ2~~]  
 \*Zhāngsān [zèngsòng Lǐsì yí gè qiú] [méi zèngsòng Lǐsì]?  
 Zhangsan give Lisi one-CL ball not give Lisi  
 Intended: ‘Did Zhangsan give Lisi one ball (as a gift) or not?’  
 b. \*SUBJ + [V(AB) + OBJ1 + OBJ2] + [NOT + V(AB) + ~~OBJ1~~ + OBJ2]  
 \*Zhāngsān [zèngsòng Lǐsì yí gè qiú] [méi zèngsòng yí gè qiú]?  
 Zhangsan give Lisi one-CL ball not give one-CL ball  
 Intended: ‘Did Zhangsan give Lisi one ball (as a gift) or not?’

Moreover, the syllable separation ellipsis is not allowed on the right conjunct:

- (14) \*SUBJ + [V(AB) + OBJ1 + OBJ2] + [NOT + ~~V(AB)~~ + ~~OBJ1~~ + ~~OBJ2~~]  
 \*Zhāngsān [zèngsòng Lǐsì yí gè qiú] [méi zèng-]?  
 Zhangsan give Lisi one-CL ball not gi-  
 Intended: ‘Did Zhangsan give Lisi one ball (as a gift) or not?’

The asymmetries of the A-not-A patterns on the left and right sides are summarised as follows:

<sup>3</sup>Example 12 shows that the ellipsis appears on the right-hand side and that only the negator is retained. This type of question is commonly referred to as the ‘VP-neg question’ (M. Zhang 1990 and Zhu 1991), which is formed by ending the question with an aspect-sensitive negation maker such as *bù* or *méi(yǒu)*. Although the derivation of VP-neg questions remains debatable (Cheng et al. 1996; Hsieh 2001), this paper advocates a unified analysis of the VP-neg question and other A-not-A variants under a synchronic view (Gasde 2004). The VP-neg question will be treated as one of the different variants of the A-not-A omission patterns.

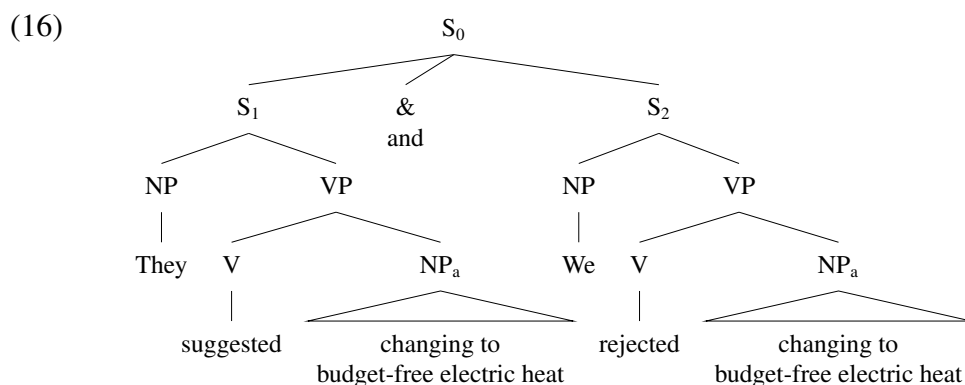
- (15) The asymmetries of omission patterns on the left and right conjuncts
- Omission is allowed to apply below the word level on the left conjunct but not on the right conjunct, comparing (9) with (14).
  - The lowest constituent can be deleted individually on the left conjunct but not the right conjunct, comparing (7) and (13a).
  - The minimum unit retained on the left conjunct is the first syllable of the initial linearised material in the A-not-A coordination (see 9), while the minimum unit retained on the right conjunct is the negator (see 12).

### 3. Backward prosodic deletion on the left conjunct of A-not-A coordination

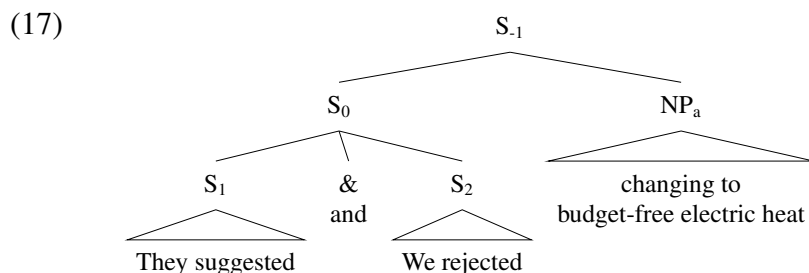
#### 3.1. Left-hand side A-not-A patterns as Right-node raising constructions

I argue that the left-hand side A-not-A patterns (in Huang's terms, the [V-not-VP] type of A-not-A questions) can be captured as Right-node raising (RNR) constructions (as shown in the data from (7) to (9)). Before going on to describe how it works, I must clarify what is meant by RNR properties and RNR-related analyses in this study.

Ross (1967) treated RNR as the syntactic across-the-board (ATB) rightward extraction that applies when mapping from the deep structure to the surface structure. For concreteness, Ross (1973:108; 1967:175) proposes that the surface structure of RNR constructions is obtained by deleting the identical right extremity on each conjunct and right-Chomsky adjoining one copy of the identical right extremity to the conjoined node. In (16), the two conjuncts have the same rightmost element, namely *changing to budget-free electric heat*:



The ATB rightward extraction in the RNR construction converts (16) into (17) by deleting the two original rightmost identical elements and adjoining one of their copies to the right of the coordination node:



Since Ross, RNR has gradually evolved into a phenomenon rather than a specific rule. This is because, although RNR constructions involve the same surface structure, RNR structures involve a large number of peculiarities that make it impossible to formulate a specific RNR rule properly. In this case, there is still no consensus on the analysis of RNR derivations to date, with related analyses such as the backward deletion analysis from Wilder 1997, Hartmann 2000, Chaves 2014, Booij 1985 among others; the multi-dominance analysis from McCawley 1982, Wilder 1999, De Vries 2009, among others; the ATB rightward extraction from Ross 1967, Postal 1974, Sabbagh 2007, among others; and a dual multi-dominance-plus-ellipsis analysis from Barros & Vicente 2011, and Belk et al., 2023. In the present study, I will not be addressing the issue of how to define RNR constructions, nor how to analyse them comprehensively, but rather, along the lines of Hartmann (2000) and Chaves (2008, 2014), be arguing that the [V-not-VP] type of A-not-A patterns (exhibiting RNR phenomena) can be captured by backward prosodic deletion.

Prosodic deletion is independently motivated elsewhere in the literature. For example, Chaves (2008, 2014) introduces *backward periphery deletion* in analysis of Right-node Raising phenomena, in which he delimits RNR cases into VP/N'-ellipsis, across-the-board extraposition and backward periphery deletion. Backward periphery deletion is modelled as a linearisation-based operation: it can apply in any pair of peripheral strings when their morph forms are the same as their postcedents. Further, what is retained after deletion must be able to stand alone prosodically (Booij 1985). The backward prosodic deletion analysis can capture the deletion of non-constituents and word-parts (Chaves 2014), and these deletion patterns do occur in left-hand side A-not-A patterns.

(18) Chaves (2008:269)  
The French and the Germans are excellent ORTHO-~~[dɔntists]~~ and PERIO-[dɔntists]

(19) SUBJ + [V(AB) + OBJ1 + OBJ2] + [NOT + V(AB) + OBJ1 + OBJ2]  
Zhāngsān [zèng-] [méi zèngsòng Lǐsì yígè qiú]?  
Zhangsan gi- not give Lisi one-CL ball  
'Did Zhangsan give or not give Lisi one ball (as a gift)?'

In the above examples, RNR applies below the  $X^0$ -level, which is considered a typical case and can be explained by prosodic deletion rather than a movement or multidominance account of RNR, because in the latter two analyses, they must additionally explain why word-parts can be accessible to syntax (Booij 1985; Hartmann 2000; Chaves 2008, 2014; Artstein, 2002). Note the syllable separation pattern in A-not-A questions does not apply only to verbal heads (modals/auxiliaries/verbs), but also to adjectives, prepositions or adverbs, provided that they are the initial linearised material in the A-not-A coordination. In the following example, word-part deletion occurs on the adverb, but is not allowed to occur on the verb, because the verb is not the initial element in the A-not-A coordination.

(20) a. Nǐ [jīngcháng tiàowǔ] [bù jīngcháng tiàowǔ]?  
you often dance not often dance  
'Do you dance often?'  
b. ??Nǐ [jīngcháng tiàowǔ] [bù tiàowǔ]?  
you often dance not dance

Intended: ‘Do you dance often?’

### 3.2. Backward prosodic deletion: word-part prosodic deletion & phrasal prosodic deletion

The patterns of A-not-A constructions on the left-hand side can be captured by prosodic backward deletion: it runs from right to left (on the left conjunct), deleting almost anything that can be deleted on the way. This phenomenon is not essentially syntactic, but linearisation-based (Chaves, 2014:838). There are two types of prosodic deletion in A-not-A questions<sup>4</sup>:

- (21) *Phrasal prosodic deletion* deletes one phrase or two phrases or more and then leaves behind at least one phrase; as shown in examples (7) and (8).
- a.  $[(\sigma\sigma) (\dots) (\leftarrow\dots)]$  [not  $(\sigma\sigma) (\dots) (\dots)$ ]      *only one phrase elided on the left*  
 b.  $[(\sigma\sigma) (\leftarrow\dots)(\leftarrow\dots)]$  [not  $(\sigma\sigma) (\dots) (\dots)$ ]      *more than one phrase elided on the left*
- (22) *Word-part prosodic deletion* can go all the way back to the inside of the initially linearised word and leaves behind a prosodically well-formed part of a word, see (9).
- a.  $[(\sigma\sigma)(\leftarrow\dots)(\leftarrow\dots)]$  [not  $(\sigma\sigma) (\dots) (\dots)$ ]      *deletion below the word level*  
 b.  $[(\sigma\sigma\sigma)(\leftarrow\dots)(\leftarrow\dots)]$  [not  $(\sigma\sigma\sigma) (\dots) (\dots)$ ]      *deletion below the word level*

Chaves (2008) compares both phrasal and word-part deletion in terms of morphological, semantic, syntactic and phonological properties and argues that, firstly, prosodic deletion is sensitive to all of these properties. Secondly, all of these properties apply in the same way to phrasal and word-part instances of deletion. Thus, he proposes that backward prosodic deletion applies uniformly to both phrasal and word-part structures.

In A-not-A questions, I argue that, in the same vein of Chaves (2008), sublexical operation is exactly the same as phrasal operation in the framework of prosodic deletion. Word-part deletion removes the syllables from left to right, leaving only the linearly leftmost one(s) that can stand alone prosodically, while phrasal deletion can remove any number of phrases from left to right, but is guaranteed to leave at least one phrase. Prosodic deletion can capture all the grammatical left-hand side A-not-A patterns, as shown in (7-9).

The ungrammatical left-hand side A-not-A pattern in (10b) can be excluded by the Right Edge Restriction (Sabbagh, 2007:356; see also Hartmann, 2000; Postal, 1974; Wilder, 1997, 1999):

- (23) Right Edge Restriction (RER)  
 In the configuration:  $[[A \dots X \dots] \text{Conj. } [B \dots X \dots]]$   
 X must be rightmost within A and B before either (i) X can be deleted from A; (ii) X can be rightward ATB-moved; or (iii) X can be multiply dominated by A and B.

the string undergoing RNR operation needs to be the rightmost element in a conjunct. Compare the following contrasts (Citko, 2017:18):

<sup>4</sup> Please note that the power of backward prosodic deletion is not unlimited, it needs to be subsumed under independently-grounded prosodic constraints. For what is deleted/ what stands at the pivot position, Swingle (1993; see also McCawley 1998) argues that the size of a RNR pivot should be an independent intonational phrase. Due to space limitations, I will leave the restrictions on phonologically conditioned deletion to further discussion.

- (24) a. Leslie wrote \_\_\_\_, and Terry reviewed, **a new manuscript**.  
 b. \*Leslie sent \_\_ to Terry, and Terry reviewed, **a new manuscript**.

I will refer to an *RNR pivot* as an element that is both deleted on the first conjunct and shown in the rightmost position of a RNR construction, following the literature on RNR. In (24a), both the gap and the pivot are the rightmost elements of the two conjuncts, and according to (23), this RNR structure is grammatical. By contrast, in (24b), the gap is not rightmost within the initial conjunct, resulting in ungrammaticality. (10b) is ungrammatical (repeated below) since the RNR operation is disallowed to target elements other than the rightmost one.

- (25) \*SUBJ + [V(AB) + ~~OBJ1~~ + OBJ2] + [NOT + V(AB) + OBJ1 + OBJ2]  
 \*Zhāngsān [zèngsòng yígè qiú] [méi zèngsòng Lǐsì yígè qiú]?  
 Zhangsan give one-CL ball not give Lisi one-CL ball  
 Intended: ‘Did Zhangsan give one ball (as a gift) or not give Lisi one ball (as a gift)?’

In summary, the omission patterns on the left conjunct in an A-not-A coordination can be captured by the prosodic deletion analysis, which applies to both phrasal and sublexical structures. A further fact in support of this analysis is that all deletion patterns on left conjunct need to satisfy the Right Edge Restriction, a pre-condition for deriving deletion patterns in RNR structures.

#### 4. Issues with Huang’s analysis I: Lexical Integrity Hypothesis and P(reposition)-stranding

With this caveat in mind, let us return to the two arguments in Huang’s (1991) analysis. One concerns the Lexical Integrity Hypothesis; and the other concerns preposition stranding. I argue that neither leads ineluctably to Huang’s analysis, and propose instead that appealing to an independently motivated prosodic process is a better approach.

Huang (1991, see also Huang et al., 2009) proposes two important arguments to contribute to the delineation of the [VP-not-V] and [V-not-VP] types. One involves the violation of the Lexical Integrity Hypothesis (LIH), which states that the phrase-level rules targeting in syntax are prohibited from affecting subparts of words. Specifically, as I described in Section 2, the syllable separation pattern is allowed on the left conjunct but not on the right conjunct, comparing (9) with (14).

The other argument is that the A-not-A patterns on the left allow P(reposition)-stranding, whereas the A-not-A patterns on the right prohibit it, in the same way that prepositions in declarative sentences cannot take an empty category as their object (Hornstein & Weinberg, 1981), as seen in the following examples.

- (26) P-stranding in declarative sentence (Huang et al., 2009:249)  
 Bōshìdùn nán-zhàn, wǒmen míngtiān jiù cóng \*(nàr) chūfā.  
 Boston South-Station we tomorrow then from there depart  
 ‘Boston South Station, we shall then depart from \*(there) tomorrow.’
- (27) P-stranding in A-not-A question  
 a. *The [V-not-VP] form*

Zhāngsān [cóng] [méi cóng Běijīng chūfā]?  
 Zhangsan from not from Beijing depart  
 ‘Did Zhangsan leave from Beijing or not?’

b. *The [VP-not-V] form*

??Zhāngsān [cóng Běijīng chūfā] [méi cóng]?  
 Zhangsan from Beijing depart not from  
 Intended: ‘Did Zhangsan leave from Beijing or not?’

In example (26), P-stranding is prohibited in the declarative sentence and in example (27), the A-not-A patterns of the left and right conjuncts show a parallel distinction in P-stranding, i.e., it is permitted on the left but not on the right.

On the basis of these two arguments, on the one hand, the [V-not-VP] involves syllable separation patterns that cannot be explained in syntax due to the violation of LIH, and by this logic, syllable separation patterns can only occur phonologically. Huang, therefore, proposes a reduplication analysis for the [V-not-VP] form. On the other hand, unlike the [VP-not-V] form, the [VP-not-V] type disallows the syllable separation pattern and prohibits P-stranding. In this case, Huang argues that this form undergoes Anaphoric Ellipsis against the full-size A-not-A coordination.

I agree with Huang (1991) that A-not-A patterns on the left and the right conjuncts should be treated differently. However, the two arguments that support Huang’s reduplication analysis are also consistent with RNR properties.

First, as I mentioned in Section 3.1, the word-part deletion pattern on the left conjunct can be captured by a prosodic deletion account of RNR. By contrast, the word-part deletion pattern is not allowed on the right conjunct, because another omission mechanism is in effect, which requires that the right syntactic configuration licenses ellipsis before it can take place. Word-part deletion cannot be syntactically licensed properly and is therefore prohibited, see more details in Section 6.

Moreover, RNR allows P-stranding in languages in which the ban on P-stranding is absolute, such as Irish (McCloskey 1979:132; 1986:184):

(28) P-stranding in Irish

a. without P-stranding in declarative sentence

Ba leis-an ghirseach bheag rua aL bhí Tarlach de Brún ag  
 was with-the girl little red-haired COMP was Charlie Brown at  
 caint.  
 talking

‘It was to the little red-haired girl that Charlie Brown was talking.’

b. with P-stranding in declarative sentence

\*Ba í an ghirseach bheag rua aN raibh Tarlach de Brún ag  
 was her the girl little red-haired COMP was Charlie Brown at  
 caint le.  
 talking with

‘It was the little red-haired girl that Charlie Brown was talking to.’

c. with P-stranding in RNR construction

Brian Mag Uidhir ... ag glacadh le agus ag cabhrú le plandáil  
 Brian Maguire PROG take with and PROG help with planting  
 a dtailte féin...  
 their lands REFLEX

‘Brian Maguire ... accepting, and helping with, the planting of their own lands’

In Irish, RNR constructions allow P-stranding (28c), which is forbidden in normal declarative sentences (28b). This is the same fact as in the A-not-A question where the left conjunct allows P-stranding patterns since they are RNR structures, whereas the right conjunct and declaratives do not.

So far, both Huang’s reduplication analysis and the linearisation-based prosodic deletion seem to capture the left-hand side A-not-A patterns. The difference, however, is that the backward prosodic deletion analysis can be motivated on independent grounds dating back to Ross (1976) and Booij (1985). I argue that the reduplication analysis proposed to explain the left-hand side A-not-A patterns is not economical compared to the independently motivated backward deletion analysis, in which full-size A-not-A sequences undergo prosodic deletion below or above the word-level.

### 5. Issues with Huang’s analysis II: ‘Fake’ negation vs. ‘real’ negation

In this section, I will focus on an important unresolved issue in Huang’s proposal, namely, how the mechanism of phonological insertion of an aspect-sensitive negation in A-not-A questions works. I will also provide examples to illustrate that the independent syntactic link between negation and predicate in declaratives is also operative in A-not-A questions. I will conclude from this that there is no motivation in favour of the existence of a purely phonological negation insertion.

The negator in an A-not-A question can be either *bù* or *méi*, depending on the aspectual property of verbal phrases (Huang et al., 2009). *Bù* is selected when it negates a clause which denotes an unbounded situation, whereas *méi* is selected when it negates a clause which denotes a bounded situation (Lin 2003, see also J. Shen 1995).

- (29) a. Tā [xǐhuān] [bù/\*méi xǐhuān zhèběn shū]?  
 he like not like this.CL book  
 ‘Does he like this book?’  
 b. Tā [xǐhuān-guò] [méi/\*bù xǐhuān-guò zhèběn shū]?  
 he like-GUO not like-GUO this.CL book  
 ‘Has he ever liked this book?’

Unlike (29a), where *bù* is used in an unbounded event, when the experiential marker -GUO is suffixed to the verb in (29b), the negator *méi* is used to denote a bounded event.

McCawley (1994) counters Huang’s proposal by arguing that the negation in the [V-not-VP] type of the A-not-A questions is a real negation. As we saw above, Huang (1991) proposes that the negation is added to [V-not-VP] by phonetically realised insertion, and that the negation does not appear in the syntactic structure, in which case McCawley refers to the phonetically realised negation as *fake negation*. However, McCawley (1994, p.180) points out that, according to Huang’s phonological insertion proposal, an element like *yě* ‘also’ or even *jiàngyóu* ‘soy sauce’,

when inserted into the [V-not-VP] sequence, is not substantially different from the negator *bù* or *méi*. This is because there is no motivation in the morphophonology for *bù* or *méi* over any other morpheme, but this prediction is not borne out: other morphemes inserted between the two conjuncts in the A-not-A question are ruled out.

Another piece of evidence showing that negation is a real negation in the A-not-A question is that predicates that cannot occur with negators in declarative sentences cannot occur in A-not-A questions either (McCawley 1994). The bisyllabic predicates exemplified below are composed with the first syllable transparently negating the second (henceforth, I shall use the term *transparent negative compound* to indicate this kind of predicates), and the pattern of co-occurrence between the predicates and the negators is consistent in declaratives and A-not-A questions (McCawley 1994, pp.181-183):

- (30) a. Tā wúquán gānyù.  
 he without.right interfere  
 'He has no right to interfere.' [In declarative sentence]
- b. \*Tā bù/méi wúquán gānyù.  
 he not without.right interfere  
 'He does not have no right to interfere.' [In the negative declarative sentence]
- c. \*Tā [wú-] [bù/méi wúquán gānyù]?  
 he without not without.right interfere  
 Intended: 'Does/Did he have no right to interfere?' [In the A-not-A question]

The transparent negative compounds are allowed in the affirmative declarative sentence (30a), but not in the negative declarative sentence and the A-not-A question (30b-c). In which cases, the transparent verb *wúquán* cannot be negated.

If we were to adopt phonologically inserted negation, then we would need a rule that inserts negation to be sensitive to these different predicates in exactly the same way that syntactic negation clearly is. If we say that the negation in A-not-A questions is syntactic, then the set of patterns found is expected and nothing extra needs to be said. It follows that we should treat negation in A-not-A questions as syntactic, not phonological. In the later work, Huang et al. (2009), based on the suggestion by McCawley's (1994), adapts the negation insertion as 'turning the second of the identical parts into its appropriate negative form' (p.253). However, these adjustments still leave unanswered the question of whether the negation in A-not-A questions should be encoded in the syntactic structure or whether they should be encoded purely phonetically. In this case, I argue that the [V-not-VP] type of the A-not-A question also derives from the full-size A-not-A coordination, in which both affirmative and negative conjuncts are encoded in the syntactic structure. This is why in the A-not-A question, the complex co-occurrence patterns of predicates and negation are the same as those observed with the corresponding declarative sentences.

To sum up, there are some problems with the theoretical framework on which Huang builds his account. His two arguments that LIH is violated and that P-stranding is permitted in the [V-not-VP] form, do not uniquely point to his reduplication analysis, the string-based prosodic deletion captures both aspects as well. More advantageously, backward prosodic deletion in the framework of RNR analyses is in fact mostly motivated on independent grounds in comparison to the reduplication analysis, thus it is feasible to pursue the backward deletion analysis in the [V-not-VP] form. Moreover, there is independent syntactic link between negation, predicate



selection and predicate aspectuality in both declaratives and A-not-A questions, so that the analysis involving phonological insertion of negation is not appropriate for A-not-A puzzles.

### 6. Forward ellipsis on the right conjunct of A-not-A coordination

Huang's Anaphoric Ellipsis analysis on [VP-not-V] could be better developed with the help of the PF-deletion account. It has become popular in omission research in mainstream generative frameworks, where the elided material has full syntactic structure but just remains unpronounced in Phonetic Form (PF). Furthermore, it remains unclear under what licensing and identification conditions the Anaphoric Ellipsis proposed by Huang (1991) in explaining the [VP-not-V] form can work, which can be achieved by drawing on Lobeck's (1993), Merchant's (2001) and Aelbrecht's (2010) theories advanced in my research.

#### 6.1. Forward syntactically-conditioned ellipsis: licensing and identification

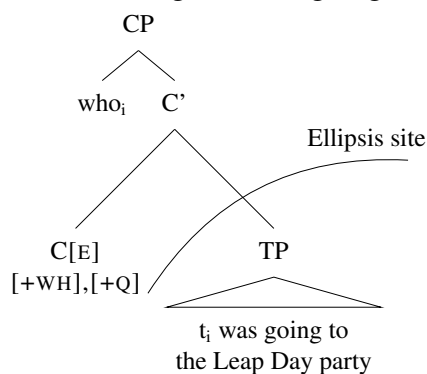
Before turning to the omission patterns on the right conjunct of an A-not-A question, the difference between *deletion* and *ellipsis* in this work should be clarified: they both result from the nonrealisation of syntactic structure at PF. In both cases, the elided constituent has to be recoverable under the identity of the proper antecedent/postcedent. However, ellipsis is a very particular type of deletion: it has to be licensed and identified in advance by particular heads and features at syntax.

Ellipsis can only take place when it is licensed by particular heads, namely licensors, and is identified through association with agreement features (Lobeck 1993, 1995; Johnson 2001; Merchant 2001, 2004; Aelbrecht 2010, among others). In what follows, I will briefly discuss Merchant's (2001) proposals, on which my analysis of ellipsis in A-not-A questions will draw.

Building on Lobeck's (1993, 1995, 1999) findings, Merchant (2001) argues that only certain heads have the ability to license the ellipsis of their complements. What is different from Lobeck (1993, 1995, 1999), Merchant postulates an ellipsis feature [E], which only occur with certain heads, establishing a feature-feature checking relation. Specifically, Merchant argues that in sluicing, [E] feature is checked only by [+wh, +Q] on C head. The omission of the head's complement at PF, namely TP, is triggered after feature checking (identification). See the following example and tree diagram (Merchant, 2001):

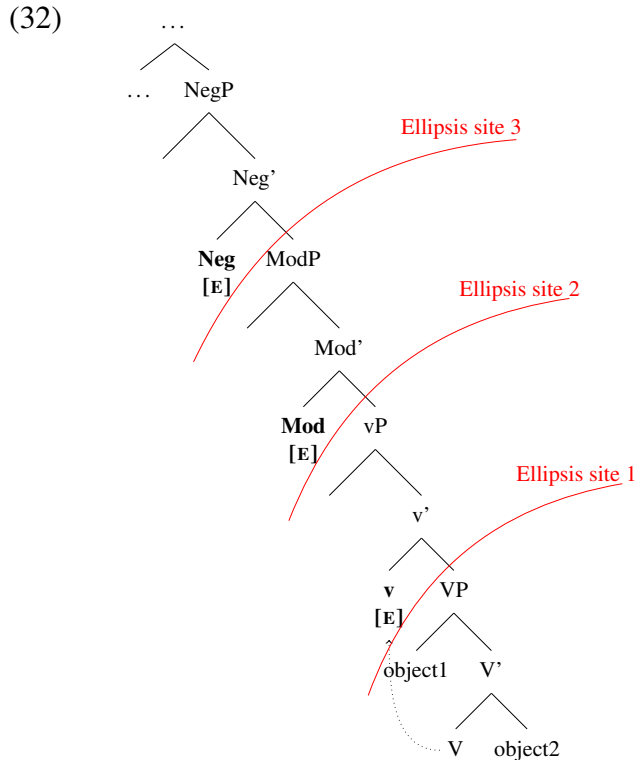
(31) a. One of the linguists was going to the Leap Day party, but no-one told me who.

b.



In the above sluicing example, [E]-feature triggers deletion of the complement (TP) of the head (C) on which it resides.

Along the same lines of Lobeck (1995, 1999) and Merchant (2001, 2004), I argue that, ellipsis on the right conjunct of A-not-A questions is licensed by overt functional heads (i.e., Neg, Mod, v...). Ellipsis is identified by the [E]-feature resides on these functional heads. The ellipsis licensing head and the ellipsis site stand in a head-complement relation and the result of ellipsis is to send off the complement of the functional head where the [E]-feature is located to PF, as shown in the following tree diagram.



The syntactically conditioned ellipsis analysis straightforwardly captures the right-hand side A-not-A patterns discussed in the previous sections. Comparing (11) with (13a), as repeated below, only if both objects are deleted together, the A-not-A sequence is grammatical. It can be accounted for in (32), where the verb is raised from V to v, with v acting as a functional head with [E]-feature licensing and identifying the ellipsis of both objects.

- (33) a. SUBJ + [V(AB) + OBJ1 + OBJ2] + [NOT + V(AB) + ~~OBJ1~~ + ~~OBJ2~~]  
 Zhāngsān [zèngsòng Lǐsì yí gè qiú] [méi zèngsòng]?  
 Zhangsan give Lisi one-CL ball not give  
 ‘Did Zhangsan give Lisi one ball (as a gift) or not give?’
- b. \*SUBJ + [V(AB) + OBJ1 + OBJ2] + [NOT + V(AB) + OBJ1 + ~~OBJ2~~]  
 \*Zhāngsān [zèngsòng Lǐsì yí gè qiú] [méi zèngsòng Lǐsì]?  
 Zhangsan give Lisi one-CL ball not give Lisi  
 Intended: ‘Did Zhangsan give Lisi one ball (as a gift) or not?’

In (12), as repeated below, the whole verb phrase is elided, only leaving the negator intact. In

this case, Neg with [E]-feature licenses and identifies its complement to be left unpronounced.

- (34) SUBJ + [V(AB) + OBJ1 + OBJ2] + [NOT + V(AB) + OBJ1 + OBJ2]  
 Zhāngsān [zèngsòng Lǐsì yíge qiú] [méi(yǒu)]?  
 Zhangsan give Lisi one-CL ball not  
 ‘Did Zhangsan give Lisi one ball (as a gift) or not?’

Accordingly, the ungrammaticality of (13b) and (14) is either due to the fact that the complement of the licensor has not been completely deleted, or that there is no appropriate syntactic head to license the deletion. Due to space constraints, I will not go into detail here.

Importantly, the syntactic structure in (32) can be independently motivated by the cross-linguistic existence of Modal Complement Ellipsis (see Aelbrecht 2010), Negation Complement Ellipsis (see Lobeck, 1995:154) and Verb-stranding VP Ellipsis (see Goldberg 2005). Due to space constraints, only VP ellipsis (VPE) will be discussed below, as there are significant differences between Chinese and English VPEs. In what follows, I argue:

- (35) The differences between Chinese and English VPEs  
 a. English VPE is tense-involved.  
 b. Chinese VPE is not tense-involved.

To be concrete, English VPE is licensed and identified by the lexically filled inflectional head T with strong agreement feature [+TENSE] (Zagona 1982, 1988a,b; Lobeck 1993, 1995). For instance, English VPEs can run successfully when a finite auxiliary verb *have* or *be* (in 36a), the ‘dummy’ auxiliary *do* (in 36b), or a modal (in 36c), fills T (Lobeck 1999:111):

- (36) a. First fire was pouring out of the building, and then smoke **was** ~~pouring out of the building~~.  
 b. Before John **did** ~~read *War and Peace*~~, Mary read *War and Peace*.  
 c. Even though her coach thinks Mary **should** ~~continue swimming two miles a day~~, she won’t continue swimming two miles a day.

Nonfinite *have* and *be* cannot license and identify VPEs (Lobeck 1999:113):

- (37) Contexts: The company asks that employees be finished with lunch by 2 pm.  
 a. \*The company recommends that they **be**, in order to be back on the job by 2:05.  
 b. The company hopes that they **are**, in order to be back on the job by 2:05.

By contrast, on the one hand, there is no consensus on whether a finite/nonfinite contrast exists in Mandarin Chinese (see Huang 1998, Li 1990, Tang 1990, Paul 2002, Lin 2011, among others assume this contrast, whereas Hu et al. 2001, Grano 2017 argue against this contrast). On the other hand, even when ellipsis cases are tested in structures where researchers (mainly Lin 2011 and Huang 1998) have argued for the existence of a non-finite/infinite distinction, the ellipsis patterns still show no difference in these structures. Specifically, Lin (2011) argues that the epistemic modals in Chinese, like *kěnéng* ‘be likely to’, take a finite TP complement, whereas the root modals, like *néng*, take a nonfinite TP complement. As in the following examples, VPEs are tested in the TP complement of either *kěnéng* or *néng*, and the results confirm that VPEs are permitted in both finite clause of *kěnéng* and nonfinite clause of *néng*.

- (38) *VPE in finite embedded clauses of kěnéng: negator and verb stranded*  
 Zhāngsān kěnéng [zài chī hàn**bǎo**], dàn Lǐsì [kěnéng méi(yǒu) zài chī hàn**bǎo**].  
 Zhangsan maybe ZAI eat burger but Lisi maybe not ZAI eat burger  
 ‘Zhangsan maybe eating a burger, but Lisi may not be.’
- (39) *VPE in nonfinite embedded clause of néng: negator and verb stranded*  
 Zhāngsān néng [qù Běijīng] le, Lǐsì néng [bú qù Běijīng] le.  
 Zhangsan be.able.to go Beijing LE Lisi be.able.to not go Běijīng LE  
 ‘It has become the case that Zhangsan is able to go to Beijing and Lisi is able to not go to Beijing.’

Even when embedded clauses are distinguished between non-finite and finite contexts, no significant difference is found between non-finite and finite clauses in terms of VP ellipsis, let alone other contexts that show that there is no finite/non-finite contrast in Mandarin Chinese. In this sense, I propose that the different patterns of Chinese and English VP ellipsis can actually be attributed to the fact that English VPEs involve tense, while Chinese VPEs do not.

In summary, the omission patterns on the right conjunct of an A-not-A coordination can be captured by syntactically licensed ellipsis. The ellipsis feature [E] is only compatible with overt functional heads. A licensor bearing [E]-feature licenses and identifies the ellipsis of the licensor’s complement, which is left unpronounced at PF after ellipsis takes place.

## 7. Conclusion

The aim of this paper has been to analyse the different variants of the Chinese A-not-A interrogative in a uniform manner: the syntax of A-not-A questions is an asyndetic coordination. Different variants are derived from either backward prosodically-conditioned deletion or forward syntactically-conditioned ellipsis against the full-size of an A-not-A coordination. I argue against Huang’s (1991) proposal, since the two arguments Huang proposes regarding the asymmetrical patterns between [V-not-VP] and [VP-not-V] forms do not lead ineluctably to his modular approach. Rather, backward prosodic deletion and forward syntactically-conditioned ellipsis can also capture all the patterns, let alone they are backed by more independently motivated theories and supported by cross-linguistic data. Moreover, in Huang (1991), the negation in A-not-A questions is derived from phonological insertion, which fails to explain why negation is aspect-sensitive and behaves in the same way as negation in declarative sentences, where it is constructed in syntax. In Huang et al. (2009), this issue still remains unclear.

Backward prosodic deletion proceeds sequentially from right to left in the initial conjunct of an A-not-A question, and it can apply to both sublexical and phrasal structures (Chaves 2008). This explains why omissions patterns on the left conjunct can target the lowest constituent of a ditransitive construction as well as word-parts.

Differently, forward ellipsis is syntactically licensed by overt functional heads bearing [E]-feature. When ellipsis takes place, the complete complement of the licensor is sent off to PF, where it is inaccessible to narrow syntax (Aelbrecht, 2010). This explains why the lowest constituent of a ditransitive construction cannot be elided, since V is not a licit licensor that permits ellipsis (see (32)). Moreover, syntactically licensed ellipsis does not apply below the word level.

The different mechanisms of omission between left and right conjuncts capture the asymmetrical patterns of different A-not-A variants.

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### Abbreviations

CL	classifier	COMP	complementiser
DE	prenominal modifier marker	INFL	inflection
LE	perfect/inchoative marker	PROG	progressive
REFLEX	reflexive	T, TP	tense, tense phrase
ZAI	progressive marker		

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# Chamorro’s person-animacy restriction, inertness and dynamic feature gluttony

James Morley

Chamorro (Austronesian) exhibits a person-animacy restriction (PAR) with a typologically unusual property, which I refer to as *1<sup>st</sup>-person inertness*: 1<sup>st</sup>-person pronouns are grammatical in any configuration with any other argument. This paper argues that this property poses a non-trivial problem for all contemporary theories of person-animacy restrictions in minimalist syntax: specifically it yields a paradox, the *Inertness Paradox*, based on two assumptions shared by almost all contemporary approaches. This can be resolved on the basis of two innovations: (i) the claim that the feature [SPECIFIC] in Chamorro is underspecified on 1st-person; and (ii) a new theory of PARs, which combines Coon & Keine’s (2021) feature gluttony model with Deal’s (2024) dynamic interaction architecture.

## 1. Introduction

### 1.1. Chamorro’s person-animacy restriction

In person-animacy restrictions (PARs), or ‘hierarchy effects’, the (un)grammaticality of a configuration containing two arguments – either an external-internal argument (EA-IA) or internal-internal argument (IA-IA; descriptively, goal-theme) pair – depends on their person and animacy properties, broadly construed (Coon & Keine 2021:655). Descriptively, the (structurally) lower argument cannot ‘outrank’ the higher on a ‘person-animacy hierarchy’ (PAH).

Chamorro (Malayo-Polynesian; Austronesian) exhibits a person-animacy restriction which constrains possible combinations of external and internal arguments in (mono)transitive clauses.<sup>1</sup> The restriction and the corresponding ‘person-animacy hierarchy’ are stated in (1) and (2) respectively (synthesizing Chung 2014; Chung 2020:353-360).

#### (1) **Chamorro person-animacy restriction**

The internal argument cannot outrank the external argument on the Chamorro-specific person-animacy hierarchy.

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<sup>1</sup> The ungrammatical configurations are typically produced via passivisation or antipassivisation instead; i.e., by valency-reducing operations (Chung 2014:7).

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(2) **Chamorro-specific person-animacy hierarchy**

2<sup>nd</sup>-person > 3<sup>rd</sup>-person animate pronoun > 3<sup>rd</sup>-person animate lexical noun > Inanimate  
*shorthand*: 2 > 3' > 3'<sub>lexical</sub> > 0

This corresponds to the set of grammatical and ungrammatical configurations of external and internal arguments in Chamorro summarised in Table 1.

		External Argument					
		1EXCL	1INCL	2	3'	3' <sub>lexical</sub>	0
Internal Argument	1EXCL	✓	✓	✓	✓	✓	✓
	1INCL	✓	✓	✓	✓	✓	✓
	2	✓	✓	✓	*	*	*
	3'	✓	✓	✓	✓	*	*
	3' <sub>lexical</sub>	✓	✓	✓	✓	✓	*
	0	✓	✓	✓	✓	✓	✓

Table 1. Distribution of (un)grammatical EA-IA configurations in Chamorro

This can be understood in terms of three overlapping 'sub-restrictions', relating to three different components of 'person'/'animacy': a person subrestriction, an animacy subrestriction and a referentiality restriction. These are summarized and exemplified in (3-5).

**Animacy subrestriction:** inanimate external arguments cannot co-occur with animate internal arguments. This excludes 0>>2, 0>>3', 0>>3'<sub>lexical</sub>. (3) exemplifies \*0>>3'<sub>lexical</sub>.

- (3) \**Ha na'-kâti i manenghing i neni.*  
 3SG.REAL CAUS-cry the cold the baby  
 Intended: 'The cold made the baby cry.' (Aissen 1997:736)

**Referentiality subrestriction:** lexical external arguments cannot co-occur with animate pronominal internal arguments. This excludes 3<sub>lexical</sub>>>2, 3<sub>lexical</sub>>3' and (where the inanimate argument is lexical) 0>>2, 0>>3'. (4) exemplifies \*3'<sub>lexical</sub>>>3'.

- (4) \**Para u bisita siha si Juan agupa'.*  
 FUT 3SG.IRR visit them UNM Juan tomorrow  
 Intended: 'Juan is going to visit them tomorrow.' (Chung 2014:5)

**Person subrestriction:** 3<sup>rd</sup>-person external arguments cannot co-occur with 2<sup>nd</sup>-person internal arguments. This excludes 3'>>2, exemplified in (5) (in addition to 0>>2, \*3'<sub>lexical</sub>>>2).

- (5) \**Kao ha kuentusi hâo ântis di u hânao?*  
 Q 3SG.REAL speak.to you before 3SG.IRR go  
 Intended: 'Did he speak to you before he left?' (Chung 2014:5)

1.2. 1<sup>st</sup>-person inertness

This person-animacy restriction has a typologically unusual property: 1<sup>st</sup>-person pronouns – singular and plural (exclusive and inclusive) – are not affected by it. That is, 1<sup>st</sup>-person pronouns are grammatical in any configuration as an external argument (1>>...) or an internal argument (...>>1) co-occurring with any other type of argument. This is unexpected insofar as, cross-linguistically, 1<sup>st</sup>-person pronouns generally do not fail to participate in a PAR in this way unless 2<sup>nd</sup>-person also does (e.g. Clothier-Goldschmidt 2015:fn.1) – contra fact in Chamorro. This is exemplified for three configurations which would standardly be expected to be ungrammatical, given typological trends in person-animacy restrictions (e.g. Croft 2003:130ff.): 3’>>1 in (6a), 3’<sub>lexical</sub>>>1 in (6b) and 0>>1 in (6c).

- (6) a. *Ma ikak yu’ gi karera asta i iskuela.*  
 3PL.REAL defeat me LCL race until the school  
 ‘They defeated me in the school race.’ (Chung 2020:363)
- b. *Ha li’I’ yu’ i che’lu-n Antonio gi nigap.*  
 3SG.REAL see me the sibling-LNK Antonio LCL yesterday  
 ‘The brother of Antonio saw me yesterday.’ (Chung 2020:605)
- c. *Mamokkat yu’ gi hemhum ya ha gua’ding yu’ i*  
 1SG.REAL.walk I LCL dark and 3SG.REAL trip me the  
*hayu.*  
 stick  
 ‘I walked in the dark and the stick tripped me.’ (Chung 2014:11)

I refer to this property as (*1<sup>st</sup>-person*) *inertness*. I define inertness formally in (7). Note that ‘argument type’ refers to the types which are potentially relevant to a person-animacy restriction: for Chamorro, this means that argument types may be defined in terms of person (1<sup>st</sup>-person vs. 2<sup>nd</sup>- vs. 3<sup>rd</sup>-), animacy (3<sup>rd</sup>-person animate vs. 3<sup>rd</sup>-person inanimate) and referentiality (pronoun vs. lexical noun).

(7) **Inertness**

An argument type  $\delta$  is inert iff:

- a. For some argument types  $\alpha$ ,  $\beta$  there is a PAR such that  $*\alpha >> \beta$ ,  $\beta >> \alpha$  (i.e.  $\beta$  ‘outranks’  $\alpha$ ), and;
- b.  $\delta >> \alpha$ ,  $\delta >> \beta$  and  $\alpha >> \delta$ ,  $\beta >> \delta$ .<sup>2</sup>

In this paper I argue that this property of Chamorro’s PAR yields a paradox for (almost) all current theories of person-animacy restrictions in minimalist syntax. This will require sketching a new theory, based on combining two recent proposals about the architecture of Agree (Coon & Keine 2021; Deal 2024).

<sup>2</sup> In principle,  $\delta$  is only nontrivially inert with respect to a person-animacy restriction insofar as we have independent reason to expect arguments of type  $\delta$  to participate in that PAR, a priori. I ignore this herein, however, noting that this does hold in the case of Chamorro: as above, the sensitivity of 2<sup>nd</sup>-persons to a PAR cross-linguistically usually entails the sensitivity of 1<sup>st</sup>-persons, so we have to reason a priori that 1<sup>st</sup>-person should participate. In formal terms, standard assumptions about person feature-specifications are such that, if 2<sup>nd</sup>-person participates, 1<sup>st</sup>-person should too (see, e.g., Harley & Ritter, 2002).

## 2. Inertness poses a problem for previous work

Consider first the problems that 1<sup>st</sup>-person inertness poses for extant theories of person-animacy restrictions. I divide the discussion in two: (i) morphological approaches; (ii) syntactic approaches.

### 2.1. Morphological approaches

Morphological approaches to person-animacy restrictions assume that the ungrammatical configurations are excluded by some property of the morphological component. In practice these approaches are also typically language-specific: they postulate that it is a specific idiosyncratic property of the relevant language, rather than anything universal, which results in the PAR. This is the strategy adopted by the only prior generative analysis of Chamorro's PAR, Chung's (1998, 2014). Chung argues that the typological rarity of 1<sup>st</sup>-person inertness and its inconsistency with pre-existing cross-linguistic generalisations (i.e. that 1<sup>st</sup>-person must outrank 2<sup>nd</sup>-/3<sup>rd</sup>-persons, inanimates, etc.) suggests that Chamorro's PAR is an idiosyncratic property of Chamorro.

This is implemented by Chung (2014) by appeal to 'abortive spell-out' rules. In the syntax, the external and internal arguments (EA, IA) Agree with T<sup>0</sup> and v<sup>0</sup> respectively, whose features then 'pool' postsyntactically on v<sup>0</sup>. The PAR then arises in spelling-out v<sup>0</sup>. PAR-violating configurations trigger abortive spell-out rules: rules whose output is '\*', inducing ungrammaticality. PAR-obeying configurations do not meet the conditions for these rules, so trigger non-abortive spell-out rules instead. 1<sup>st</sup>-person inertness follows because there happens to be no abortive spell-out rule whose conditions are met by any 1>>... or ...>>1 configuration. These rules are illustrated in Table 2.

Type of spell-out rule	Configuration	Spell-out rule
Abortive	*3>>2	v <sup>0</sup> → * [-Participant] <sub>subj</sub> [-Author, +Participant] <sub>obj or poss</sub>
Canonical agreement	3 <sub>(singular)</sub> >>	v <sup>0</sup> → /ha/ [-Author, -Participant, -Plural, -Irrealis] <sub>subj</sub> [φ-obj]
Non-canonical agreement	Subject wh-agreement	v <sup>0</sup> → /um/ [nomWh-Agr] [-Irrealis] [φ-subj]

Table 2. Example spell-out rules from Chung (2014)

There are two main reasons to disfavour a morphological account of any type, including Chung's (2014).

First, Chung's encoding '\*' as a representational primitive, despite lacking phonological/semantic content, is clearly ontologically dubious; '\*' is a diacritic, just stipulating ungrammaticality. Note, however, that Chung's decision to invoke '\*' isn't

arbitrary: it is partly forced. This suggests the ontological dubiousness problem may inhere in morphological analyses more generally. Observe that Chung only needs ‘\*’ because she assumes that PAR-violating configurations’ ungrammaticality results from triggering a spell-out rule: these rules will consequently need the power to induce ungrammaticality, whence Chung’s use of ‘\*’. A common alternative (e.g. Wiltschko 2008), which does not need ‘\*’, assumes PAR-violating configurations’ ungrammaticality results not from triggering a spell-out rule, but failing to trigger one at all: no spell-out rule is conditioned by (a subset of) the feature-specifications involved in (e.g.)  $*3'_{\text{sing}} \gg 2$ , so none applies, making it a ‘paradigmatic gap’; hence ungrammatical. ‘\*’ is then unnecessary. Note, to apply this to Chamorro, no spell-out rule like  $3_{\text{(singular)}} \gg$  in Table 2 can exist: this is conditioned by a subset of the features of (e.g.)  $3'_{\text{(singular)}} \gg 2$ , so would spell it out, making it grammatical. Instead,  $3' \gg 1/2/3'/3'_{\text{lexical}}/0$  all need their own spell-out rules, conditioned by both the EA’s/IA’s features, to ensure that there is no rule underspecified enough to expone  $3' \gg 2$ . Languages with subject and object agreement require this independently: if subject/object agreement occupy the same head,  $3' \gg 1/2/3'/3'_{\text{lexical}}/0$  need separate rules, object agreement differing in each. Crucially, since Chamorro lacks object-agreement, the same assumption is wholly arbitrary:  $3' \gg 1/2/3'/3'_{\text{lexical}}/0$  always spell out the same 3<sup>rd</sup>-person subject/predicate-agreement. This alternative account is thus undesirable for Chamorro. This is suggestive: not only is Chung’s morphological account ontologically dubious, this is arguably partly forced by a common, simpler alternative being unavailable – disfavouring morphological analyses more generally.

Second, morphological accounts are insufficiently predictive. II aside, Chamorro systematically obeys cross-linguistic generalisations on PARs: it otherwise perfectly tracks the PAH; and unlike other ‘morphological’ PARs (e.g. Chukchi; Bobaljik & Branigan 2006), obeys the generalisation that PARs are number-insensitive (Nevins 2011). Indeed, while ‘reverse Chamorro’ – with hierarchy  $0 > 3'_{\text{lexical}} > 3' > 2$  – is apparently unattested, each of Chamorro’s subrestrictions occurs elsewhere:  $*3'/3'_{\text{lexical}}/0 \gg 2$ , including inert 1<sup>st</sup>-person, in Halkomelem and Squamish (Jelinek & Demers 1983);  $*3'_{\text{lexical}} \gg 3'$  (albeit as part of a more general ban on all  $*\text{Nonpronoun} \gg \text{pronoun}$ , irrespective of animacy, unlike Chamorro) in Sierra Zapotec (Sichel & Toosarvandani 2024); and  $*0 \gg 3'/3'_{\text{lexical}}$  in Tzotzil (Aissen 1997). Chamorro’s adherence to these cross-linguistic generalisations can only follow from a language-specific morphological analysis at the cost of proliferating explanations. For example, we might assume some constraint in Chamorro’s morphology, ensuring only PAH-violating configurations could possibly trigger abortive spell-out. However, that this same generalisation holds of other languages is then accidental, requiring a separate (non-Chamorro-specific) explanation. Instead, I propose the null hypothesis that these constraints on PARs have a single, unified explanation; so Chamorro’s PAR should be unified with other PARs. These other PARs being standardly syntactic, we thus assume a unified, syntactic account of Chamorro.

## 2.2. Syntactic approaches

As I now demonstrate, however, contemporary syntactic theories of person-animacy restrictions cannot capture 1st-person intertense either. I first outline in abstract terms the problem that inertness poses for these theories, on the basis of two assumptions they share; before showing in more concrete terms how this arises for a small sample of theories.

Chung (2014:11) already notes that the treatment of 1<sup>st</sup>-persons in Chamorro’s PAR poses a paradox for one kind of approach to PARs, Nevins’ (2007), because 1<sup>st</sup>-person cannot be

assigned a feature specification. I generalise this, by demonstrating that 1<sup>st</sup>-person inertness in fact poses a paradox for (almost) all approaches to PARs. To see this, observe first that (almost)<sup>3</sup> all contemporary approaches to PARs make the following two abstract assumptions.

- (8) a. **Assumption 1 (A1)**  
 For two argument types  $\alpha$ ,  $\beta$ ,  $*\alpha \gg \beta$  &  $\beta \gg \alpha$  (i.e. ' $\beta$  outranks  $\alpha$ ') iff  $\beta$  is more featurally specified than  $\alpha$  with respect to some standard S.
- b. **Assumption 2 (A2)**  
 An argument type's degree of feature specification with respect to S is constant.

Consider first Assumption 1. A1 just formally re-encodes the notion of 'ranking', which is traditionally used to describe person-animacy restrictions – as in (1), for example. The asymmetrical relationship between  $\beta$  and  $\alpha$  represented descriptively by ' $\beta$  outranks  $\alpha$ , with respect to a person-animacy hierarchy', is now translated into a different, formal asymmetry: ' $\beta$  is more featurally specified than  $\alpha$ , with respect to a standard' (see also Oxford 2017:15-17). I use the theory-neutral term 'standard', S, because the precise comparandum varies. In Nevins' (2007, 2011) approach, for example, S is the set of contrastive and/or marked feature-values which the relevant probe searches for. Accordingly,  $*\alpha \gg \beta$ ,  $\beta \gg \alpha$  obtains when  $\beta$  has a feature-[F] from this set of contrastive and/or marked features that  $\alpha$  does not have, but the reverse –  $\alpha$  having a feature from this set which  $\beta$  lacks – doesn't hold. In other words, this means that  $\beta$  must have a superset of the features, relative to S, that  $\alpha$  has. I take this asymmetrical relationship to amount to  $\beta$  being 'more featurally specified' than  $\alpha$ ; whereupon, we reach A1. The same holds for approaches like Anagnostopoulou (2005) and Pancheva and Zubizarreta (2018), although the standard differs from Nevins' approach: it is a set of features on goals which require special 'licensing'; for Pancheva and Zubizarreta, for example, these are the features [PROX]/[PART]/[AUTH], depending on which person restriction is involved. Again,  $*\alpha \gg \beta$  requires that  $\beta$  have some feature-[F] from this set which  $\alpha$  doesn't – whereupon [F] cannot be Agreed with and licensed, yielding ungrammaticality; and  $\beta \gg \alpha$  requires that  $\alpha$  not have such a feature (ibid:1300ff; Anagnostopoulou 2005:221). Accordingly, for  $*\alpha \gg \beta$  and  $\beta \gg \alpha$ ,  $\beta$  must again have a superset of  $\alpha$ 's features relative to the standard – whence, A1.

Another class of approaches, which includes Yokoyama's (2019), Béjar and Rezac's (2009:43-44) Cyclic Agree approach and Coon & Keine's (2021) feature gluttony, implements the standard in terms of the unvalued features of a probe. In feature gluttony, for example, probes are taken to bear articulated geometries of unvalued features; and, upon Agree with a goal, they are taken to copy the whole (in this case,  $\varphi$ -)feature-set of the goal – i.e., copying is coarse.  $*\alpha \gg \beta$ ,  $\beta \gg \alpha$  then obtains when  $\beta$  has a superset of the probe-valuing features that  $\alpha$  bears. In  $*\alpha \gg \beta$ , this induces ungrammaticality because the probe, having Agreed with  $\alpha$ , will still have unvalued features which  $\beta$  can value under Agree. The probe consequently copies the feature-sets of both  $\alpha$  and  $\beta$ ; the probe is 'gluttonous'. This is represented, in simplified form, in the toy example (9).  $\{X\{Y\}\}$  represents a feature geometry where a feature Y asymmetrically entails a feature X. (9a) illustrates a probe (Probe<sup>0</sup>) contracting two Agree relations, with  $\alpha$ ,  $\beta$ ; (9b) shows the probe's resulting, gluttonous feature specification.

<sup>3</sup> There are at least two theories which do not make these assumptions: Deal's (2024) interaction-and-satisfaction model, which abandons assumption 2 (see below); and Stegovac's (2019) feature inheritance theory. They nonetheless have independent flaws which make them incompatible with the Chamorro data; for these, see Morley (2023).

- (9) a.  $[\text{Probe}^0_{\{uX\{uY\}} \dots [\alpha_{\{X\}} \dots [\beta_{\{X\{Y\}} \dots ]]]]$   
 b.  $\text{Probe}^0\{\{X\}, \{X\{Y\}\}\}$

Gluttony in turn induces ineffability in the morphological component, because the probe – having copied two full feature-sets, with potentially conflicting features – yields contradictory spell-out instructions.  $\beta \gg \alpha$  is grammatical because  $\alpha$  does not have any probe-valuing features which  $\beta$  lacks, and thus the probe will have no reason to Agree with  $\alpha$ , having first Agreed with  $\beta$ . Again, then,  $*\alpha \gg \beta$ ,  $\beta \gg \alpha$  obtains iff  $\beta$  is more featurally specified with respect to a standard S than  $\alpha$ .

These approaches also all assume Assumption 2 insofar as they have no means of changing either  $\alpha/\beta/\dots$ 's features, or the standard's features. Thus there is no mechanism for changing the set of contrastive and/or marked features on the probe in Nevins' system; for changing the set of licensing-requiring features in Pancheva and Zubizarreta's or Anagnostopoulou's systems; or for changing the unvalued features of the probe in Coon and Keine's. Likewise there is no mechanism for changing the features of the goals. As a consequence,  $\alpha/\beta/\dots$ 's degree of feature specification with respect to S necessarily cannot change either; it is constant.

Crucially, these two assumptions give rise to a paradox in light of the existence of inertness effects like Chamorro's. This is the *Inertness Paradox*, (10).

(10) **Inertness Paradox**

If:

- a. for some argument types  $\alpha, \beta$ ,  $*\alpha \gg \beta$ ,  $\beta \gg \alpha$ , and;
- b. A1, and;
- c. A2;

then there can be no argument type  $\delta$  which is inert, i.e. whereby  $\alpha \gg \delta$ ,  $\beta \gg \delta$  and  $\delta \gg \alpha$ ,  $\delta \gg \beta$ .

Recall the definition of inertness from (7) above: the existence of some argument type  $\delta$  for which  $\alpha \gg \delta$ ,  $\beta \gg \delta$  and  $\delta \gg \alpha$ ,  $\delta \gg \beta$  are grammatical, even though we see a person-animacy restriction applying to  $\alpha$  and  $\beta$ : i.e., even though  $*\alpha \gg \beta$ ,  $\beta \gg \alpha$ . Now, as we have seen, A1 and A2 entail that, for  $*\alpha \gg \beta$ ,  $\beta \gg \alpha$  to hold, it must be the case that  $\beta$  is – constantly – more featurally specified than  $\alpha$  with respect to the standard. This leaves only three logically possible degrees of feature specification for  $\delta$ , those in Table 3. As the table shows, whichever feature specification we assume we cannot generate both  $\delta \gg \alpha/\beta$  and  $\alpha/\beta \gg \delta$ . We will always predict some configuration to be ungrammatical. Whence, the paradox.

This problem can be directly transposed to Chamorro's 1st-person. Given the PAR, we know that 2 is more featurally specified than 3' relative to the standard, 3' more specified than 3'lexical, etc. Whichever specification 1 then receives – more specified than 2/3'/3'lexical/0 (row 1 in Table 3), less specified (row 2) or intermediately specified (row 3) – some configuration will prove unexpectedly grammatical, vis-à-vis our predictions.

Relative feature specification for $\delta$	Corresponding 'ranking' for $\delta$	Unexpectedly grammatical configuration
$\delta$ is more featurally specified than both $\alpha$ , $\beta$	$\delta > \beta > \alpha$	$\alpha/\beta \gg \delta$
$\delta$ is less featurally specified than both $\alpha$ , $\beta$	$\beta > \alpha > \delta$	$\delta \gg \alpha/\beta$
$\delta$ is more featurally specified than $\alpha$ but less featurally specified than $\beta$	$\beta > \delta > \alpha$	$\delta \gg \beta, \alpha \gg \delta$

Table 3. Possible relative feature specifications for an inert argument type,  $\delta$

This yields a paradox: given assumptions 1 and 2, there is no possible feature specification for an additional argument,  $\delta$ , that generates inert behaviour. This is thus the Inertness Paradox: theories which make assumptions 1 and 2, i.e. almost all contemporary theories of PARs, cannot capture inertness.

Note, given that cross-linguistically 1<sup>st</sup>-person typically outranks 2<sup>nd</sup>-person in person-animacy restrictions (and always outranks 3<sup>rd</sup>-persons; Aissen 1999:678), I assume that Chamorro's 1st-person is really more specified than  $2/3'/3'_{\text{lexical}}/0$ ; that is, row 1 of Table 3 is correct. The unexpectedly grammatical configuration is thus  $2/3'/3'_{\text{lexical}}/0 \gg 1$ .

### 3. What a solution should look like?

I now sketch in abstract terms what a solution to this problem should look like; before sketching one way of achieving this in the following two sections.

Understanding the problem posed by inertness in terms of the Inertness Paradox makes it clear what a theory of PARs which can capture inertness, and thus can model Chamorro, must do: jettison one or other of assumptions 1 and 2.<sup>4</sup> I focus on jettisoning assumption 2; this is preferable, insofar as assumption 2 is more fundamental to contemporary theories and thus requires a more radical departure. Abandoning assumption two undoes the Inertness Paradox because it allows for an inert argument's degree of specification with respect to the standard to vary; so for Chamorro's 1<sup>st</sup>-person, for example, we could assert that 1<sup>st</sup>-person is more specified than  $2/3'/3'_{\text{lexical}}/0$  when it is an EA (1<sub>EA</sub>), but that it's not more specified when an IA (1<sub>IA</sub>); so we predict both  $1 \gg 2/3'/3'_{\text{lexical}}/0$ ,  $2/3'/3'_{\text{lexical}}/0 \gg 1$  to be grammatical, avoiding the paradox.

There are, in turn, two ways to abandon assumption two: we can either allow the goals to be able to change feature specification; or we can allow the standard S to change feature specification.<sup>5</sup> I set aside the first option because there is no evidence for any special differences between 1<sub>EA</sub> and 1<sub>IA</sub>, either in feature specification, distribution or structural properties (Chung 2020:173-190). This leaves the second option: allowing the standard to change feature specification. Taking Chamorro again, this means that 1<sub>EA</sub>/1<sub>IA</sub> themselves have the same properties; but the standard against which 1<sub>EA</sub> is measured differs in some way from that against

<sup>4</sup> I set aside the possibility of abandoning both assumptions 1 and 2 on Ockhamian grounds: we can resolve the Inertness Paradox by dropping one or other assumption, so dropping both is unnecessarily complex.

<sup>5</sup> Again, I set aside the possibility of allowing both on Ockhamian grounds; see fn.4.

which  $1_{IA}$  is measured, such that *both*  $1_{EA} \gg$  and  $\gg 1_{IA}$  are grammatical. In the following two sections, I sketch a new theory which achieves this.

#### 4. Component one of a solution: dynamic feature gluttony

The first component of this theory is an amended probing architecture, based on combining Deal's (2024) dynamic interaction with Coon and Keine's (2021) feature gluttony, discussed above.

##### 4.1. Dynamic interaction

Deal (2024) introduces dynamic interaction in a theory of PARs based on the interaction-and-satisfaction Agree model. For Deal, the probe in an  $EA \gg IA$  configuration targets IA first; EA is Agreed with only on a subsequent cycle of Agree. Probes bear satisfaction conditions (SAT), determining which goals cause the probe to halt; interaction conditions (INT), determining which goals an unsatisfied probe will Agree with; and dynamic interaction conditions ( $INT^\uparrow$ ), INT added to the probe during the derivation, under Agree with a goal bearing the relevant feature. In the terminology used above, these SAT/INT<sup>(†)</sup> constitute the 'standard'. Consequently,  $INT^\uparrow$  are standard-changing: for  $EA \gg IA$ , for example, the 'standard' qua set of SAT/INT<sup>(†)</sup> against which IA's feature specification is measured may differ from that against which EA's is measured, because  $INT^\uparrow$  are added to the probe during the derivation. More generally, this means that one and the same argument – say, Chamorro's 1 – might be subject to different 'standards' when it merges as an EA vs. IA; as above, this is in principle what we need to avoid the Inertness Paradox. Note,  $INT^\uparrow$  specifically makes the standard stricter: it adds conditions that the second goal must meet, making Agree harder.

Crucially, however,  $INT^\uparrow$  is the wrong kind of standard-changing, in the context of an approach like Deal's. Recall that inertness boils down to 'unexpected grammaticality': whichever feature specification we give an inert argument, there will be some configuration of the form  $\alpha \gg \beta$  whereby  $\beta$  is more featurally specified than  $\alpha$  with respect to the standard, which ends up grammatical – contrary to our expectations. In a theory like Deal's – a 'failed Agree' approach (Coon & Keine 2021) – the reason we expect configurations of this sort to be ungrammatical is that they should involve an argument failing to Agree; for  $\alpha \gg \beta$ , on Deal's theory this argument is  $\alpha$ , since  $\alpha$  is probed second.<sup>6</sup> Accordingly, in general terms, what Deal's theory requires is a device for making Agree easier; turning a configuration where  $\alpha$  fails to Agree, into one where it succeeds. Here, the problem with  $INT^\uparrow$  becomes obvious:  $INT^\uparrow$  makes Agree harder, not easier. Accordingly,  $INT^\uparrow$  will never turn a non-Agreeing configuration into an Agreeing one. For a theory like Deal's, this means  $INT^\uparrow$  never turns an ungrammatical configuration into a grammatical one – so cannot generate unexpected grammaticality, and thus inertness. In familiar terminology, Deal needs a device making the standard laxer, so that arguments ( $\alpha$ ) which should be insufficiently specified vis-à-vis the 'normal' standard become sufficiently specified, facilitating Agree; but  $INT^\uparrow$  only makes standards stricter.

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<sup>6</sup> In principle we could probe  $\alpha$  first; but in a theory like Deal's this will not work empirically, because we would then be able to successfully probe  $\beta$ , on the grounds that  $\beta$  is more specified than  $\alpha$  – incorrectly predicting grammaticality.



#### 4.2. Dynamic feature gluttony

However, when combined with feature gluttony, dynamic interaction triggers exactly the right kind of 'standard-changing' to capture inertness. This is the basis of the new theory I propose, which I term dynamic feature gluttony (DFG). To see why this holds, recall that feature gluttony makes opposite assumptions to 'failed Agree' approaches like Deal's about what counts as grammatical: in feature gluttony, failing to Agree with both goals is grammatical, not ungrammatical; it is successfully Agreeing with both arguments that actually yields ungrammaticality, because it creates contradictory spell-out instructions. Accordingly, to explain why configurations like Chamorro's  $2/3'/3'_{\text{lexical}}/0 \gg 1$  are 'unexpectedly grammatical' in feature gluttony will require a device which makes Agree harder: specifically, we need to turn a configuration where  $1_{IA}$  Agrees (and induces gluttony), into one where it does not. Otherwise put, we need a device which makes the 'standard' stricter – so that  $1_{IA}$  cannot Agree, despite being more featurally specified than  $2_{EA}/3'_{EA}/\dots$  with respect to the initial standard. From this perspective, dynamic interaction is perfect:  $INT^{\uparrow}$  do make the standard stricter, and so Agree harder.

Before seeing how this can capture Chamorro's PAR specifically, it is important to underline several respects in which the way I formalize dynamic feature gluttony differs from Deal's and Coon and Keine's assumptions. I formalize DFG as follows. For concreteness, I translate the basic feature gluttony architecture into interaction-and-satisfaction terms, like Hammerly (2020); though these are not used in precisely Deal's sense. First, I allow SAT to consist of sets of features, equivalent to the 'segments' of feature gluttony, with each feature satisfied independently. Second, as in FG, I assume a goal's whole person-geometry is copied back under Agree with a person-probe. The real amendment to standard feature gluttony is the appeal to INT. The notion of INT I adopt is a dilution of Deal's: instead of defining goals with which a non-fully-satisfied probe will always Agree, INT just define potential goals, with which the probe only Agrees if they meet any of the probe's unsatisfied SAT. So-construed, INT amount to visibility conditions on the probe.

#### 4.3. Inertness: a test case

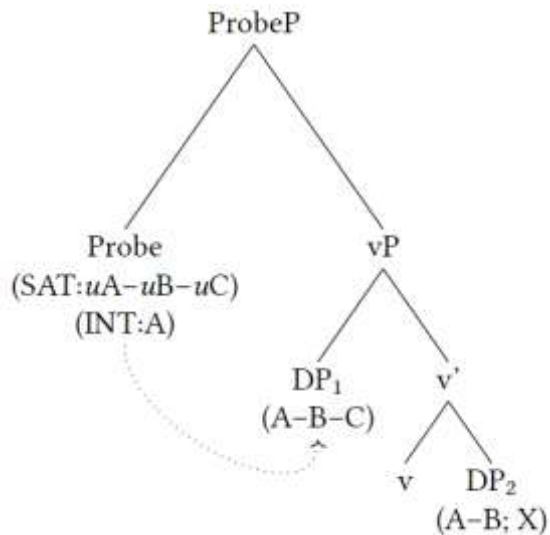
With this noted, now consider how dynamic feature gluttony can explain Chamorro's PAR. To see thus, let us apply DFG to a toy grammar with the feature specifications in (11); and let us assume a probe which is higher than both goals. The probe's unvalued feature set means that it is satisfied – i.e. ceases probing – only after it has copied back [A], [B] and [C]. It can only Agree with [A]-bearing goals. And, crucially, it also has the dynamic interaction condition [ $uX^{\uparrow}$ ], meaning that after it Agrees with an [X]-bearing goal it will only be able to Agree with [X]-bearing goals thereafter.

##### (11) Toy grammar: feature specifications

- a. 1<sup>st</sup>-person pronouns: [A-B-C]
- b. 2<sup>nd</sup>-person pronouns: [A-B, X]
- c. 3<sup>rd</sup>-person pronouns: [A, X]
- d. Probe: [SAT:  $uA—uB—uC$ ]  
[INT: A,  $uX^{\uparrow}$ ]

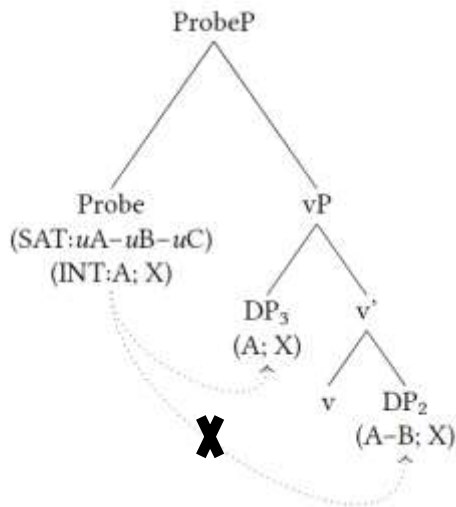
Now consider what DFG predicts, given these assumptions. Take first those configurations where 1 is the external argument,  $1 \gg 2$  and  $1 \gg 3$ . I illustrate with  $1 \gg 2$  in (12). The probe first encounters  $1_{EA}$ , since it is more local.  $1_{EA}$  meets the interaction condition because it bears [A], and thus is able to satisfy all three of the probe's satisfaction conditions. The probe, being satisfied, does not probe further. The probe thus will never end up being 'gluttonous'; and consequently, these configurations are always grammatical.

(12)



The crucial configuration is where 1 is the internal argument,  $2 \gg 1$  and  $3 \gg 1$ . I illustrate with  $3 \gg 1$  in (13). The probe first encounters  $3_{EA}$ ; since  $3_{EA}$  meets the interaction condition by virtue of bearing [A], it is able to satisfy the features on the probe for which it has corresponding valued features – i.e., [A]. Since it cannot satisfy all the probe's features, the probe remains active. *Prima facie*, this should raise a problem: 1 is more featurally specified with respect to the initial specification of the probe than 3 is, because 1 bears [A], [B] and [X]; thus, we expect that  $1_{IA}$  will Agree with the probe too, inducing gluttony and ungrammaticality. Crucially, however, notice that  $3_{EA}$  also bears [X]. This causes [ $\mu X^{\uparrow}$ ], i.e. the probe's dynamic interaction condition, to be activated; the probe consequently cannot interact with non-[X]-bearing goals. Equally crucially,  $1^{st}$ -person does not bear [X]. Consequently, the probe will continue searching after Agreeing with  $3_{EA}$ , but it will fail to find another goal, because  $1_{IA}$  is inaccessible: it does not bear the dynamic interaction condition. Gluttony thus cannot ensue, and the output is grammatical. The same occurs for  $2 \gg 1$ , because 2 again bears [X].

(13)



This captures this toy inertness effect. 1<sup>st</sup>-person behaves as inert because, although it is more featurally specified than 2<sup>nd</sup>- and 3<sup>rd</sup>-person with respect to the initial specification of the probe (i.e. the initial standard), the probe itself changes by acquiring a dynamic interaction condition; and relative to the *new* specification of the probe (i.e. the new standard), 1<sup>st</sup>-person is in fact *less* specified than both 2<sup>nd</sup>- and 3<sup>rd</sup>-person, being unable to interact at all. In this way, both 1>>... and ...>>1 configurations fall out as grammatical.

This leaves the challenge of how to flesh this out into a theory of Chamorro's PAR; in particular, we need to establish what the identities of [A], [B], [C] and, most crucially, [X] could be in Chamorro. This is the goal of the following section.

### 5. Component two of a solution: [SPECIFIC<sup>†</sup>]

I proceed in two steps: I outline and justify the feature specifications for the argument types in Chamorro; before arguing that the crucial dynamic interaction condition corresponds to [SPECIFIC].

#### 5.1. Feature specifications for argument types

I propose the feature specifications for the argument types in Chamorro in Table 4.

1EXCL	1INCL	2	3'	3' <sup>lexical</sup>	0
$\delta$   ANIM   $\pi$   PART   AUTH	$\delta$   ANIM   $\pi$   PART ^ AUTH ADDR	$\delta$ / \ ANIM SPECIFIC   $\pi$   PART   ADDR	$\delta$ / \ ANIM SPECIFIC   $\pi$	$\delta$ / \ ANIM SPECIFIC	$\delta$   SPECIFIC

Table 4. Feature specifications for Chamorro argument types

These are nonstandard, but they require only one assumption which is not advocated elsewhere. The distinctions between inclusive and exclusive and between the local (1<sup>st</sup>, 2<sup>nd</sup>) and nonlocal (3<sup>rd</sup>) persons are both standard (see, e.g., Harley & Ritter 2002).

The use of [ $\pi$ ] to distinguish animate pronouns from animate lexical nouns and all inanimates follows Sichel and Toosarvandani (2024). Sichel and Toosarvandani posit that, in Sierra Zapotec, [ $\pi$ ] distinguishes all pronouns from all lexical nouns; this is taken to explain why lexical noun EAs block cliticisation of pronoun IAs (\*lexical-noun>>pronoun), because it makes pronouns more featurally specified with respect to the relevant probe, inducing a PAR effect. Crucially, however, S&T also anticipate cross-linguistic variation, such that [ $\pi$ ] is associated with all pronouns in some languages, but only animate pronouns in others (*ibid*:18-19). I take Chamorro to instantiate the latter type; [ $\pi$ ] will then explain why animate pronouns disallow lexical EAs, \*3'<sup>lexical</sup>>>3', again because possessing [ $\pi$ ] makes 3' more featurally specified.

Animates and inanimates are then distinguished by [ANIM]. A dedicated animacy feature of this sort is independently proposed elsewhere (e.g. Lochbihler 2012, Ojibwe). That [ANIM] immediately dominates [ $\pi$ ] in the 'geometry' is analogous to Oxford (2024), where [ANIM] similarly immediately dominates the lowest feature distinguishing among 3<sup>rd</sup>-persons (Oxford's '[PERSON]'). Finally, all nominals 1EXCL/1INCL/2/3'/3'<sup>lexical</sup>/0 share [ $\delta$ ]<sup>7</sup>, taken to denote individuation (Sichel & Toosarvandani 2024). This again follows Sichel and Toosarvandani (2024), who motivate [ $\delta$ ] on the basis that lexical nouns can only intervene for pronouns, and so derive Sierra Zapotec's \*lexical>>pronominal constraint, if they share some feature – [ $\delta$ ]. In Chamorro, [ $\delta$ ] is used the same way, qua to explain how the least featurally specified argument, this time inanimates, can intervene for other arguments; i.e., \*0>>2/3'/3'<sup>lexical</sup>.

## 5.2. [SPECIFIC<sup>^</sup>]

This leaves only the feature [SPECIFIC]. In this section I motivate two claims: (i) that [SPECIFIC] is active, and specifically as a person-feature, in Chamorro; (ii) it is the dynamic interaction condition which will explain 1<sup>st</sup>-person inertness.

That [SPECIFIC] is active in Chamorro is assumed elsewhere (Chung & Wagers 2021:778ff). As evidence, I offer the morphosyntactic reflexes of Milsark's (1974) 'weak'/'strong' nominal contrast.<sup>8</sup> Like other languages, Chamorro allows only 'weak'

<sup>7</sup> Note that this is unrelated to my earlier use of ' $\delta$ ' to denote an inert argument.

<sup>8</sup> Thanks to Chung (p.c.) for this suggestion.

nominals as pivots of existential predicates, and only 'strong' nominals as subjects of individual-level predicates (Chung 2008:196-198); Table 5 categorises these. Crucially, this distinction is associated with other morphosyntactic effects in Chamorro. Oblique arguments of intransitive verbs/adjectives, nominalised predicates and antipassive/applicative/causative verbs get (overt) oblique case *only* when strong (Chung 2020:90-91): compare the strong, oblique-marked *i*-phrase *ni salâppi* (where *i* and oblique-marker *nu* have coalesced), with the weak, non-oblique-marked *bula*-phrase, *bula na salâppi*, in the applicative (14). Moreover, when a weak possessed noun phrase takes a strong possessor, the possessor makes it pattern morphosyntactically as strong, becoming a licit subject for individual-level predicates – e.g. *amigu-ña si Julia*, headed by indefinite  $\emptyset$  but with a strong, proper name possessor, is the subject of an individual-level predicate in (15) (Chung 2008:204-207).

<b>Strong</b>	<b>Weak</b>
<i>i</i> (definite article)	$\emptyset$ (null indefinite article)
[some uses] <i>un</i> (indefinite singular article)	[some uses] <i>un</i> (indefinite singular article)
demonstratives	numerals
some quantifiers: <i>kada</i> ('each'); <i>todu</i> ('all')	some quantifiers: <i>bula</i> ('much, many'); <i>meggai</i> ('many'); <i>dídidi</i> ('few, not much'); <i>palu</i> ('some'); 'etc.'
Pronouns	
Proper names	

Table 5. Elements heading strong vs. weak nominals in Chamorro (Chung 2008:196)

- (14) *In apâsi i patgun lâhi {ni salâppi'/bula na salâppi}'.*  
 1EXCLPL.REAL pay the child male OBL money much LNK money  
 'We (excl.) paid the boy {the money/a lot of money}.' (Chung 2020:90)
- (15) *Chamoru amigu-ña si Julia.*  
 Chamorro friend-3SG.POSS UNM Julia  
 'A friend of Julia's is Chamorro.' (Chung 2008:205)

Insofar as these effects are syntactic, they should involve some formal feature. I propose [SPECIFIC] (as Chung, p.c., suggests). For one, note the close correspondence between 'strong' nominals, and nominals which pattern as specific with respect to Chamorro's EA 'specificity restriction', which requires that EAs always be semantically specific (Chung 1998:112ff); see Table 6. Only *palu*-phrases and numerals, patterning as specific but morphosyntactically weak (so non-[SPECIFIC], ex hypothesi), pattern unexpectedly. Since Chung (1998) analyses the specificity restriction on EAs as involving semantic specificity, not *formal* [SPECIFIC], this nonisomorphism needn't be problematic: mismatches between, e.g., semantic vs. formal animacy are well-attested (Wiltschko & Ritter 2015:899-902); and I independently require a mismatch for 1<sup>st</sup>-person, since it patterns as semantically specific for the EA restriction but, I argue below, lacks [SPECIFIC]. Thus, I assume Chamorro has [SPECIFIC].

Specific nominals
<i>i</i>
<i>un</i>
demonstratives
numerals
<i>palu, kada</i> (on partitive readings), <i>todu</i> (on partitive readings)
pronouns
proper names

Table 6. Elements heading ‘specific’ nominals in Chamorro (Chung 2020:163,369-370)

That [SPECIFIC] is a person-feature, qua a dependent of the highest node in the person-‘geometry’, follows Béjar (2003:48-50), Carvalho (2017). That specificity can trigger PARs, like person and unlike number/gender (Stegovec 2019), is also suggestive for the relatedness of person/specificity – especially since Toosarvandani (2023) takes features capable of triggering PARs to be precisely those composing on the same head as person, so plausibly occupying the same geometry.

The final assumption is that [SPECIFIC] is unspecified on 1<sup>st</sup>-person, but obligatorily present on all other argument types when they act as external arguments, in Chamorro. This is crucial, insofar as this is what allows [SPECIFIC] to explain 1<sup>st</sup>-person inertness: like [X] in the toy grammar above, [SPECIFIC] is a feature which 1<sup>st</sup>-person lacks but which the external argument always has in ...>>1 configurations; this means that, if [SPECIFIC<sup>†</sup>] is a dynamic interaction condition on the probe, 1 will never be able to induce Agree – and so gluttony, and so ungrammaticality – in ...>>1 configurations.

The evidence for this assumption is more speculative. I nonetheless offer three arguments that it is at least plausible: from parsimony, acquisition and generic pronouns.

The parsimony argument is that [SPECIFIC] already has two properties we need the INT<sup>†</sup> to have in order to derive 1<sup>st</sup>-person inertness, so using it to this end is most parsimonious. First, to explain why 1<sub>IA</sub> is always inert for any EA, we need the INT<sup>†</sup> to always be activated by EAs. [SPECIFIC] plausibly meets this in Chamorro, given the EA specificity restriction discussed above. Although, as noted, I follow Chung (1998) in taking this restriction to ultimately be about semantic specificity rather than [SPECIFIC], it’s reasonable to assume that any arguments contrastively specified for [SPECIFIC] will nonetheless bear [SPECIFIC] when they are EAs, given we expect semantic/formal specificity to more-or-less align, where possible. Accordingly, for all 2/3’/3’<sub>lexical</sub>/0>>1, the EA bears [SPECIFIC], as desired.

The second property is that, whatever the INT<sup>†</sup> is, any other arguments independently assumed to lack that feature should also not trigger PAR effects when occurring as IAs, because INT<sup>†</sup> will make them inaccessible to Agree. Importantly, nonspecific IAs are at least heavily dispreferred in Chamorro. Cooreman (1988:570-571) asserts that antipassivisation is ‘obligatory in the case of indefinite or generic objects’, and specifically ‘must be used when the specific identity of the Object referent is not known’ (*ibid*:587). If we define specific arguments as ‘specify[ing] a referential argument’, following Chung (1998:112), then Cooreman’s assertion entails that antipassivisation is obligatory with nonspecific IAs – ruling out nonspecific IAs in simple transitives. Chung (2020:223) dilutes this to a ‘strong preference’, the transitive being ‘considerably less common’ with nonspecific IAs; Chung (p.c.) adds that, though at least *nisisita* ‘need’ does ‘routinely take a nonspecific/indefinite direct object’,

antipassive is elsewhere 'clearly the preferred option'.<sup>9</sup> Whatever explains this restriction, it augurs well for my analysis, insofar as limited evidence for PAR-avoidance in 'specific>>nonspecific' contexts follows straightforwardly from their being dispreferred, so plausibly under-represented. Moreover, in the contexts where nonspecific IAs are systematically attested in Chamorro, they appear not to participate in the PAR – as predicted if [SPECIFIC] is a dynamic interaction condition. Possessed DPs headed by the null indefinite/nonspecific article (Chung 2020) are unusual in that the PAR is not calculated based on the features of the DP; it is instead based on the features of the possessor (Chung & Wagers 2021:778ff). This is not true of possessed DPs headed by the overt (definite/specific) article. This suggests that the possessed DP is ignored by the PAR just in case it is nonspecific – as predicted, if [SPECIFIC] is a dynamic interaction condition (see Chung & Wagers 2021:778-779 for the claim that [SPECIFIC] must be a type of interaction condition on the probe in Chamorro, given this data). The second context with nonspecific DPs, generic pronouns, I return to shortly.

The second argument that [SPECIFIC] is plausibly a dynamic interaction condition in Chamorro comes from acquisition. Formal specificity is acquired early in child language acquisition: e.g. Russian's specificity-based verb-object/object-verb alternation is acquired by 1;7 (Avrutin & Brun 2001), and Swahili's specificity-based object-agreement by 1;10 (Deen 2005). Insofar as this means [SPECIFIC] is present early in grammar-development, it may be particularly susceptible to 'recycling', i.e. re-use to perform multiple grammatical functions (Biberauer 2019); so a plausible candidate for the INT<sup>†</sup> a child-learner might posit when acquiring Chamorro's PAR.

The third and most direct argument is from generic pronouns. Carvalho (2017:79-81) takes referential vs. generic uses of pronouns to derive from the presence vs. absence of [SPECIFIC]. Accordingly, it is suggestive that – though generic pronouns are sparingly discussed – at least Cooreman (1987) gives (16) as evidence that 2<sup>nd</sup>-person pronouns may be used generically in Chamorro, but no prior literature suggests 1<sup>st</sup>-person can. This implies that only 2<sup>nd</sup>-person (plus 3<sup>rd</sup>-persons, as standard) requires contrastively specified [SPECIFIC]. 1<sup>st</sup>-person (singular/exclusive/inclusive) could be unspecified, being inherently specific (Béjar 2000:57); particularly since similar syntax/semantics mismatches are independently required for other PARs, e.g. 1/2 are inherently animate, but don't participate in Tzotzil's \*Inanimate>>Animate restriction, so must be unspecified for [ANIM] (Aissen 1997).

- (16) *Pues ha na'-mutta hão.*  
 then 3SG.REAL CAUS-fine you  
 'And then they (=police) fined you.' (Cooreman 1987:97)<sup>10</sup>

Notice too that (16) involves a 3'>>2 configuration, which should be PAR-violating, but is grammatical. Insofar as generic pronouns reflect the absence of [SPECIFIC], this is further suggestive evidence that [SPECIFIC] is an interaction condition on the probe which can bleed Agree with, and hence PAR-violations induced by, nonspecific internal arguments.

<sup>9</sup> Whether nonspecific uses of pronouns are dispreferred is not clear; though see (16) and surrounding discussion.

<sup>10</sup> Null EA here denotes the discourse-salient referent, 'police', which in Chamorro triggers singular agreement (Cooreman 1987:ch.5,n.3).

6. *A dynamic feature gluttony account of Chamorro's PAR*

Given these assumptions, I now demonstrate in more concrete terms how dynamic feature gluttony can explain Chamorro's PAR. I illustrate with three sample derivations: a derivation with a simple PAR-violation, \*3'>>2; a derivation with a 1<sup>st</sup>-person external argument, 1>>2; and a derivation with a 1<sup>st</sup>-person internal argument, 0>>1.

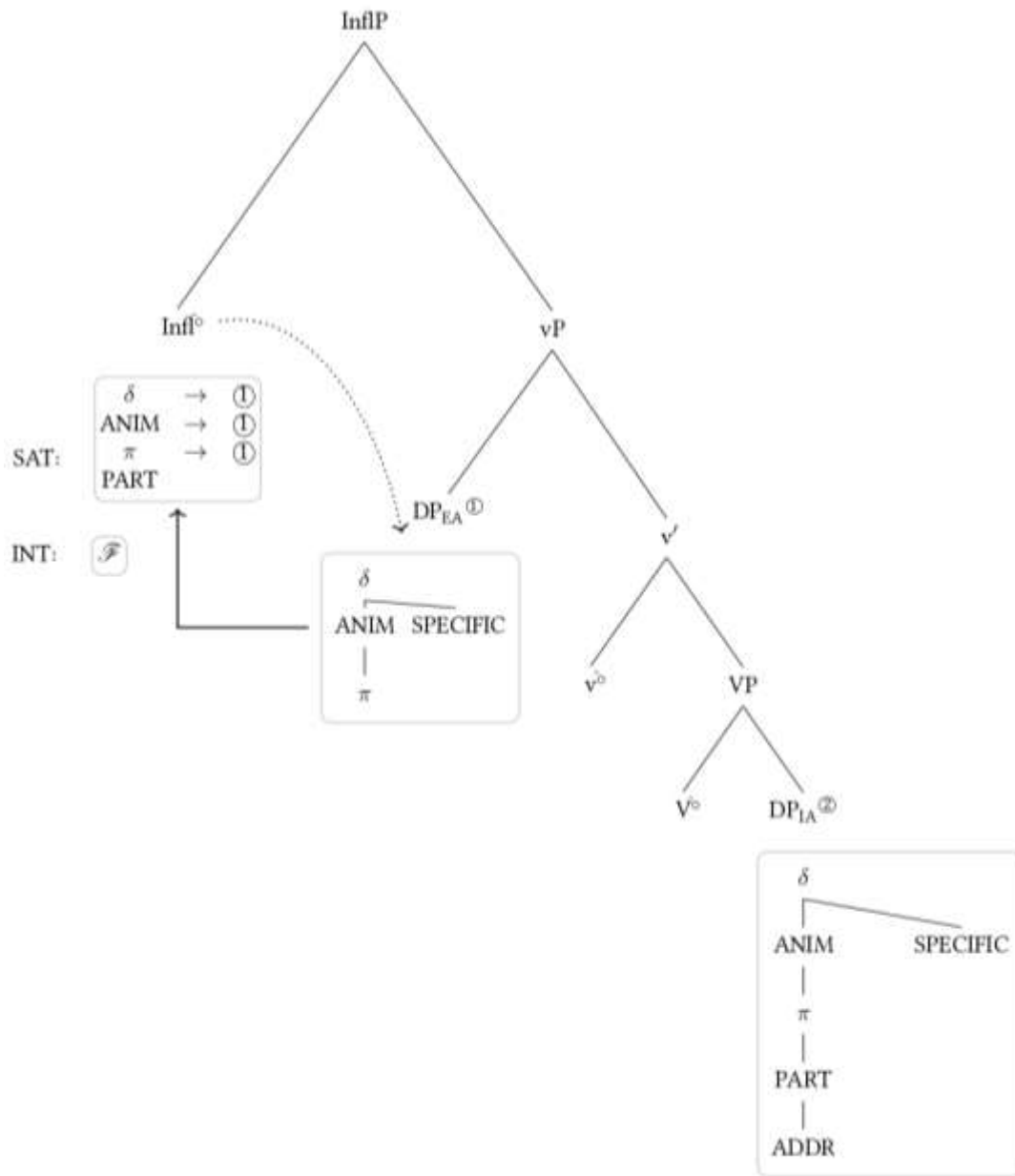
First, I assume the specification for the PAR-inducing probe, which I place on Infl<sup>0</sup>, in (17). Note that I follow Baier (2018:65ff) in assuming that  $\varphi$ -probes universally have initial [INT:ɸ], a superordinate feature encompassing both [ $\varphi$ ]/[A'] features.

(17) Probe:       [SAT:  $\delta$ —ANIM— $\pi$ —PART]  
                   [INT: ɸ, SPECIFIC']

Now consider the derivation for a \*3'>>2 configuration. In (18), we see that the probe first encounters 3'<sub>EA</sub>. 3'<sub>EA</sub> meets the interaction condition [ɸ ]; it thus Agrees with the probe and meets its satisfaction conditions [ $\delta$ ], [ANIM] and [ $\pi$ ]. Since [PART] remains unsatisfied, the probe continues to search.

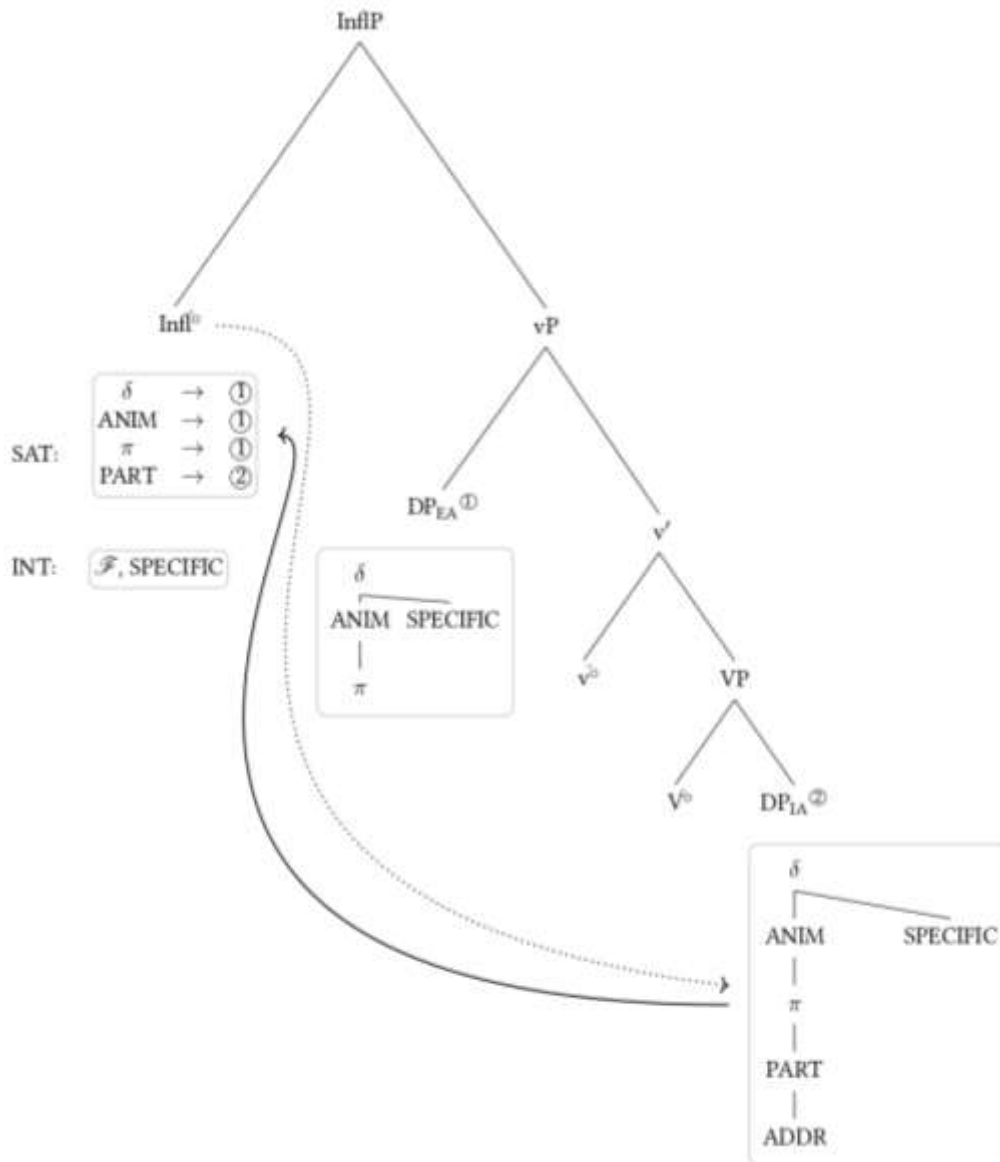


(18)



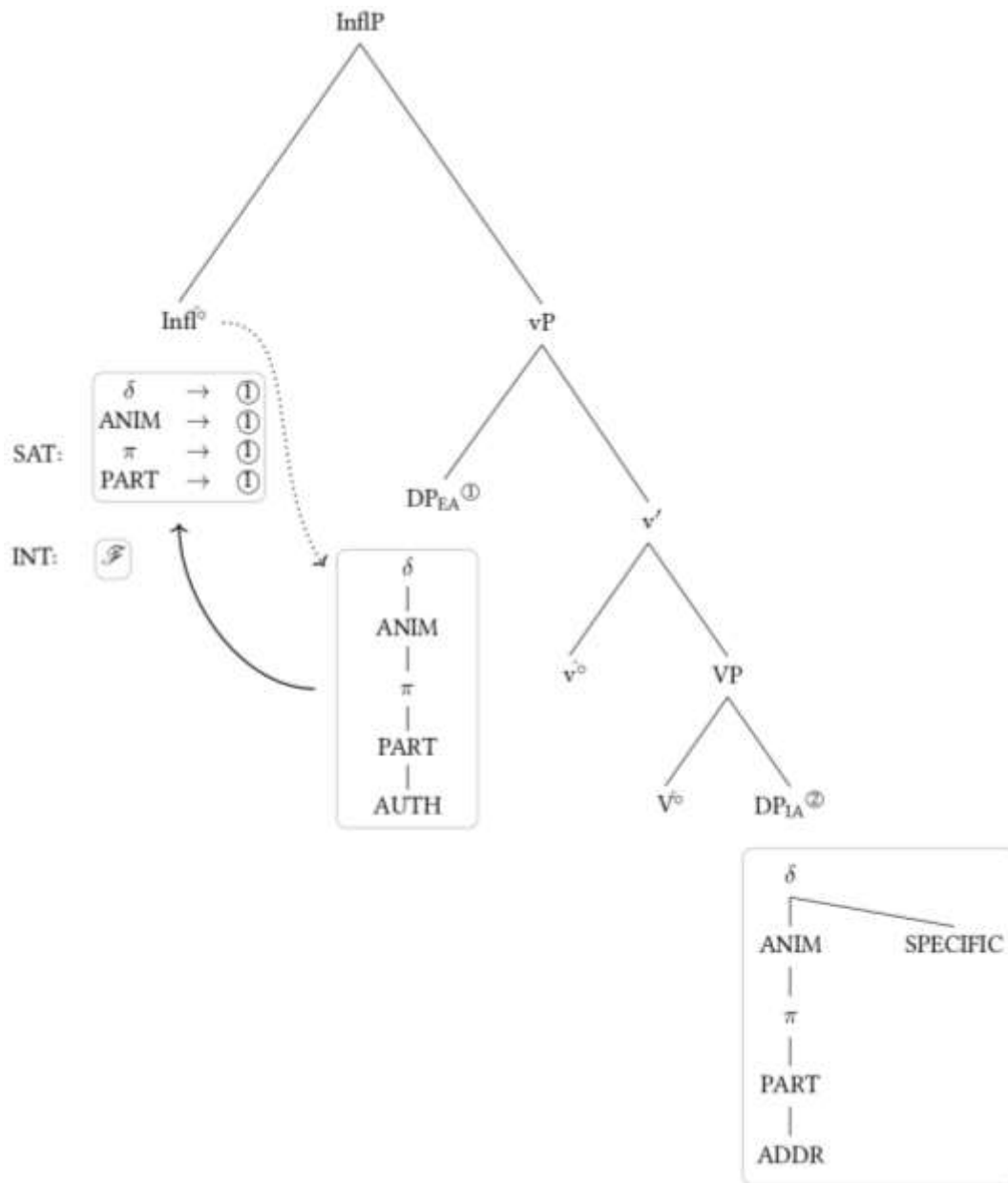
Because  $3'_{EA}$  also bears [SPECIFIC], it activates this dynamic interaction condition; the probe subsequently can only interact with [SPECIFIC]-bearing goals.  $2_{IA}$  does bear both  $\mathcal{F}$  and [SPECIFIC], so can interact with the probe. It also bears the remaining unsatisfied satisfaction condition on the probe, [PART]; it consequently Agrees with the probe. This induces gluttony; and on the (standard) assumption that Chamorro lacks a vocabulary item which can spell-out both 2<sup>nd</sup>- and 3<sup>rd</sup>-person features simultaneously, this induces ungrammaticality. This is summarized in (19).

(19)



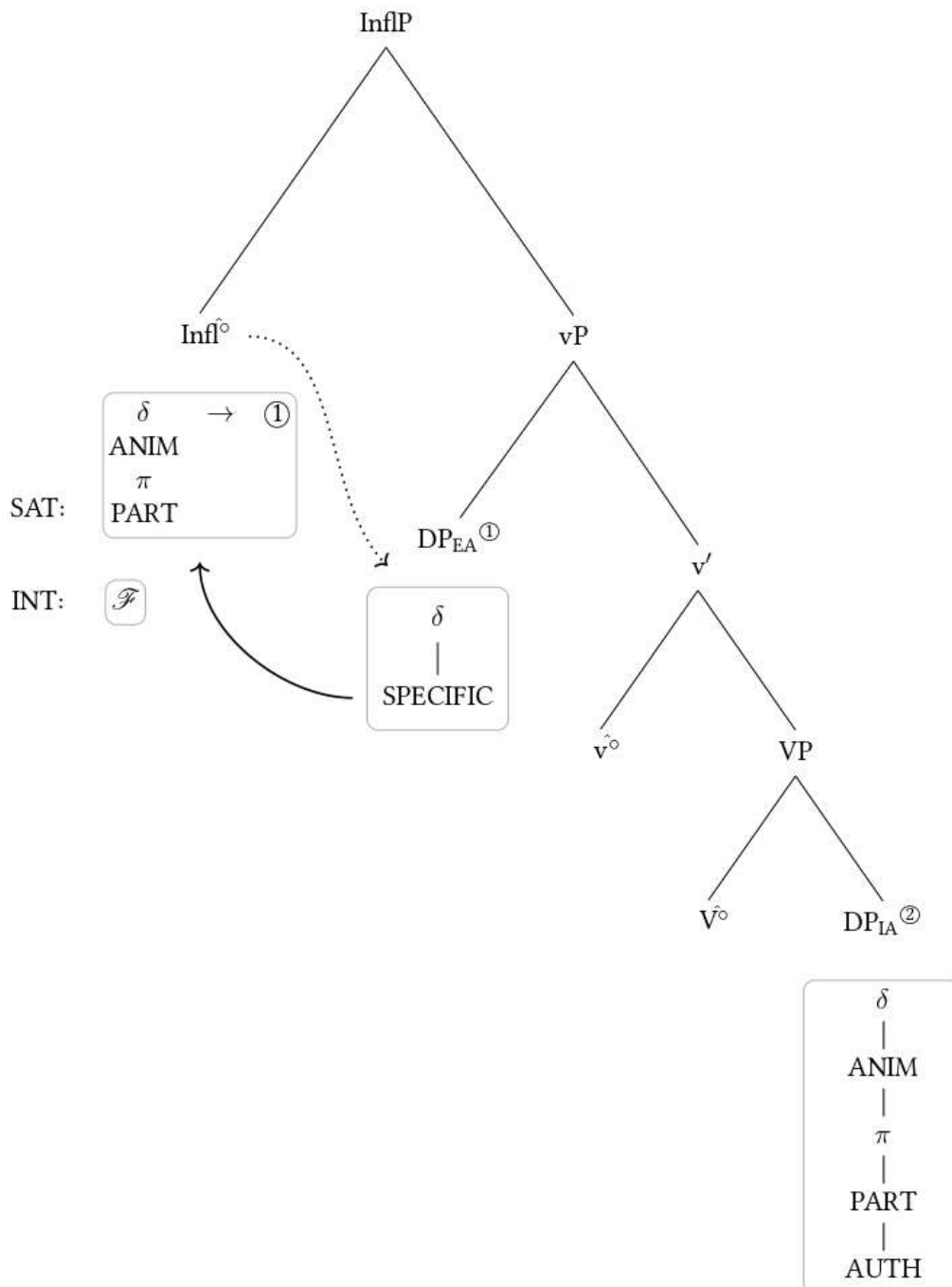
Consider now the 1>>2 configuration, (20). The probe targets 1<sub>EA</sub>; 1<sub>EA</sub> bears [F ] so is able to interact with the probe, and since 1<sub>EA</sub> bears the full set of the probe's satisfaction conditions, it fully satisfies the probe. The probe thus ceases searching; the internal argument fails to undergo Agree; and thus gluttony, and the resultant ungrammaticality, is avoided. This explains why all 1>>... configurations are grammatical.

(20)



The final configuration is  $0 \gg 1$ . In (21), the probe first finds  $0_{EA}$ ;  $0_{EA}$  bears  $[\mathcal{F}]$ , so can interact and satisfy the only satisfaction condition on the probe for which it has a corresponding valued feature –  $[\delta]$ . The probe, having failed to be fully satisfied, can thus continue probing.

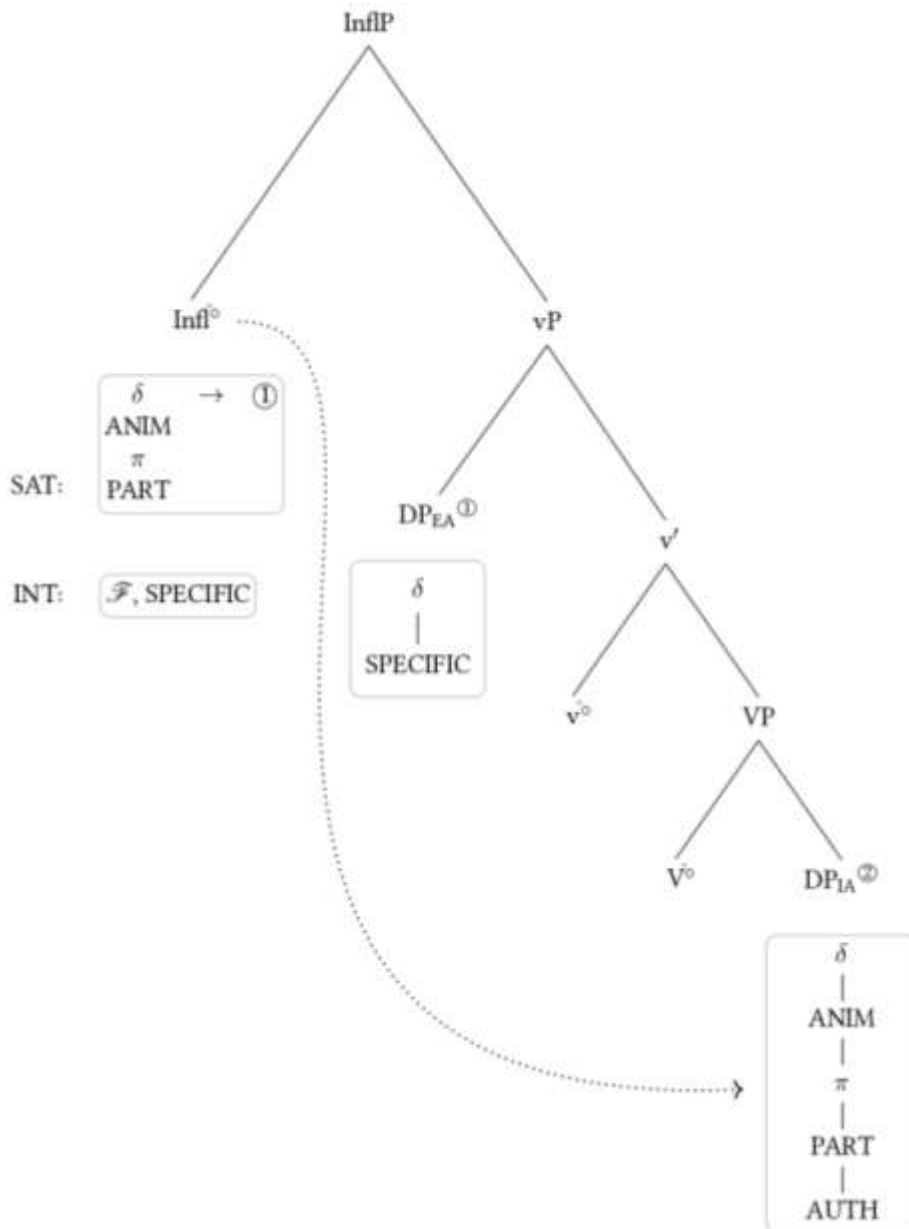
(21)



Crucially, however,  $0_{EA}$  bears [SPECIFIC]. This is an (indirect) side-effect of the specificity restriction on external arguments in Chamorro, as noted above: EAs have to be semantically specific in Chamorro; so, ex hypothesi, where they can also be formally specific (which excludes 1<sup>st</sup>-person, which is inherently underspecified for [SPECIFIC], ex hypothesi) they will be. This means that the dynamic interaction condition [SPECIFIC'] gets activated on the probe, meaning it can only interact henceforth with [SPECIFIC]-bearers. Since I have proposed that 1<sup>st</sup>-person in Chamorro is inherently underspecified for [SPECIFIC],  $1_{IA}$  will necessarily fail to meet this dynamic interaction condition, and thus be unable to trigger Agree – even though it

has features which could satisfy further satisfaction conditions. This is summarized in (21). Insofar as (non-1<sup>st</sup>-person) external arguments will always bear [SPECIFIC] in Chamorro, given the specificity restriction, this means that all ...>>1 configurations will go the same way; and hence, will be grammatical.

(22)



We thus derive 1<sup>st</sup>-person inertness. In 1>>... configurations, 1<sup>st</sup>-person is more featurally specified with respect to the standard – i.e., the probe's satisfaction and interaction conditions – than all other arguments, hence 1>>... is always grammatical. However, whenever we have a non-1<sup>st</sup>-person external argument, the standard changes after Agreeing with the external argument: it acquires [SPECIFIC] as an interaction condition. This change makes 1<sup>st</sup>-person actually less featurally specified with respect to S than all other argument types, because it alone

lacks the interaction condition. Consequently, ...>>1 configurations are also always grammatical.

### 7. Conclusion

In sum, this paper has argued that a property of Chamorro's – and several other languages – PARs, inertness, poses a major problem for contemporary theories of PARs. This includes morphological approaches, but also crucially syntactic approaches: I have shown that (almost) all of these theories are fundamentally incompatible with inertness on the basis of two abstract assumptions they share, which preclude inert behaviour. Resolving this required abandoning one of these two assumptions. I showed that this could be achieved in a new model of PARs, which combined two innovations: a new theory of the probing architecture, based on supplementing Coon and Keine's (2021) feature gluttony theory with the notion of dynamic interaction from Deal (2024); and the assumption that [SPECIFIC] is underspecified on 1<sup>st</sup>-person pronouns in Chamorro.

One major implication is the need to re-evaluate other PARs with inertness effects. If Chamorro's PAR can follow from a unified theory of PARs, then other inertness effects may too. Halkomelem and Squamish, for example, have similar PARs to Chamorro, with the hierarchy 2>3>3<sub>lexical</sub> (i.e. Chamorro's minus the animacy contrast, so all pronouns outrank non-pronouns; Wiltschko 2008). This re-evaluation will also inform the broader typology of inertness. 1I has been identified in multiple languages, but 2<sup>nd</sup>-person/3<sup>rd</sup>-person inertness (2I/3I) are less clear. Some underdiscussed evidence for 3I in person restrictions comes from some Romanian speakers' \*2>>1 restriction (Ciucivara 2006), and Nez Perce's inverse triggered by only 2>>1 (Rude 1997); 2I is apparently unattested, though Stegovec (2019:337) argues this result from insufficient sampling. I am unaware of evidence for 2I/3I in PARs with richer hierarchies beyond person, like Chamorro. Establishing this typology will inform constraints on DFG, and ultimately the typology of features which can act as INT<sup>†</sup> generating inertness.

### Abbreviations

1	first person	LCL	local case
2	second person	OBL	oblique case
3	third person	PL	plural
CAUS	causative	POSS	possessor
EXCL	exclusive	Q	question particle
FUT	future	REAL	realis
IRR	irrealis	SG	singular

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## Through the sociolinguistic lens

The periphrastic construction “motion verb + *a* + infinitive” in Italian

Emanuela Li Destri

This study examines the grammaticalization of Italian motion verbs (*andare* ‘to go’, *venire* ‘to come’, *tornare* ‘to come back’) in the “motion verb + *a* + infinitive” construction, focusing on their aspectual meanings (culminative, inchoative-imminential, iterative). The analysis of speech and written corpora (KIParla and CORIS respectively) reveals diaphasic and diamesic variations. Formal written Italian shows higher percentage of use of aspectual values, while the periphrastic constructions seem to be used to a lower degree in spontaneous speech. Additionally, corpora investigation indicates that the inchoative-imminential aspect is more frequent in speech than in written texts.

### 1. Introduction

Motion verbs are often involved in grammaticalization processes: according to Bybee et al. (1994), for instance, they are the most common base for the formation of new grams of future. In some Romance languages, forms based on motion verbs serve as the foundation for the construction of analytic futures, or *go*-futures, which are gradually replacing the synthetic form of future, as observed in French (1) or Spanish (2).

(1) Elle va le quitter  
she go.PRS.3SG him leave.INF  
‘She will leave him.’ (French; Bres & Labeau 2013:(18))

(2) El tren con destino Blanes va a efectuar su salida  
the train with destination Blanes go.PRS.3SG to effectuate.INF its exit  
‘The train to Blanes will depart.’ (Spanish; Garachana 2018:(8))

Motion verbs in Italian also are found in grammaticalized constructions. *Andare* ‘to go’ and *venire* ‘to come’, for example, when followed by past participle, can act as passive auxiliaries.

(3) I documenti vanno distrutti  
ART documents go.PRS.3PL destroy.PST.PTCP.PL  
‘The documents should be destroyed.’ (Italian; Mocciaro 2014:(4))

- (4) La casa andò distrutta negli anni settanta  
 ART house go.PFV.PST.3SG destroy.PST.PTCP in.ART years seventies  
 ‘The house got destroyed in the Seventies.’ (Italian; Sansò & Giacalone Ramat 2016:(10))
- (5) I due vennero trascinati via  
 ART.M.PL two come.PFV.PST.3PL drag.PST.PTCP.M.PL away  
 ‘The two were dragged off.’ (Italian; Sansò & Giacalone Ramat 2016:(1))

*Andare* can convey either a deontic passive (3) or a “true” passive reading (4): this last interpretation is often associated with expressions of negativity, destruction, or loss, and it generally implies an accidental interpretation of the event (Mocciaro 2014). Sansò & Giacalone Ramat (2016) point out that these two constructions evolved independently: *andare* originally had an atelic semi-copula meaning of persistence in a given state, which later developed into a deontic passive. In contrast, the evolution into a “true” passive stemmed from *andare*’s usage as a telic change-of-state semi-copula.

A similar progression from a change-of-state meaning is observed with *venire* followed by the past participle (5). As evidenced by the emergence of *become*-passives in German and other languages, *venire* + past participle evolves into a passive auxiliary due to the inherently passive orientation of the past participle (Giacalone Ramat & Sansò 2014). *Venire* + past participle, retaining traces of the *venire* meaning, typically indicates a more dynamic passive state, contrasting with the *be*-passive, which usually conveys a more static passive state (Giacalone Ramat & Sansò 2014).

Although motion verbs in grammaticalization processes have been extensively studied, there still remain uncertainties regarding the specific paths they undergo. This work aims to provide a clearer understanding of the Italian motion verb periphrases with the infinitive (hereafter referred to as MVP). Section 2 will provide a description of Italian MVPs, examining the aspectual and modal meanings attributed to these periphrases and assessing the degree of periphrasticity. Then, a focus on the expanding uses of *andare* is presented: recent studies have considered *andare a* + infinitive to be one of the traits that gained standard status in the restandardization process that involves contemporary Italian. In Section 3, the results from querying *andare/venire/tornare a* + infinitive in two Italian corpora, CORIS and KIParla, will be presented. The chosen corpora, one of spoken language and one of written texts, are divided into subcorpora that cover a broad range of diaphasic contexts. The goal is to map the distribution of MVPs in contemporary Italian and test existing hypotheses from the literature. The discussion will focus on the uneven distribution of MVPs in both written and spoken texts, as well as the attestation of the aspectual values in different diaphasic contexts.

### 1.1. Grammaticalization

The study of how grammatical forms develop from lexical items has a long-standing history in linguistics, and it became known as grammaticalization after Meillet’s work in 1912. This topic experienced a resurgence in the 1970s, particularly within functional linguistics, largely due to the contributions of Givón (1971, 1979).<sup>1</sup> Currently, there are various approaches to

<sup>1</sup> For more information on the history of studies on grammaticalization see Lehmann (1982), Heine et al. (1991), Hopper & Traugott (2003), Lindström Tiedemann (2004).

grammaticalization (see Narrog & Heine 2011), but a broad working definition can be found in Heine & Kuteva (2002:1): ‘grammaticalization is defined as the development from lexical to grammatical forms and from grammatical to even more grammatical forms.’

This process has been described as a sequence of overlapping stages, as change is gradual. Initially, the form acquires a new interpretation through inferential mechanisms: in the context where this form is used, a new interpretation becomes more plausible than the old one (Heine 2002). The development of grammatical functions has been associated with processes such as the loss of morphosyntactic properties (*deategorialization*) and/or phonetic material (*erosion*) of the source form, the loss of semantic meaning (*desemanticization*), and the subsequent use in new contexts (*extension*), as well as the increase in cohesion (*bondedness* and *paradigmaticity*) (Lehmann 1982; Heine 2003). While some approaches tend to discuss grammaticalization in terms of loss—emphasizing how grammaticalized forms become dependent and obligatory in certain syntagmatic contexts and focusing on the loss of phonetic and semantic substance—another line of research centers on gains. This perspective highlights the pragmatic enrichment and acquisition of polysemy and polyfunctionality that affect the forms undergoing grammaticalization, emphasizing the extension of context (see Traugott 2010; Traugott & Trousdale 2013).

Although later than other linguistic approaches, formal linguists have also investigated this research topic. From a formal perspective, grammaticalization implies that a lexical or functional item shifts to being realized in a structurally higher position than it diachronically started out in. Drawing on the Minimalist Program (Chomsky 1995), Roberts & Roussou (2003) and van Gelderen (2004, 2011, 2023) explain grammaticalization as a matter of structural economy and featural economy. In van Gelderen’s (2011) proposal two principles (HPP and LMP) come into play.

(6) *Head Preference Principle* (HPP)  
Be a head, rather than a phrase.

(7) *Late Merge Principle* (LMP)  
Merge as late as possible.

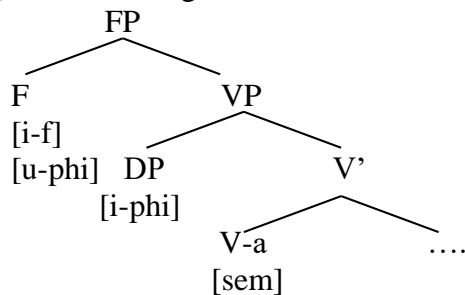
These are later reformulated in terms of feature change and loss in (8). Changes from verbs to auxiliaries and from prepositions to complementizers can be accounted for by arguing that their (initially) semantic features are reanalyzed as interpretable ones (iF) and then as uninterpretable ones (uF).

(8) *Feature Economy*  
Minimize the semantic and interpretable features in the derivation, for example:  
Adjunct Specifier Head affix  
semantic > [iF] > [uF] > [uF]

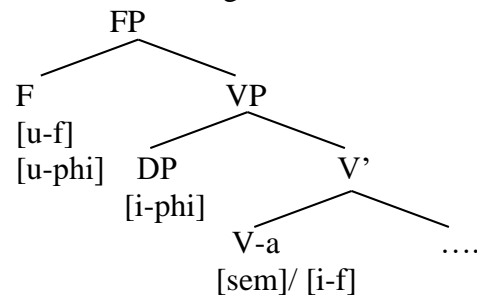
These principles are illustrated through a typical grammaticalization cycle, transitioning from analytic auxiliaries to synthetic TMA markers, as outlined by van Gelderen (2011). In the below diagrams (9), F represents T (tense), M (mood), or ASP (aspect), and [f] denotes the features (interpretable – [i-f] or uninterpretable [u-f]) associated with that position. Initially, we observe the analytic stage, where the TMA auxiliary verb (V-a) is base generated in the TMA head. At this point, V-a functions as the main verb. According to van Gelderen (2011), there is a probe

with [u-phi] that interacts with the TMA, potentially driving the movement of V to F. In the subsequent stage, F is reinterpreted as a probe with uninterpretable features. This marks the beginning of the synthetic stage, during which the lexical verb may shift to the TMA head. Following this, Late Merge occurs, culminating in the final stage where the lexical verb evolves into an auxiliary and eventually into an inflexional affix.

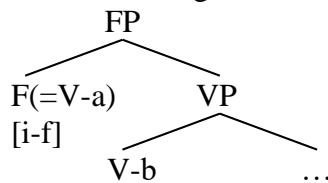
(9) a. First stage



b. Second stage



c. Third stage



## 2. Motion verbs periphrases with *andare/venire/tornare a + infinitive* in Italian

In Italian, motion verbs can be followed by a purpose infinitive, as shown in the following sentences (10), (11), and (12):

(10) All' ora di pranzo io vado a comprare i calamari  
 at.the hour of lunch I go.PRS.1SG to buy.INF the squids  
 'At lunchtime I go to buy squid.'  
 (Italian; CORIS)

(11) La cameriera è venuta a portare il cibo  
 the waitress be.PRS.3SG come.PST.PTCP to bring.INF the food  
 'The waitress came to bring the food.'  
 (Italian; CORIS)

(12) Torni a riprendere suo figlio tra due ore  
 return.IMP.3SG to pick.up.INF his son in two hours  
 'Come back to pick up your son in two hours.'  
 (Italian; KIParla)

In these sentences, the subjects move through space in order to accomplish a task: in (10) the speaker heads somewhere to purchase lunch, in (11) the waitress moves through the restaurant to serve food to the customers, while in (12) a parent is instructed to return to collect their son in two hours. Thus, there is spatial displacement in order to achieve a goal. However, in sentences like the ones below (13) (14) (15), where the motion verbs are grammaticalized, physical movement through space is absent.

- (13) Vado a ridurre la quantità di alimento perché la scrofa [...]
   
go.PRS.1SG to reduce.INF the amount of food because the sow [...]
   
è più affaticata
   
is more fatigued
   
‘I am going to reduce the amount of food because the sow [...] is more fatigued.’
   
(Italian; KIParla)
- (14) Se anche solamente cinque studenti svolgono in modo errato il test,
   
if even only five students perform in way wrong the test,
   
si viene a parlare già del venticinque per cento
   
IMPRS come.PRS.3SG to talk.INF already about twenty-five percent
   
‘If even only five students perform incorrectly on the test, we end up talking about twenty-five percent already.’
   
(Italian; KIParla)
- (15) Federalberghi torna a esprimere la propria preoccupazione
   
Federalberghi return.PRS.3SG to express.INF the its concern
   
‘Federalberghi expresses its concern again.’
   
(Italian; CORIS)

In (13), despite the subject being animate and in control of their action, there is no observable movement. Instead, the speaker’s intention to modify the animal’s food consumption is conveyed. In (14), there is no animate subject capable of moving through space to achieve a goal, but the focus is on the result of an event. Likewise, in (15), the action is repeated without implying movement through space. The aspectual values displayed – inchoative-imminential, culminative, and iterative – will be discussed in greater detail later. In this study, I will examine the usage of *andare*, *venire*, and *tornare* followed by an infinitive. Previous research has primarily concentrated on *andare*, with fewer studies dedicated to *venire*. *Tornare*, on the other hand, has been analyzed separately due to its distinct aspectual meaning, as it will be discussed later. However, since some studies examine them collectively, I have opted to explore their distribution across Italian varieties and investigate the extent of their grammaticalization to achieve a more comprehensive understanding.

Previous studies have examined the status of MVPs as a periphrastic construction. Valentini (2007) characterizes *andare* MVP as a categorical periphrasis, following Haspelmath’s (2000) framework. It displays semantic non-compositionality, constraints on the auxiliary element, and a meaning not expressed through monolexical forms elsewhere in Italian, even though it does not fill a gap defined by a system of monolexical forms.

Moreover, this periphrastic construction meets the criteria outlined in Bertinetto (1990) for identifying a periphrasis: it exhibits semantic integration, with a meaning that is not merely the sum of its parts; it consists of an auxiliary verb (*andare*, *venire*, *tornare*) and a main verb in a non-finite form (infinitive); and the auxiliary is part of a limited set, as indicated by Dietrich (1973).

Building upon prior research on the subject (Amenta & Strudsholm 2002; Valentini 2007; Levie 2015, 2017; Strik Lievers 2017), an outline of the tests employed to assess the degree of periphrasticity of MVPs is shown below. While previous studies primarily focused on *andare*, the results discussed here are also applicable to *venire* and *tornare*.

*Clitic climbing*

- (16) a. Ve lo vado a mostrare  
 to.you it go.PRS.1SG to show.INF  
 b. Vado a mostrarvelo  
 go.PRS.1SG to show.INF-you-it  
 ‘I am going to show it to you.’

*Negation scope*

- (17) a. Non vado a mostrarvi questo dipinto  
 not go.PRS.1SG to show.INF-to.you this picture  
 b. \*Vado a non mostrarvi questo dipinto  
 go.PRS.1SG to not show.INF-to.you this picture  
 ‘I am not going to show you this.’

*Interposition of lexical material*

- (18) a. Vado fra poco a mostrarvi questo dipinto  
 go.PRS.1SG among little to show.INF-to.you this picture  
 ‘I am going to show you this picture in a little bit.’  
 b. Vado con Mario a mostrarvi questo dipinto  
 go.PRS.1SG with Mario to show.INF-to.you this picture  
 ‘I go with Mario to show you this picture.’

*Extension of use*

- (19) a. \*Vado ad andare  
 go.PRS.1SG to go.INF  
 ‘I am going to go.’  
 b. La situazione va a peggiorare  
 the situation go.PRS.3SG to worsen.INF  
 ‘The situation ends up worsening.’

As is evident, these criteria encompass both syntactic and semantic considerations. The periphrasis demonstrates syntactic cohesion: clitic climbing (16) is viable, and the scope of negation (17) extends across the entire structure;<sup>2</sup> moreover, only the insertion of light elements (18a), such as adverbs and connectives, is accepted. Regarding the assessment of the motion verb’s desemanticization, it remains unacceptable for these motion verbs to be followed by another motion verb (19a), despite some instances of *andare* followed by *andare* being found online (Levie 2017). On the other hand, inanimate and non-agent subjects are permitted (19b). Moreover, restrictions possible on tense appear absent with culminative and iterative values, while the inchoative value is only viable with the present, future, and imperfect tenses.

<sup>2</sup> However, as Strik Lievers (2017) has already pointed out, clitic climbing and the scope of negation are not optimal tests for evaluating if reanalysis has occurred, as they are possible when the motion verbs have their literal meaning followed by a purpose clause, as *andare* and *venire* are restructuring verbs in Italian (Rizzi 1976, 1978; Cardinaletti & Shlonsky 2004; Cinque 2006).

(i) Non lo vado a comprare lì  
 not it go.PRS.1SG to buy.INF there  
 ‘I do not go there to buy it.’

These findings indicate a process of grammaticalization occurred: the motion verbs have experienced a reduction in lexical meaning (desemanticization), while simultaneously new contexts of usage have emerged (extension). Furthermore, it appears likely that a process of reanalysis has occurred, implying decategorialization: thus, what was once a biclausal sentence featuring a motion verb followed by a purpose clause has evolved into a monoclausal structure: [VP motion verb [CP a [VP infinitive]]] > [FP motion verb [FP a [VP infinitive]]].

In line with van Gelderen’s (2004, 2011, 2023) framework for grammaticalization, it is possible to hypothesize that a lexical item (*andare*, *venire*, and *tornare*), following the Late Merge Principle, merged at a higher position, outside of the VP. This resulted in the creation of a new monoclausal structure, where the motion verb, once positioned within the functional domain, now exhibits aspectual values.

### 2.1. *Andare*

The periphrastic construction *andare a* + infinitive is the most studied of the periphrases constituted by motion verb followed by infinitive in Italian. Bertinetto (1991:160–161) mentions *andare / venire a* + infinito among the ‘risolutiva’ periphrases in Italian, i.e. those that indicate the final attainment of a given result, as seen in (20).

- (20) Custodi[scono]    beni    che andranno ad    aumentare    le    rendite  
 safeguard.PRS.3PL    assets    that go.FUT.3PL to    increase.INF    the    incomes  
 ‘They safeguard assets that will end up increasing the income.’                    (Italian; CORIS)

Amenta & Strudsholm’s (2002) work on *andare* MVP gives us a clearer picture regarding this periphrastic construction: when *andare* does not retain its lexical value, it could express an aspectual value or it could be part of multiword expressions, such as *andare a finire* ‘to go to end’. They propose to treat these expressions on their own as *andare* occurs more frequently with these infinitive verbs and they present a higher level of lexicalization. As for the periphrastic construction, *andare* conveys a different meaning, similar to the one described in Bertinetto (1991). In their description, they highlight that the verb is desemanticized and is subject to a process of decategorialization (Amenta & Strudsholm 2002).

Valentini (2007) recognizes, on the other hand, two aspectual values that can be conveyed by the periphrasis composed of *andare a* + infinitive: the culminative meaning and the ingressive value (21), that denotes the coming into being of a state.<sup>3</sup>

- (21) Andiamo    a esplorare    rapidamente    anche    tra    questa    e  
 go.PRS.1PL    to explore.INF    quickly    also    between    this    and  
 la    prossima    lezione Coltrane  
 the    next    lecture    Coltrane  
 ‘We are going to explore Coltrane quickly between this and the next lecture.’  
 (Italian; KIParla)

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<sup>3</sup> Valentini (2007) describes the culminative value following the one presented in Bertinetto (1991) and uses too the term ‘risolutiva’. I chose to translate ‘risolutiva’ with culminative, as this term is employed in other works regarding Italian MVPs.

Valentini (2007) investigates also the relationship with the Aktionsart of the main verb: in her account, achievement verbs occur preferably with the culminative value, while the ingressive reading emerges with the activity verbs; with accomplishments both readings seem possible.<sup>4</sup> In the few cases where the periphrasis appears with a stative verb, the most acceptable interpretation is the culminative reading, even if it is considered sub-standard. Sometimes the culminative value is absent, and the periphrastic construction has the effect of forcing a telic reading of the predicate (22).

- (22) È il libro che va ad essere il focus della frase  
 is the book that go.PRS.3SG to be.INF the focus of.the sentence  
 ‘It is the book that becomes the focus of the sentence.’ (Italian; Valentini 2007:(32))

Strik Lievers (2017) also proposes two possible interpretations for the periphrasis *andare a + infinitive*, namely the culminative and the inchoative. Similar to the ‘risolutivo’ value, the culminative draws attention to the outcome: it is defined as “a non-intended outcome[...] preceded by a preparatory process, which is encoded by the verb of motion” (Veland 2014: 157). Following Veland (2014), for Strik Lievers (2017) in the culminative reading the event described by the infinitive verb is usually presented as independent of the subject’s will, often non-agent and/or inanimate. With the inchoative value, on the other hand, the beginning of the event expressed by the verb in the infinitive is presented as imminent and the subject is often animated (Strik Lievers 2017).

The analysis of PAISÀ, an Italian corpus that contains web texts, has shown that these two values have notable differences in their presence: the culminative periphrasis is considerably more frequent than the inchoative one (Strik Lievers 2017). Out of 200 occurrences, 47% of them were culminative, while 5% inchoative.<sup>5</sup> The use of *andare* with imminent meaning, however, has been linked to cooking tutorials, both video recipes and written ones on cooking blogs (Frosini 2020), make-up video-tutorials (Bellone 2020) and gaming tutorials from YouTube (Li Destri *forth.*).

Diachronically, the culminative use of *andare* has been attested since Old Italian, while the inchoative value is more recently attested in diachronic corpora, as the first occurrences of this value date back to the 17<sup>th</sup> and 18<sup>th</sup> centuries (Strik Lievers 2017). During the same time, grammarians warned against the employment of this periphrastic construction, that was thought to be a Gallicism. While the debate around the possible calque is not settled (see Li Destri 2023), the similarities between the aspectual and modal values conveyed by *andare a + infinitive* and *aller + infinitive* have been investigated by van Hecke (2007). The resemblance in meanings and uses could also be explained as *andare* being in the well-known grammaticalization path in which a motion verb evolves into a future form. From the allative meaning, i.e. of ‘movement toward X’, the construction with the motion verb can lose the sense of change of place in space to acquire a figurative interpretation of ‘movement toward a goal’ (Bybee et al. 1994:268), that then, through the expression of intention may develop the sense of immediate future and future (Motion > Goal-Oriented Activity > Intention > Immediate Future > Future).

<sup>4</sup> See Vendler (1957) on state, activity, accomplishment and achievement verbs.

<sup>5</sup> The other 48 % is *andare* with motion meaning.



The culminative value also finds some similarities in the use of *go* in other Romance languages. Garachana (2018) describes a periphrastic construction with *ir a* + infinitive that has terminative value, in which the termination is emphasized above all, even when the idea of movement can be still present.

- (23) Al final, fuimos a parar a un restaurante de mala muerte  
 at.the end, go.PST.1PL to stop.INF in a restaurant of bad death  
 ‘At last, we ended up stopping in a dodgy restaurant.’ (Spanish; Garachana 2018:(2))

Terminative *ir* shows less productivity than culminative *andare*, as it seems to appear with a restricted set of lexical verbs (i.e. *caer* ‘to fall’, *morir* ‘to die’, *ocurrir* ‘to occur’) and it is only found in past tenses (Garachana 2018). Differently from other Spanish terminative constructions, such as *acabar por* + infinitive ‘to end up’, *ir a* + infinitive adds a nuance of meaning denoting a non-acceptance of an unexpected or unwanted situation that has arisen. Yllera (1980) claims that this meaning evolved from putting the focus on the end of the path, so on the result of the movement performed.

Van Hecke (2007) reports that *andare* can express what she calls *aporie épistémique*, that is the impossibility to know or understand something (24). In this modal meaning, *andare* is usually found in the imperative form followed by verbs such as *sapere* ‘to know’ or *capire* ‘to understand’.

- (24) Va’ a capire cosa gli passa per la testa...  
 go.IMPV.2SG to understand.INF what to.him pass through the mind...  
 ‘Go figure what he is thinking...’ (Italian; van Hecke 2007:(2))

*Andare* MVPs can also convey the astonishment of the speaker in front of something unexpected, often carrying on the disapproval of the speaker (25).

- (25) Cosa andate a credere?  
 what go.PRS.2PL to believe.INF?  
 ‘Do you really believe that?’ (Italian; van Hecke 2007:(7))

This modal value, that van Hecke (2007) describes as *allure extraordinaire*, has been identified in literature on other constructions as mirative (i.e. Cruschina & Bianchi 2021), in which the event has a disrupting nature compared to the expected order of things. Levie (2013) does not detect any tense restriction on this modal use, and she reports attestations with verbs of every lexical aspect. This value has also been recorded in GDLI (*Grande Dizionario della Lingua Italiana*, ‘Great Dictionary of the Italian Language’), especially when *andare* is found with *fare* ‘to do’, *dire* ‘to say’ and *pensare* ‘to think’ (Battaglia 1961:453). This mirative modal value holds some resemblance with French MVPs with *aller* (26) and with Spanish *ir* (27).

- (26) Je sais pas comment je suis allée penser à  
 I know not how I be.PRS.1SG go.PST.PTCP think.INF to  
 cette histoire  
 this story  
 ‘I don’t know how I came to think of this story.’ (French; Bres & Labeau 2018:(58))

- (27) Y me lo vas a decir justo ahora  
 and me it go.PRS.2SG to tell.INF right now  
 ‘And you tell me this now.’ (Spanish; Garachana 2018:(4))

As seen in this summary of previous studies on *andare* MVP, various terms have been used to describe the aspectual values this periphrasis conveys. I chose to use culminative to refer to the aspectual meaning that focuses on the outcome of the process. When the attention is on the start of the process, the terms ingressive, inchoative, and imminential have been employed in literature. The terms ingressive and inchoative are generally considered synonymous (Boogart 2004), while imminential identifies a different aspectual meaning. Moreover, Italian inchoative and imminential periphrases behave differently: for example, inchoative periphrases are not allowed with achievement verbs, while imminential periphrases are compatible with them (Bertinetto 1991). *Andare*, on the other hand, is found with verbs with this lexical class. As it displays both aspectual meanings and sometimes the distinction is not clear, the term inchoative-imminential has been employed in this study to refer to this aspectual value.

## 2.2. *Venire*

The periphrastic construction with *venire* has also two grammatical meanings: culminative (28) and inchoative-imminential (29).

- (28) Così facendo, la tutela stessa viene a mancare  
 so doing, the protection itself come.PRS.3SG to lack.INF  
 ‘In doing so, the protection itself ends up coming to an end.’ (Italian; CORIS)
- (29) Ora viene a confermare all’ amante il dubbio  
 now come.PRS.3SG to confirm.INF to.the lover the suspicion  
 ‘Now (this) comes to confirm the lover’s suspicion.’ (Italian; KIParla)

According to Strik Lievers (2017), the use of *venire* in the periphrastic construction is significantly higher than its use as a verb of movement. Indeed, in the PAISÀ corpus, the periphrasis is used in 90% of the occurrences. This figure is significantly higher than that for *andare*, in which the periphrastic construction stands at 51%. However, Veland (2014) and Strik Lievers (2017) report that in the periphrasis *venire* is combined with a small number of verbs, especially in comparison with *andare*. In Veland’s (2014) corpus, *venire* is attested with *sapere* ‘to know’, *creare* ‘to create’, *mancare* ‘to lack’, and *costare* ‘to cost’. For Bertinetto & Squartini (2016) this construction is marginal and limited only to meteorological predicates (e.g. *Viene a piovere* ‘It is going to rain’).

Moreover, the culminative value is much more frequent than the inchoative one: out of 200 occurrences taken from PAISÀ, only one occurrence had inchoative value (Strik Lievers 2017). The culminative reading occurs “if the participant were brought to the culminative process by a chain of events or a set of circumstances without much consideration being given to any specific intent on her or his part” (Bourdin 2009:364). Silletti (2018) also notes that in the construction with *venire* the agentivity of the subject is greatly reduced, making it appear so that the subject is only a spectator of the action.

Historically, both culminative and inchoative values have been attested since the oldest Italian texts (13<sup>th</sup> and 14<sup>th</sup> centuries), even if there are few occurrences in MIDIA, a diachronic corpus of Italian (Strik Lievers 2017). The data show an increase in attestation for the culminative value between the 16<sup>th</sup> century and 19<sup>th</sup> century, but then it falls back down. The inchoative value, on the other hand, is always scarcely attested, having only a few occurrences for period (for example, during the 1692-1840, there are only two occurrences).

Culminative *venire* shows similarities with French and Spanish periphrastic construction with *come*. In French, *venir* ‘to come’ can be found in an albeit not so frequent periphrastic construction (30) that express the result (*aboutissement*).

- (30) *Peu à peu le feu vient à embraser toute la maison*  
 bit to bit the fire come.PRS.3SG to engulf.INF all the house  
 ‘Gradually the fire ends up engulfing the whole house.’  
 (French; Bres & Labeau 2018:(51))

This terminative/culminative value can also be expressed by the Spanish *venir a + infinitive* (31), that share the same features of terminative *ir a + infinitive*.

- (31) *La noticia del enfriamiento antártico viene a complicar*  
 the news of.the cooling antarctic come.PRS.3SG to complicate.INF  
 el entendimiento del cambio climático en curso  
 the understanding of.the change climate in progress  
 ‘The news of Antarctic cooling somewhat complicates our understanding of current climate change.’  
 (Spanish; Garachana 2018:(50))

The mirative modal value, as described for *andare*, can also be expressed by MVP with *venire* (Levie 2013), as seen in (32). Similar use (33) can be found with French *venir* (Bres & Labeau 2018).

- (32) *Non venitegli a dire cosa devono bere*  
 not come.PRS.2PL-to.him to say.INF what should drink  
 ‘Do not tell them what they should drink.’  
 (Italian; Levie 2013:(14))
- (33) *Mais tu te rends compte? Venir me dire ça à moi?*  
 but you at.you make account? come.INF me tell.INF this to me?  
 ‘But do you realize? Come and tell me that?’  
 (French; Bres & Labeau 2018:(59))

### 2.3. Tornare

The periphrastic construction *tornare a + infinitive* is not usually studied along with other motion verb periphrases (i.e. Rosemeyer 2016; Parry 2022), as it does not hold culminative or inchoative-imminent meanings. I followed Veland (2014) and Strik Lievers (2017) approaches to consider them together in order to highlight similarities and differences among their behavior in Italian corpora.

When used in the periphrastic construction, *tornare* conveys an iterative sense: this ‘AGAIN’ meaning has been further specified in repetitive and restitutive. In the case of the repetitive periphrasis ‘the earlier event is repeated in the future’ (34), while in the restitutive periphrasis ‘the restitution of an earlier state’ (35) (Rosemeyer 2016:240). Rosemeyer (2016) proposes the following path for the grammaticalization of ‘*return*+ aInf’ in Romance languages: Change of location > Restitution > Repetition.

- (34) Il culto del santo subì un arresto [...], per poi tornare  
 the cult of.the saint suffered a standstill, for then return.INF  
 a manifestarsi nel secolo successivo  
 to manifest.INF-IMPS in.the century following  
 ‘The cult of the saint came to a standstill [...], only to return in the following century.’  
 (Italian; Strik Lievers 2017:(46))

- (35) Nel maggio 2000, è tornata a svolgere  
 in.the May 2000, be.PRS.3SG come.PST.PTCP to perform.INF  
 il ruolo di imprenditore  
 the role of entrepreneur  
 ‘In May 2000, she returned to her the role of entrepreneur.’  
 (Italian; Strik Lievers 2017:(47))

Strik Lievers (2017) points out that the different aspectual values are usually associated with verbs of different lexical classes: restitutive periphrasis occurs with durative verbs (in particular, activity and state verbs), whereas repetitive interpretation is elicited by non-durative verbs (Strik Lievers 2017). Her data also confirm Rosemeyer’s (2016) observation that in Italian the restitutive use of periphrases prevails over the repetitive one: in her corpus 79% of the occurrences have restitutive value and only 8% repetitive. According to Rosemeyer (2016), the scarcity of occurrences in Italian of *tornare a* + infinitive with repetitive value is due to the vitality of the prefix *ri-*, which competes with the periphrastic construction in the expression of repetition. Strik Lievers (2017) notes that in the presence of repetitive interpretation of *tornare* it is common for the main verb to also be prefixed with *ri-* (36).

- (36) La primavera tornò a rinverdire anche i pascoli  
 the spring return.PFV.PST.3SG to become.green.INF also the pastures  
 ‘Spring turned the pastures green again.’ (Italian; CORIS)

Giacalone Ramat (2001) classifies *tornare* MVP in Italian as an emergent periphrasis with a sense of iterativity. In her research in a corpus of spoken Italian, this periphrasis appeared predominantly with verbs of saying, perception and mental activity (e.g. *Torno a ripetere* ‘I say it again’). The analysis of a diachronic corpus of Italian, MIDIA, shows that, in addition to the sense of spatial movement, both the restitutive sense and the repetitive sense have been present since Old Italian and have been continuously attested until the present day, even if the occurrences are limited (Strik Lievers 2017). Moreover, *tornare* is more used than *andare* and *venire* in the periphrastic construction. The presence of similar periphrastic constructions in most Italo-Romance languages could also have influenced its spread. Parry (2022) finds that *tornare* has been used metaphorically since the Middle Age in many Romance varieties of Italy:

it is often found with inanimate subjects and in many Italo-Romance languages the alternation of *be-* or *have-*auxiliary is attested, often linked to a semantic difference.

*Tornare a + infinitive* is thought to have weak productivity (Lamiroy & De Mulder 2011), in particular when compared with Spanish *volver a + infinitive* (37) and Catalan *tornar a + infinitive* (38). Rosemeyer (2016) argues that the grammaticalization of Italian *tornare* was slower than the Spanish and Catalan counterpart.

(37) Lo volvi6 a redactar  
 it return.PST.PFV.3SG to formulate  
 ‘S/he formulated it again’  
 \*‘S/he came back to formulate it.’ (Spanish; Rosemeyer 2016:(18))

(38) El sector editorial català va tornar a caure un 10%  
 the sector editorial Catalan go.PRS.3SG return to fall a 10%  
 ‘The Catalan editorial marked has dropped another ten percent.’  
 (Catalan; Rosemeyer 2016:(4))

### 3. Sociolinguistics of MVPs in Italian

In Italian linguistics, the term *neostandard* refers to the linguistic variety employed by educated speakers in moderately controlled settings (Berruto 2012 [1987]), characterized by traits previously considered substandard and associated with informal, colloquial contexts. These features, however, have risen from lower levels (Sobrero 1992). Berruto (2017) proposes the concept of *restandardization*, noting that forms and structures once exclusive to substandard Italian have lost their markedness and are now utilized by educated speakers, even in written language.

However, it is essential to recognize that the evolution of contemporary *neostandard* Italian is not one-directional. Renzi (2012), drawing from Labov’s (1994) framework, identifies two significant directions of change in Italian: *changes from above* and *changes from below*. Changes from above, labeled as *snobismi* (i.e. ‘snobbism’, Renzi 2012), are introduced by the higher social class, often consciously (Ballarè 2020). The use of *piuttosto che* ‘instead of’ with a disjunctive meaning (Renzi 2012) exemplifies this phenomenon. While in standard Italian the connective introduces the discarded alternative, it has developed the function of linking equivalent, typically non-exhaustive, alternatives (Mauri & Giacalone Ramat 2015). This change spread from the northern varieties of Italian, in particular the variety spoken in Milan, which have a higher degree of prestige. Conversely, changes from below encompass traits once deemed nonstandard, such as the use of the pronoun *lui* instead of *egli* (Berruto 2013; Cardinaletti & Starke 1999). This innovation, once censured and corrected in schools, is now largely accepted.

Renzi (2012) classifies the periphrastic use of the verb *andare* as a form of linguistic snobbery. Renzi (2012) points out that *andare* MVPs are often found in formal contexts, such as in the speech of lecturers and TV presenters, indicating it might be a change from above. Similarly, Berruto (2012[1987]) mentions its occurrence in more formal speech, referring to it as a formulaic expression. Additionally, Levie (2015) found that *andare* MVPs were prevalent in journalistic prose.

Frosini (2020), on the other hand, highlights that speakers perceive the use of *andare* with inchoative-imminent value as characteristic of specific communicative contexts, such as cooking shows, recipes, and recipe videos on online platforms. Frosini (2020) suggests that this periphrasis might function as textual deixis, guiding the listener to find a temporal reference point within the discourse. This function may also account for its widespread adoption, especially within the context of culinary Italian, as it is perceived as a marker of more modern and fashionable discourse compared to other forms. The inchoative-imminent periphrasis with *andare* is also examined by Bellone (2020), who classifies it among the linguistic snobisms typical of formal speech. Bellone notes that this construction is widely used by influencers and individuals who post tutorials on social media platforms.

The purpose of this work is to provide a more accurate picture of the behavior of MVPs across Italian, taking into account all varieties from the formal written prose of academic or bureaucratic texts to the informal spoken language of spontaneous conversations. In addition to examining *andare*, for which there are already studies available in the literature, an analysis will be offered on the sociolinguistic behavior of MVPs with *venire* and *tornare*, about which our knowledge is limited.

#### 4. Corpora analysis

Following a review of what is known about MVPs in Italian, the attention is directed towards data from the analysis of two corpora of spoken and written Italian. The investigation of the written corpus was conducted in previous work (Li Destri 2023). Since the data from that study is relevant to our discussion, the results will be reported comprehensively. Firstly, the corpora used will be described and then how the research was conducted will be illustrated. In the discussion of the results, the percentage of use of *andare*, *venire*, and *tornare* with functional values will be examined, focusing on the discrepancy between the use of MVPs in speech and written texts and what it can reveal about the direction of change. Additionally, a close observation of the aspectual values in the speech corpus will be conducted, as it presents a different picture from what was known in the literature. Furthermore, a reflection on the role of agentivity in the selection of the value will be carried on, drawing on the data about first and second person verbs.

##### 4.1. Methodology

The available corpora of Italian seem well suited to meticulously document the distribution of Italian MVPs. The two corpora to be used, CORIS and KIParla, capture various diaphasic and diamesic varieties, ranging from formal written to informal spoken language.

CORIS is a synchronic corpus of written Italian comprising 165 million words. Initially published in 2001 with 100 million words, it undergoes systematic updates every three years through monitor corpora. This linguistic resource proves extremely helpful in exploring diaphasic variation within written Italian, as CORIS is divided into sub-corpora containing different registers and domains: Press, Fiction, Academic Prose, Legal and Administrative Prose, Miscellanea, and Ephemera. For a clearer insight into the diverse composition of the corpora, please refer to a table extracted from Rossini Favretti et al. (2002).

Subcorpus	Sections	Subsections
<i>Press</i>	newspapers, periodic, supplement	national, local, specialist, non-specialist, connotated, non-connotated
<i>Fiction</i>	novels, short stories	Italian, foreign, for adults, for children, crime, adventure, science fiction, women’s literature
<i>Academic Prose</i>	human sciences, natural sciences, physics, experimental sciences	books, reviews, scientific, popular history, philosophy, arts, literary criticism, law, economy, biology, etc.
<i>Legal and Administrative Prose</i>	books, reviews	legal, bureaucratic, administrative
<i>Miscellanea</i>	books, reviews	books on religion, travel, cookery, hobbies, etc.
<i>Ephemera</i>	letters, leaflets, instructions	private, public, printed form, electronic form

Table 1. CORIS’s composition

A search was conducted for a motion verb followed by “a” and an infinitive form, since CORIS is lemmatized and pos-tagged. In CORIS, there are 12.089 occurrences of “*andare* + a + infinitive”, 4.780 occurrences of “*venire* + a + infinitive”, and 2.441 occurrences of “*tornare* + a + infinitive”. However, considering all occurrences is impractical (and CORIS allows extraction of only 1000 occurrences for each search). Therefore, it was decided to randomly select 600 occurrences for each verb, drawing 100 from each sub-corpus, for a total of 1800.

KIParla is a corpus of spoken Italian containing approximately 1 million words (Mauri et al. 2019). The 100 hours of recordings include spontaneous conversations, semi-structured interviews, lectures, academic oral exams, and professors’ office hours. These recordings were made in Bologna (KIP) and Torino (ParlaTO) with speakers from various regions of Italy. KIParla’s structure allows for a detailed analysis of diaphasic variation in Italian. As KIParla is not pos-tagged nor lemmatized, a search was performed for various verb forms followed by “a”. Subsequently, instances with an infinitive verb were manually selected. Due to its smaller size, all occurrences for each verb were considered: there are 621 occurrences of “*andare* + a + infinitive”, 185 of “*venire* + a + infinitive”, and 20 of “*tornare* + a + infinitive”, totaling 826 occurrences.

After collecting the occurrences, the next step was to determine if the motion verb had a functional value, as it cannot be done automatically. To differentiate between functional meanings for *andare* and *venire*, I followed Valentini’s (2007) recommendation of using *accingersi/mettersi a* + infinitive ‘to start’ to paraphrase the inchoative-imminent meaning, while substituting *finire per* + infinitive ‘to end up’ for the culminative value.

#### 4.2. Results and discussion

To begin, each instance was examined to determine whether it conveyed aspectual values. Figure 1 illustrates the percentage of functional usage of *andare*, *venire*, and *tornare* in every subcorpus of CORIS, with 100% representing the total occurrences for each subcorpus.

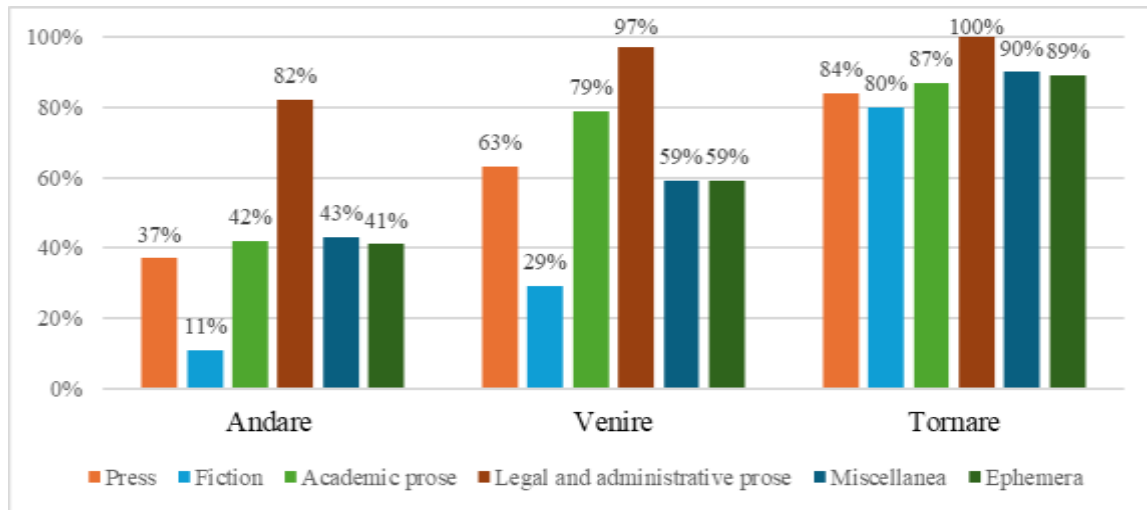


Figure 1. *Andare*, *venire* and *tornare* MVPs in CORIS

In general, similar patterns are observed with all three verbs. The Fiction subcorpus consistently shows the lowest percentage of occurrences involving the functional use of motion verbs. On the other hand, in the Legal and Administrative Prose subcorpus, the percentage of periphrastic usage is significantly higher for all three verbs, with *tornare* reaching a functional usage rate of 100%. *Andare* exhibits the lowest percentage of functional use, with a minimum of 11% and an average use of 43%. The largest disparity (71 percentage points) between Fiction and Legal and Administrative Prose is seen with *andare*. The periphrastic use of the verb *andare* in other subcorpora, such as Press, Academic Prose, Miscellaneous, and Ephemera, remains around 40%. Regarding *venire*, the highest occurrence of periphrastic usage is observed in Legal and Administrative Prose, nearing 100%, while the lowest is still found in Fiction (29%). The Miscellanea, Ephemera, and Press subcorpora reach approximately 60% functional use, for an overall average use of 64%. However, unlike *andare*, *venire* in Academic Prose diverges from the central group, with a percentage of periphrastic usage reaching 79%. As depicted in the graph, *tornare* emerges as the motion verb most consistently employed in the periphrastic construction, averaging 88% usage. It follows a pattern akin to *andare* and *venire*, albeit more condensed: at the extremes are Fiction (80%) and Legal and Administrative Prose (100%), while Miscellanea, Ephemera, and Press show no significant differences. MVPs do not seem to be more prevalent in the Press subcorpus compared to other subcorpora. This finding contrasts with Levie's (2015) observation regarding the frequency of *andare* in journalistic texts.

In the analysis of the KIParla corpus, each occurrence was evaluated to determine whether the motion verbs had a lexical meaning or an aspectual value. Figure 2 presents the results, where 100% indicates that all occurrences in that subcorpus had aspectual value, and 0% signifies that all had lexical meaning. Figure 2 shows that the use of motion verbs with aspectual value (MVPs) is generally lower in KIParla.



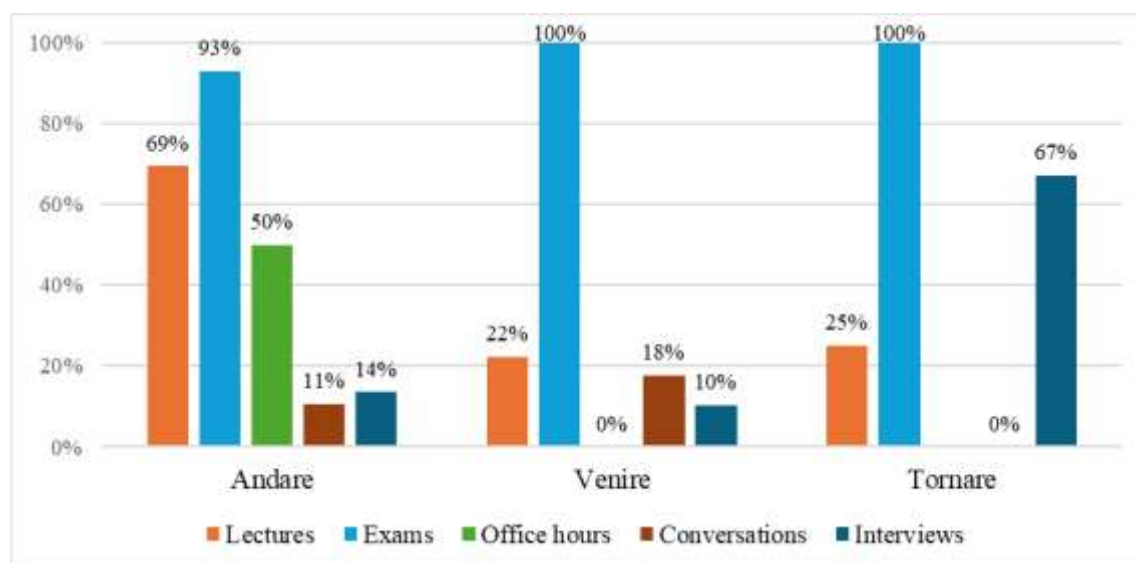


Figure 2. *Andare*, *venire* and *tornare* MVPs in KIParla

*Tornare*, despite its limited number of instances, is the most frequently used in its functional sense, averaging 56%, which is a decrease from the CORIS average of 88%. *Andare* has the highest number of occurrences and exhibits the smallest difference in the average percentage of functional use between CORIS (43%) and KIParla (21%). Finally, *venire* shows the most significant reduction in functional use, dropping from an average of 64% in CORIS to 15% in KIParla. MVPs are most frequently used in the Exams subcorpus for all verbs. This finding is consistent with previous observations on university students’ writing habits, that showed that this is one of the most used *neostandard* traits by Italian students. It is believed that these verbs are perceived as formal and thus suitable for academic contexts (Li Destri 2021). When comparing *andare* and *venire*, it is clear that *venire* with a functional value is rarely used by professors. In contrast, *andare* with a functional value is more commonly attested in this group, appearing in up to 69% of instances in Lectures and 50% during Professors’ office hours. Meanwhile, *venire* appears only 22% of the time in Lectures and is entirely absent in Professors’ office hours. Conversely, the use of functional *andare* and *venire* is least frequent in spontaneous speech, as evidenced in the Conversations and Interviews subcorpora. It is notable that this linguistic change is so minimally represented in informal speech. As observed, *tornare* is used in its functional sense on average 56% of the time and, similar to *andare* and *venire*, it is frequently used as a functional verb in Exams. Like *andare*, its use is somewhat lower in Lectures and Professors’ office hours. However, unlike the other two motion verbs, *tornare* exhibits a higher percentage of use in Interviews subcorpus. Interestingly, the imperfect tense of *andare* exhibits one of the lowest percentages of aspectual values, 6%. This offers a more nuanced perspective on the tense restriction noted by Levie (2017) for functional *andare*. While it was believed that the imperfect tense could be compatible with a functional value, the data shows that, although possible, it is not commonly preferred. In contrast, *andare* in the present and future tenses is used with a functional meaning approximately 30% of the time.

Examining KIParla MVPs reveals a range of meanings: besides culminative and inchoative-imminent values, there are several instances of modal meanings, particularly with *andare* (39).

- (39) Chissà che cacchio ha visto, va a capire  
 who.knows what heck has seen, go.PRS.3SG to understand.INF  
 ‘Who knows what the heck s/he saw, go figure.’ (Italian; KIParla)

Furthermore, the query enables us to make some generalizations regarding the aspectual values of MVPs. Previous studies have noted that the culminative value is predominant (see Strik Lievers 2017; Li Destri 2021). However, the KIParla corpus presents a different perspective.

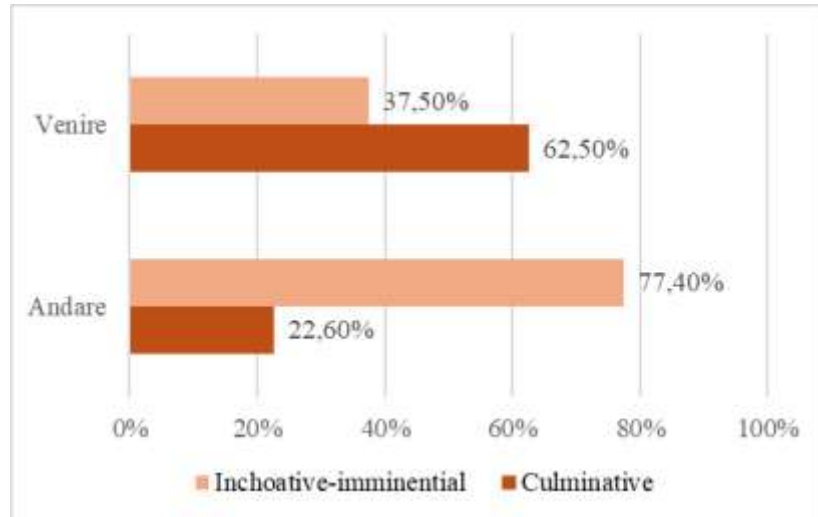


Figure 3. *Andare* and *venire* aspectual values in KIParla

As shown in Figure 3, the inchoative-imminential aspectual value is more prominently attested in KIParla compared to earlier investigations. In Strik Lievers's (2017) analysis of PAISÀ, the attestation of inchoative-imminential *andare* was 9%, while inchoative-imminential *venire* was as low as 1%. In KIParla, the inchoative-imminential value accounts for 77,4% of the attestation of functional *andare*, whereas the culminative aspect comprises only 22,6%. Regarding *venire*, while the inchoative-imminential value does not surpass the occurrences of the culminative aspect, it is significantly more attested than in Strik Lievers's (2017) data.

Examining the distribution of inchoative-imminential *andare* reveals that this reading seems to be predominantly associated with first and second person subjects. Since these subjects are animate, this observation may support Strik Lievers's (2017) hypothesis that the preference for one of the readings could be linked to the animacy of the subject.

<i>Andare</i>	Culminative	Inchoative-imminential
<i>Vado</i>	-	28
<i>Vai</i>	2	17
<i>Va</i>	11	9
<i>Andiamo</i>	-	21
<i>Andate</i>	-	8
<i>Vanno</i>	6	6

Table 2. Occurrences of present tense *andare*

Discussions regarding the relationship between agentivity and *go*-futures have been ongoing, and there has been a hypothesis suggesting a specialization of *go*-futures with agentive first person, although consensus on the topic has not been reached (Bertinetto & Squartini 2016).

In summary, the collected data provide us with a deeper understanding of the distribution of MVPs in Italian. The hypothesis suggested by Renzi (2012) regarding a change from above for *andare* MVP appears to be confirmed, and it seems plausible to extend this observation to *venire* MVP as well. The data extracted from KIParla offer the clearest insights: the functional values of *andare* and *venire* are rarely attested in spontaneous conversations, whereas their occurrences increase in more formal settings such as Exams and Lectures. The diaphasic and diamesic variation is notably evident, with the average use of MVPs in KIParla being lower than in CORIS. The situation in CORIS is somewhat less straightforward: while the most formal variety, Legal and Administrative Prose, exhibits the highest percentage of MVPs usage, the difference in attestation among the other subcorpora is less pronounced. *Andare* and *venire*, despite behaving similarly, display a striking divide. *Andare* is attested as a functional verb in both written and spoken usage, while *venire* is primarily observed as a functional verb in formal registers, particularly in written usage. In contrast, *tornare* follows a different trend. Its average usage as an MVP is higher in both corpora, and notably, its use in spontaneous conversations is significantly greater. This suggests that *tornare* has spread through the varieties of Italian in a different manner.

## 5. Conclusions

Motion verbs frequently undergo grammaticalization processes across languages, and Romance languages like French, Spanish, and Catalan demonstrate various paths this construction, “motion verb + (to) + infinitive” could take. In Italian, motion verbs like *andare*, *venire*, and *tornare* followed by an infinitive lose their lexical meanings to express functional values. They do not convey temporal meanings but can express aspectual values such as culminative, inchoative-imminent, and iterative. While attested since Old Italian, their use has been limited until recent times. Corpora analysis has shed light on the spread of MVPs through contemporary Italian: *andare* and *venire* MVPs are rarely found in informal spontaneous speech but their use increase in more formal contexts. The data also suggest that the use of MVPs depends on diamesic variation, as the percentage of functional use is higher in written corpora than in spoken ones, confirming the hypothesis of a change from above. Regarding *tornare*, while this trend is also observed, the iterative value appears more consistently used across all varieties. Furthermore, the analysis of a spoken corpus has revealed an interesting difference between formal written varieties and informal spoken varieties: the culminative value, previously recorded as the most common based on data from written corpora, is much more attested in the speech corpus than expected.

This study has shown that a sociolinguistic investigation of these periphrastic constructions could be fruitful. The use of MVPs in Italian, not extensively explored until recently, is influenced by diaphasic and diamesic factors and appears to be undergoing change. Following this initial exploration of Italian MVPs with three of the most frequent motion verbs in MVPs (*andare*, *venire* and *tornare*), it seems beneficial to extend this type of study to less frequently occurring verbs, such as *arrivare* ‘to arrive’ or *passare* ‘to pass’, which may yield further interesting results.

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### Abbreviations

1SG	first person singular	IMPV	imperative
2SG	second person singular	INF	infinitive
3SG	third person singular	M	male
1PL	first person plural	PFV	perfect
2PL	second person plural	PL	plural
3PL	third person plural	PRS	present
FUT	future	PST	past
IMPRS	impersonal	PTCP	participle

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# Commonalities between syntactic and phonological search algorithms

## Towards a domain-neutral formulation of Minimal Search

Liam McKnight

Developments in Minimalist syntax have explored the extent to which core operations of the syntactic component can be unified through a Minimal Search algorithm. In parallel, rule-based models of phonology, chiefly Search-and-Copy, suggest that the phonological component adheres to the same Minimalist principles as syntax. This paper examines the similarities between these Search algorithms to propose a unified, domain-neutral Minimal Search, leveraging the similarities in representation and computation across both domains. Additionally, it suggests the application of this domain-neutral Search in *spreading domains*, which are extended from non-manual markers to account for cases of morphosyntactic concord and phonological iterativity.

### 1. Introduction

Recent developments in Minimalist syntax have explored the extent to which core operations of the syntactic component, in particular Agree and Labelling, can be reduced to shared principles of efficient computation (Chomsky 2005). Chomsky (2013, 2015) suggested that these operations could be considered as different applications of a universally-available Minimal Search algorithm. However, explicit formalisations of such an algorithm have only been proposed relatively recently (Ke 2019, 2023; Aycok 2020; Branan & Erlewine to appear). In parallel, generative rule-based models of phonology have suggested that the phonological component may also adhere to the same Minimalist design principles of the syntactic component. Chief among these is the Search-and-Copy model (Samuels 2009; Nevins 2010), in which feature-lacking segments initiate Search operations for a source bearing the needed feature, and copy that feature value back onto themselves. Bearing explicit parallels to syntactic Agree, this model may also be viewed as an application of a Minimal Search algorithm.

This paper examines the similarities between proposed formalisations of Minimal Search in the relevant literature, primarily Ke's (2019) Breadth-First Search in syntax, and Mailhot & Reiss' (2007) and Samuels' (2009) Search in phonology. It also considers the similarities that have been raised between syntax and phonology in terms of the types of structures that are present in each and the computations that act on them, particularly in the light of the substance-free, rule-based and explicitly Minimalist model of phonology which Search-and-Copy represents. In particular, I examine the phenomenon of non-manual markers in many signed



languages, which spread according to syntactic spreading domains in a way which is formally similar to phonological feature spreading. These elements not only illustrate the formal similarities between the two domains, but also present a challenge to how features are represented in syntax.

From the perspective of theoretical parsimony, and in line with the Minimalist aim to reduce the content of the innate grammar, I argue that it is theoretically desirable to posit a domain-neutral Minimal Search algorithm — that is, one algorithm which applies across both syntactic and phonological domains.<sup>1</sup> I therefore propose a generalised, domain-neutral Minimal Search which takes four parameters: *search domain*, *target*, *beginning point* and *relation*. The differences in the operation of this search algorithm in the syntactic and phonological domains result only from the difference in the relations that hold between elements in each domain, namely hierarchical dominance in syntax and linear precedence in phonology.

This generalised Minimal Search is applied to the discussed cases of non-manual markers, to show how the notion of the spreading domain can be accommodated within the syntax while avoiding its representational difficulties. I then suggest further applications of domain-neutral Minimal Search and spreading domains in parallel cases of spoken-language negative concord, as well as particular challenging cases of phonological iterativity and non-myopic feature spreading. In particular, I argue that these cases can be conceived as involving a *spreading* operation, which consists of a Search operation which defines the start- and endpoint of a spreading domain, followed by a later operation (likely post-syntactic, in the examples from syntax) which aligns the relevant features over every element within that domain. I draw comparisons also with Deal's (2022) mechanism of *goal flagging* in cases of negative concord, which exhibit similar spreading behaviour.

The paper is structured as follows: section 2 presents an overview of Minimal Search in the syntactic and phonological literatures. Section 3 argues for the desirability of a unified Minimal Search as a bridge between syntactic and phonological computation, and outlines the critical cases of non-manual markers. Section 4 contains the formal proposal for domain-neutral Minimal Search, while section 5 demonstrates its application in a variety of situations; finally, section 6 concludes the paper.

## 2. Minimal Search algorithms

### 2.1 Minimal Search in syntax

Following Chomsky (2005, 2013) it has been suggested in the Minimalist programme that it is fruitful to propose an algorithm, as part of the core grammar, which describes the traversal that is undertaken across a given syntactic structure when certain other syntactic operations are performed. For example, it is standardly assumed that Agree is an operation that establishes a relationship between a Probe and a Goal, and that one is c-commanded by the other, and perhaps even that the elements that can enter into this relationship are constrained by some notion of locality. However, this alone does not explain how a Probe *finds* the Goal in a way that captures the effects of c-command and locality. A Search algorithm provides an explicit way by which one element can find another element in a structure which matches a particular featural

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<sup>1</sup> Thus, here I use 'domain-neutral' to mean neutral with respect to linguistic domains. Works such as Adger & Svenonius (2015) have explored the broader possibility of linguistic operations arising as specialisations of operations which are domain-neutral with respect to cognitive domains more generally, but I leave this aside as being beyond the scope of this paper.

description and is in some way local to it, by describing a step-by-step traversal from one point in the structure to another. Branan & Erlewine (to appear) provide an overview of the arguments for the desirability of a syntactic Minimal Search algorithm, as well as some formalisations proposed in the literature. For illustrative purposes, I present the formal Minimal Search algorithm proposed by Ke (2019, 2023), as given in (1).

(1) Formal definition of Minimal Search (adapted from Ke 2019:44)

$MS = \langle SA, SD, ST \rangle$ , where  $MS$  = Minimal Search,  $SA$  = Search algorithm,  $SD$  = Search domain (the domain that  $SA$  operates on),  $ST$  = Search target (the features that  $SA$  looks for).

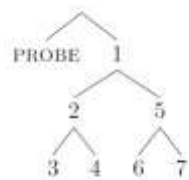
Search Algorithm:

- a. Given  $SD$  and  $ST$ , match every head member of  $SD$  to find  $ST$ .
- b. If  $ST$  is found, return heads bearing  $ST$  and go to Step c.; otherwise, get the step members of  $SD$  and store them as a list  $L$ .
  - i. If  $L$  is empty, Search fails and go to Step c.; otherwise:
  - ii. assign each of the sets in  $L$  as a new  $SD$  and go to Step a. for all these new  $SD$ s in parallel.
- c. Terminate Search.

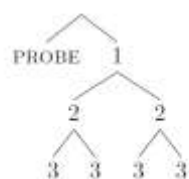
In this formalisation, Search begins from some set and checks any members of that set which are heads for the target feature(s). If a head bearing the target specification is found, Search returns that head and terminates; otherwise, the process begins again, taking any set members of the original Search domain as new Search domains. Thus, Minimal Search recursively looks deeper into sets until a head with the target specification is found. This formalisation of Minimal Search is a breadth-first, rather than a depth-first, traversal. In other words, rather than searching exhaustively through any sets and subsets contained within a given node before returning back to that node's sister, the algorithm considers the contents of sister nodes in parallel and simultaneously. This is illustrated in (2), where the numbering represents the order in which each node is checked.

(2) Depth- and breadth-first search

a. Depth-first search



b. Breadth-first search



Ke (2019:49ff.) argues that a breadth-first approach is preferable in the context of a syntactic structure for two principal reasons. First, a breadth-first approach more closely respects the hierarchical nature of syntax because each iteration of search considers nodes at the same level of hierarchy. Thus, in a situation where two heads both satisfy some target specification and one is structurally higher than the other, the algorithm will never return the lower head in preference to the higher one; as such, it never returns a c-commandee in preference to something that c-commands it. Furthermore, breadth-first search does not impose any asymmetry between two nodes, but rather searches them both in parallel. By contrast, depth-first search, requires that some distinction be made between two members of a set, in order that one is searched before the other. This distinction is admittedly less important for the current purposes. In any case, perhaps the most crucial result of the iterative and top-down nature of Minimal Search is that it straightforwardly derives locality effects procedurally, rather than representationally, as argued by Chomsky (2000) and Branan & Erlewine (to appear). That is to say, locality constraints such as Relativised Minimality (Rizzi 1990) rely on some notion of *closeness*, such that a syntactic relation may not hold between a source and a target if it could alternatively hold between the source and a closer target, where closeness is usually defined in terms of c-command relations. Under a top-down implementation of Minimal Search, this is captured by the fact that the search procedure will reach a higher node before a lower one, meaning that lower candidate nodes are never considered by the search procedure. Thus, no ‘declarative’ statement of closeness, in Branan & Erlewine’s (to appear) terminology, is required.

This formulation of Minimal Search is downward-only in terms of its traversal of a syntactic structure, owing to its reference to set membership, the fundamental and asymmetric relationship in Merge-generated syntactic structures. However, there has been significant debate around the directionality of the Agree operation — determined by the directionality of the underlying Minimal Search algorithm — raising the possibility of Agree being bidirectional or upward-only (Zeijlstra 2004, 2012; Bjorkman & Zeijlstra 2019, among others). This raises the question of whether Minimal Search could permit an upward traversal in addition to, or instead of, a downward traversal; which in turn could underlie an upward Agree operation.

Much of the evidence supporting the possibility of upward Agree lies in negative concord systems, in which the licensing of often multiple negative polarity items (NPIs), with a single sentential negation reading, seems to suggest upward agreement.

For example, Zeijlstra (2012) gives a case from Czech, in which negative concord appears to entail upward agreement of multiple arguments with a higher negative Operator in SpecTP.

(3) Negative concord in Czech

- a. Dnes nikdo nevolá nikomu.  
 today n-body NEG.calls n-body  
 ‘Today nobody is calling anybody.’ (Czech; Zeijlstra 2012:(501))

- b. [CP [TP  $Op_{\neg[iNEG]}$  [TP  $nikdo_{[uNEG]}$   $nevolá_{[uNEG]}$  [ $vP$   $t_j$   $nikomu_{[uNEG]}$ ]]]]]

Zeijlstra (2012) argues that each of the negative concord items (NCIs) and the negative verb in (3) carry a [uNEG] feature and Agree upwards with a negative Operator bearing [iNEG]. This relies on the assumption that negation is uninterpretable on the concord items, which are taken to be indefinites licensed by a higher negative operator which is interpretable. Thus, under the traditional conception of the probe-goal relation in Agree, each [uNEG] item represents a probe

Agreeing upwards with the same [iNEG] goal, presumably necessitating an upward traversal of the structure, such as upward Minimal Search.

The binary branching nature of Merge-generated syntactic structures renders the admission of upward Search undesirable. While the downward Search algorithm proceeds uniformly downward by considering a set, its head and set members, its set members' members, and so on, an upward Search would require a traversal which proceeds from a head to the set containing that head, and also considers any head sisters of that set. That is, it requires both upward and sideways traversals in order to reach any head members of a syntactic structure. Describing this operation would require additional algorithmic framework beyond that presented in (1).<sup>2</sup>

Other rebuttals have been presented to these arguments for upward Agree. In the context of the directionality of Minimal Search, Ke (2019, 2023) argues that upward Agree can be accounted for by the cyclic application of downward Minimal Search. He locates  $Op^{-1}$  in SpecvP, and posits that Agree via Minimal Search is cyclic. Initially, the search domain is the sister of the trigger; however, if Agree is unsuccessful at this stage, then it applies again at the completion of the next phase above the trigger, with the new search domain being that phase. This can be seen as a last resort mechanism: since the completion of the next phase above the trigger results in the transfer of the phase containing the trigger, then any unchecked features remaining on the trigger will crash the derivation, and so Agree is attempted again using the entirety of the material to be Spelled-Out (the phase containing the trigger).

(4) Negative concord in Czech (Ke 2019:(66))

[CP [TP *nikdo*<sub>[iNEG]</sub> *nevolá*<sub>[iNEG]</sub> [<sub>vP</sub>  $Op^{-1}$ <sub>[iNEG]</sub> [<sub>vP</sub> *t<sub>j</sub>* *nikomu*<sub>[iNEG]</sub>]]]]

Thus, in (4), when *nikdo* and *nikomu* are first merged, their initial downward Search for [iNEG] fails; however, upon the completion of vP, they each initiate a new (downward) Search with vP as the search domain, finding [iNEG] on  $Op^{-1}$ . In this way, upward Agree can be accounted for without upward Search.

Deal (2022, to appear) presents a different view on Agree in negative concord cases through her interaction-satisfaction model of Agree. Most significantly here, following Preminger (2014), Deal removes the link between probes and uninterpretable features, arguing instead that Agree serves only to copy features between a probe and goal, regardless of their respective interpretability. In these cases of strict negative concord, she argues that the negative operator functions as a probe with no satisfaction conditions (an 'insatiable probe'), and an interaction condition involving a feature dubbed [nw] which is borne on all NCIs. In this view, the probe will enter into an Agree relation with any element in its search domain bearing [nw], and will not halt upon entering an Agree relation, meaning it is free to enter into further Agree relations. The NCIs, which now function as goals rather than probes, are tagged as having entered into this relation by a process Deal dubs *goal flagging*, which in turn triggers morphological negative exponence. Thus, in this version, Agree, and hence Search, remains uniformly downward, a consequence of the removal of interpretability from the theory of Agreement.

While the debate on the necessity of interpretability is beyond the current scope, both of these proposals present promising alternatives to the upward Agree proposed by Zeijlstra and others. Although upward Agree is motivated theoretically by the classic probe-goal relationship in the context of interpretability, it is difficult to formulate in algorithmic terms. For the purpose of this discussion, I consider only a downward version of Minimal Search in syntax as in (1).

<sup>2</sup> Note that phonological Search, presented below, does not run into the same directionality issue, owing to the symmetry of leftward and rightward linear precedence in phonological strings.

## 2.2 Search in phonology

In this paper I adopt a substance-free and rule-based approach to phonology: that is, an approach which treats phonology as computation over abstract (substance-free) symbols, rather than having phonetic content within the computation. It also makes use of symbolic rules that add to or change a phonological representation over the course of a derivation to produce something which can then be interpreted phonetically, as opposed to a constraint-based approach, such as Optimality Theory. Although I do not wish to re-tread the arguments for these aspects of the approach, the rationale behind substance-free computation has been set out by Hale & Reiss (2000) et seq.; behind rule-based computation, by Vaux (2008); and behind both, by Samuels (2009). The specific rule-based approach examined here, called Search-and-Copy, takes an explicitly Minimalist approach to phonological computation (Nevins 2004, 2010; Mailhot & Reiss 2007; Samuels 2009). In Search-and-Copy, in the course of a phonological derivation, certain segments initiate a Search operation for a particular feature value, and carry out a Copy operation based on the outcome of Search. Typically, this involves copying a feature from the endpoint of the Search operation back onto the initiating segment. For example, Nawuri (a Kwa language spoken in Ghana) exhibits a process of [round] harmony, in which [ $\pm$ round] is copied from a root onto the high vowel of certain prefixes as in (5).

## (5) [round] harmony

- a. **gi**-ke:li: ‘kapok tree’
- b. **gr**-sɪbita ‘sandal’
- c. **gu**-ku: ‘digging’
- d. **gɔ**-lɔ ‘illness’

(Nawuri; Nevins 2010:(126–127), from Casali 1995:(651–652))

In this case, the prefix vowel is ‘needy’ and requires a feature, possibly to meet some phonetic interpretability requirements. It therefore initiates a rightward Search operation for a segment bearing a [ $\pm$ round] feature value, and copies that feature value onto itself.

Samuels (2009), following Mailhot & Reiss (2007), explicitly formalises the two procedures of Search-and-Copy, as the sequential application of a Search algorithm followed by a Copy algorithm, as in (6).

## (6) Search and Copy algorithms (Samuels 2009:142–143, from Mailhot &amp; Reiss 2007:30)

Search( $\Sigma$ ,  $\zeta$ ,  $\gamma$ ,  $\delta$ )

1. Find all  $x$  in  $\Sigma$  subsumed by  $\zeta$  and index them:  $\zeta_0, \zeta_1, \dots, \zeta_n$
2. For each  $i \in \{0, \dots, n\}$ :
  - a. Proceed from  $\zeta_i$  through  $\Sigma$  in the direction  $\delta$  until an element subsumed by  $\gamma$  is found.
  - b. Label this element  $\gamma_i$ .
3. Return all pairs of coindexed standards and goals ( $\zeta_i, \gamma_i$ ).

Copy:

Identify  $\alpha F$  on  $\gamma_i$  and assign  $\alpha F$  to  $\zeta_i$  if the set of conditions  $C$  on  $\gamma_i$  are satisfied.

In this formalisation, a Search procedure is triggered by a particular segment  $\zeta_i$  matching a ‘standard’  $\zeta$  within a search domain  $\Sigma$  (such as a phonological word). The Search proceeds segment-by-segment in the direction  $\delta$  (either leftward or rightward), seeking segments that match a feature specification  $\gamma$ . If an element matches  $\gamma$ , it is designated  $\gamma_i$ , giving a coindexed ‘standard’ and ‘goal’ ( $\zeta_i, \gamma_i$ ). The Search procedure terminates when the Search is satisfied, returning ( $\zeta_i, \gamma_i$ ). The Copy procedure then copies the feature specification searched for ( $\gamma$ ) from  $\gamma_i$  onto  $\zeta_i$ ; this may optionally depend on the satisfaction of a set  $C$  of other conditions on Copy. These conditions on Copy may refer to other features of the identified goal  $\gamma_i$ . For example, Nevins (2010) shows that Nawuri [+round] consonants [m, b] appear to block the Copy process, as in (7).

(7) Blocked [round] harmony

- a. gi-mu: ‘heat’
- b. gi-bo:to: ‘leprosy’

(Nawuri; Nevins 2010:(126–127), from Casali 1995:(651–652))

In Nevins’ analysis, an additional condition on Copy requires that Copy is contingent upon the goal being [-consonantal]. Although Search successfully identifies a [+round] feature on [m] in *gi-mu.*, this additional condition on Copy causes copying to fail, as the goal is [+consonantal]. Since Search has already terminated, there is no way to subsequently search for and copy the [+round] value of the following [u]. It is assumed that [-round] emerges subsequently as a default value for the initiating vowel. This conditioning of the Copy operation captures the notion of opacity in phonological interactions. Notably, however, the Search algorithm itself does not carry any extra conditions of this kind on its operation.

Samuels’ (2009) and Nevins’ (2010) implementations differ in some respects. While Nevins argues that feature copying is always *target-oriented*, from the goal  $\gamma$  back to the initiator of Search  $\zeta$ , Samuels’ approach also permits a *trigger-oriented* approach, involving copying from  $\zeta$  to  $\gamma$ . This latter kind is used to account for *F-ELEMENT-type* (or *FE-type*) rules, which introduce a new feature into the derivation. This contrasts with *Path-type* rules, which involve only the copying of a feature from one already-present segment to another within a derivation, as discussed above. An example of an FE-type rule given by Samuels is the operation of tone spreading in Tonga (a Bantu language spoken in Zambia). In this case, underlying high tones spread leftward, delinking from their original linked segment, and low-tone is subsequently associated to each remaining vowel, as illustrated in (8).

(8) Stages of leftward tone spreading

	<i>Underlying</i>	<i>Intermediate</i>	<i>Surface</i>	
a.	imakáni	ímákani	ímákàni	‘news, affairs’
b.	imusimbí	ímúsímbi	ímúsímbì	‘girl’

(Tonga; Samuels 2009:(220), from Archangeli & Pulleyblank 1994:(292))

Samuels analyses the initial rightward spreading of high tone as an ordinary Path-type rule, whereby the leftmost segments Search rightward for an H tone and copy it back onto themselves. However, she argues that this approach does not apply to the insertion of low tone, as the L tone is not yet in the string which serves as the search domain, and thus cannot be Searched for. Thus, it is L which initiates the search for targets (in this case, all vowels), and copies itself onto each target segment — the reverse copying direction. Samuels later extends

this approach to encompass cases of affixation in morphophonology more broadly. In this framework, affixes which are external to the phonological string in the workspace search within that string for a location to attach, and then attach themselves at that location via a copying process from  $\zeta$  to  $\gamma$ .

Once again, the direction of copying (whether target- or trigger-oriented) is independent of how the Search algorithm operates. The Search algorithm serves only to establish a relationship between two elements in the derivation, over which a subsequent operation acts. However, this aspect of Samuels' approach does require the introduction of another parameter into Search, which defines where in the search domain spreading begins. Since FE-type rules involve the affixation of external features to the string in the workspace, Search cannot begin from the initiator  $\zeta$ , as this location is part of the external features and so lies outside the string over which Search should operate. She therefore proposes an additional parameter  $\beta$ , the 'beginning point' parameter, which may take values corresponding to the beginning or end of  $\Sigma$ , a location relative to  $\zeta$ , or a location defined by a previous Search procedure (Samuels 2009:180).

Thus, I take a prototypical phonological Search algorithm to be essentially as in (6), with the addition of the extra parameter  $\beta$ . This algorithm is given in (9).

(9) Revised phonological Search

Search( $\Sigma$ ,  $\zeta$ ,  $\gamma$ ,  $\delta$ ,  $\beta$ )

1. Find all  $x$  in  $\Sigma$  subsumed by  $\zeta$  and index them:  $\zeta_0, \zeta_1, \dots, \zeta_n$
2. For each  $i \in \{0, \dots, n\}$ :
  - a. Proceed from  $\beta$  through  $\Sigma$  in the direction  $\delta$  until an element subsumed by  $\gamma$  is found.
  - b. Label this element  $\gamma_i$ .
3. Return all pairs of coindexed standards and goals ( $\zeta_i, \gamma_i$ ).

In its explicitly Minimalist formulation and usage, this Search algorithm bears many similarities to the syntactic Minimal Search algorithm presented above. Later, I outline these similarities explicitly and propose a unification of the two algorithms to be applicable in either phonological or syntactic domains.

### 3. Why unify syntactic and phonological Search?

#### 3.1 Computational efficiency and theoretical parsimony

One aim of the Minimalist approach to syntax, and to language more broadly, can be construed as the reduction, as far as possible, of the amount of 'overhead' in the innate grammar. As Chomsky (2007:3) writes, 'How little can be attributed to UG while still accounting for the variety of I-languages attained [...]?' That is to say, it is desirable from a theoretical perspective to posit the fewest number of operations which are innate to the grammar, rather than learned or arising from some general cognitive (*Third Factor*) principle. As discussed briefly above, Minimal Search has been proposed as a promising operation which may unify certain observed generalisations such as locality and impenetrability (Aycock 2020), and certain syntactic operations such as Agree, Labelling and/or (internal) Merge (Chomsky 2013; Ke 2019, 2024). A Minimal Search algorithm with these capabilities would therefore represent a simplification of the innate grammar, by underlying a range of previously separate operations with a single, simple one.

However, less attention has been paid to parallel questions about the nature of phonological computation. Some Minimalist work has suggested that phonology belongs to the realm of the Sensory-Motor externalisation part of language, and so is not subject to the same design constraints as the core syntax (e.g. Chomsky 2008). However, in a substance-free and rule-based system of phonology, it makes sense to consider whether the same principles of efficient computation and reduction of innate elements might also apply. Samuels (2009) and Nevins (2010) explicitly argue for this approach, by proposing a model which replicates many of the core operations of Minimalist syntax within phonology. In general, if phonology is to be considered a symbolic computational system, regardless of whether it is the same type as syntax, then under a Minimalist approach it should be theoretically desirable to apply these same principles. More broadly, taking language as a whole, an approach which uses the same computational tools in both syntactic and phonological computation would be more efficient than one which uses separate, more domain-specialised tools for each. In Search-and-Copy, Agree is taken as a model on which to analogise the computational tools of the phonological component, namely a Search algorithm and Feature Valuation. In this paper, I argue that the phonological Search algorithm is the same as the syntactic Search algorithm, both representing instantiations of the same, domain-neutral Minimal Search algorithm. This would represent a potential reduction of the complexity of the description of the innate components of language as a whole.

Two immediate issues arise from the proposal of a domain-neutral Minimal Search. The first is how the same algorithm can apply across two entirely different types of structure, one hierarchical and one linear. The second is how it can apply across domains which are so different in the kinds of processes which occur within them, since syntax involves building hierarchical structures to satisfy LF interface conditions, while phonology produces representations for phonetic interpretation. However, in the following sections, I argue that there are significant similarities between the two domains both in terms of the representations of syntactic and phonological objects, and the kinds of computations that apply to them. I suggest further that, from the perspective of a unified Search algorithm, the differences may be captured by a single parameter that encodes the fundamental relation between elements in each domain.

### *3.2 Similarities between syntax and phonology: non-manual markers*

Before I propose a unified Search algorithm, it is useful to demonstrate the formal similarities that can hold between syntactic and phonological representation and computation. As a case study to demonstrate these, I examine the spreading behaviour of non-manual markers (NMMs) in American Sign Language (ASL). Many, if not all, sign languages display NMMs, defined as ‘any linguistically significant elements that are not expressed by the hands’ (Pfau & Quer 2010:381). These elements may involve movement of the face, head, or body. Being realised simultaneously alongside manual signs, NMMs may be temporally aligned over multiple signs in a given utterance, typically spreading from some location over a well-defined portion of an utterance.

A cross-linguistically common NMM used to indicate negation is headshake. In ASL negative constructions, the presence of headshake (here with the notation *hs*) is obligatory, and an additional manual sign NOT is optional. When NOT is present, the spreading of headshake is optional (10a,b), but when NOT is absent the spreading is obligatory (10c,d) (Neidle et al. 2000).



## (10) Spreading options for ASL headshake

- a. hs  
JOHN NOT BUY HOUSE
- b. \_\_\_\_\_ hs  
JOHN NOT BUY HOUSE
- c. \_\_\_\_\_ hs  
JOHN BUY HOUSE
- d. hs  
\*JOHN BUY HOUSE

Intended meaning of all: ‘John is not buying a house’ (ASL; Neidle et al. 2000:(44–45))

In syntactic terms, Neidle et al. (2000) argue that the spreading domain of the negative NMM is the c-command domain of the Neg head — that is, the head itself and everything that it c-commands, which constitutes the VP [BUY HOUSE]<sub>VP</sub>. Although the authors do not explicitly attest the ungrammaticality of utterances in which headshake ceases early, they describe clearly that the motion continues throughout the remainder of VP, decreasing in intensity gradually in articulatory terms. In general terms, this instance of spreading either does not occur at all, or occurs without ceasing until reaching the end of a defined domain — in this case, the c-command domain of Neg.

However, since the c-command domain of Neg in the examples above is simply the remainder of the utterance, it is not possible to distinguish spreading according to c-command relations from simple linear spreading. It is possible that headshake spreads as a phonological operation after the linearisation of the structure. A different NMM, brow lowering (*bl*), provides more robust evidence for the nature of the spreading domain. According to Wilbur (2011), brow lowering is associated with [+wh] features; minimally, it co-occurs with a *wh*-item, but may also spread in certain configurations. The examples in (11) demonstrate the options for the spread of brow lowering in an embedded *wh*-clause in a wonder-type construction.

## (11) Spreading options for ASL brow lowering

- a. [+wh] in situ:  
\_\_\_\_\_ bl  
CARY WONDER [SUSAN BUY WHAT YESTERDAY]
- b. [+wh] in situ:  
\_\_\_\_\_ bl  
\*CARY WONDER [SUSAN BUY WHAT YESTERDAY]
- c. [+wh] fronting:  
\_\_\_\_\_ bl  
CARY WONDER [WHAT SUSAN BUY *t<sub>wh</sub>* YESTERDAY]

- d. [+wh] sentence-finally:

\_\_\_\_\_ b1

CARY WONDER [SUSAN BUY *t<sub>wh</sub>* YESTERDAY WHAT]

- e. [+wh] sentence-finally:

\_\_\_\_\_ b1

CARY WONDER [SUSAN BUY *t<sub>wh</sub>* YESTERDAY WHAT]

Intended meaning of all: ‘Cary wonders what Susan bought yesterday.’

(ASL; Wilbur 2011:(159))

Here the wonder-type verb requires its complement to be a clause headed by [+wh] C. As is standard in the ASL literature (e.g. Neidle et al. 2000), Wilbur assumes that this C head is located on the right and SpecCP on the left. In her analysis, *wh*-items may remain in-situ (11a), be fronted to SpecCP (11c), or move rightward to C (11d,e). Brow lowering is associated with C, and so may spread across WHAT in C (11d); alternatively, it may (optionally) spread further across the entire *c*-command domain of C (11e). When rightward *wh*-movement has not taken place, brow lowering obligatorily spreads across the entire *c*-command domain of C, and may not co-occur only with WHAT as in (11b), because it is not base-generated there.

Note that in (11c), where movement is to leftward-SpecCP, SpecCP must be included within the spreading domain of C, despite not being within its strict *c*-command domain. This is generally analysed in the literature through standard Spec-Head agreement (Pfau 2016), whereby the specifier also receives the NMM through agreement from the relevant feature-bearing head. In cases such as (11c), where SpecCP is filled, the spreading domain might therefore be characterised through two separate processes of Spec-head agreement and downward spreading. Whichever analysis is adopted, this ASL data suggests that clause-level spreading takes place to some extent through *c*-command relations, rather than linear precedence. The source of brow lowering is on the right, in C, and so spreading is leftward in linear terms, but it covers at most the embedded CP, and may not spread further over the main clause material on the left.

We might compare the formal characteristics of NMM spreading to similar cases in spoken language phonology. For example, in Terêna (an Arawakan language spoken in Brazil), 1<sup>st</sup> person singular (in terms of possession or subject-verb agreement) is expressed by the rightward spreading of nasality over all or part of a word, as in (12).

(12) 1st person singular marking

- |    |       |               |        |              |
|----|-------|---------------|--------|--------------|
| a. | emoʔu | ‘his word’    | ẽmõʔũ  | ‘my word’    |
| b. | ayo   | ‘his brother’ | ãỹõ    | ‘my brother’ |
| c. | piho  | ‘he went’     | mbiho  | ‘I went’     |
| d. | owoku | ‘his house’   | õũõŋgu | ‘my house’   |

(Terêna; Piggott 1988:(154–155))

Here, nasality spreads rightward, covering the whole word in (12a,b), but being blocked by oral obstruents in (12c,d), which become prenasalised but prevent further spreading. Thus, 1<sup>st</sup> person singular in Terêna is expressed by a feature which spreads indefinitely over a phonological word until meeting a blocker, and is realised simultaneously over various segments of the word. In the same way, ASL negation and *wh*-marking are expressed (sometimes solely) by an

articulation which is simultaneous with manual signs and spreads unbounded over a syntactically-defined domain.

However, there are some crucial representational differences between the spreading of a suprasegmental feature within a phonological derivation and the spreading of an NMM within a syntactic derivation. In Terêna and other cases of phonological feature spreading, features are manipulated directly within the phonological representation: morphologically-triggered nasal spreading directly spreads [+nasal] onto segments which may be associated with [+nasal]. In contrast, for NMM spreading within the syntax, it is not clear how markers such as *hs* or *bl* — which, referring to particular movements of articulators, should be considered as phonological in nature — could be spread onto syntactic objects that lack phonological form. Neither should NMM spreading necessarily be treated as the spreading of the syntactic feature (e.g. [+neg], [+wh]) with which each NMM is associated across its spreading domain. For instance, it seems undesirable to state that the feature [+wh] is copied onto every element within a *wh*-question. Under a syntactic analysis of NMMs, the spreading domain of an NMM must therefore have some representation prior to Spell-Out which is neither the phonological representation of the movement itself, nor the syntactic feature which it represents.

One approach has been to consider NMMs in prosodic terms, as analogues to spoken-language intonation via pitch (Pfau 2008; Sandler & Lillo-Martin 2006; Sandler 2010). Sandler (2010) argues that a prosodic approach is preferable in cases where the extent of a spreading domain is non-isomorphic to a syntactic constituent. For instance, in Israeli Sign Language (ISL), brow raise (with the notation *y/n*) is used to mark the first conjunct of a choice question, as illustrated in (13).

(13) Brow raise in choice questions

\_\_\_\_\_ *y/n*  
 YOU WANT ICECREAM WHITE INDEX<sub>a</sub> OR CHOCOLATE INDEX<sub>b</sub>  
 ‘Do you want vanilla ice cream or chocolate?’ (ISL; Sandler 2010:(318))

Assuming that WHITE INDEX<sub>a</sub> OR CHOCOLATE INDEX<sub>b</sub> ‘vanilla or chocolate [ice cream]’ forms a coordinated constituent, Sandler argues the brow raise must be delimited by some non-syntactic boundary, in this case a prosodic boundary. This is taken as evidence for NMM spreading taking place post-syntactically, as a prosodic phenomenon.

However, I adopt the view of Wilbur (2011, 2021), which posits that in many cases, the semantic and syntactic conditioning of NMMs coincide too closely to allow for a purely prosodic account. Wilbur (2011) analyses ASL NMMs, specifically brow lowering, brow raising and headshake, as semantic operators. Brow raising (*br*) is considered a dyadic operator, which relates two semantic constituents, following Krifka et al. (1995). This operator is used in a variety of constructions, including relative clauses (14a), *wh*-clefting (14b), and topic constructions (14c).

(14) The dyadic operator *br* in American Sign Language

a. \_\_\_\_\_ *br*  
<sub>1</sub>ASK<sub>3</sub> GIVE<sub>1</sub> DOG URSULA KICK THAT<sup>3</sup>  
 ‘I asked him to give me the dog that Ursula kicked.’ (Wilbur 2011:(167))

<sup>3</sup> N.B. THAT is a demonstrative, not a complementiser.

- b. \_\_\_\_\_ br  
 SHE GIVE HARRY WHAT, NEW SHIRT  
 ‘What she gave Harry was a new shirt.’ (Wilbur & Patschke 1999:(10))
- c. \_\_\_\_\_ br  
 MARY, JIM LOVE TEASE  
 ‘As for Mary, Jim loves to tease her.’ (Wilbur 2011:(165))

In each case, brow raise marks the restriction of an operator, while the remainder of the sentence unmarked by brow raise represents its scope. In syntactic terms, Wilbur analyses these constructions as the movement of the relevant restricting constituent to a specifier position (SpecCP or, less commonly, SpecDP), which receives brow raise from the corresponding operator in C through Spec-Head agreement. Such an analysis provides a more restrictive account of the distribution of brow raise than a prosodic analysis. Brow raise spreads over all and only the information which constitutes the restriction of the dyadic operator, and ceases at the onset of the scope of the operator. By contrast, for negative headshake and [+wh] brow lowering, the entirely different spreading behavior is accounted for by the fact that the corresponding operators are monadic, and the NMM spreads over their (semantic) scope. From a syntactic perspective, the extent of the spreading domain of each NMM is then given by Spec-Head agreement and the c-command domain, respectively. The distribution of these NMMs can therefore, be entirely predicted from semantic and syntactic properties, as Wilbur argues.

Once again, this raises the question of syntactic representation. These NMMs bear a close formal resemblance to feature-spreading cases in spoken language phonology, whereby a feature spreads continuously over some domain, and is articulated simultaneously with every element within that domain. However, the domain over which they spread appears to be syntactic, proceeding through c-command relations and determined by semantic and syntactic properties. This formal similarity between sign language syntax and spoken language phonology, on the one hand, and functional difference, on the other, again suggest that a common computational mechanism determining the extent of the spreading domain, which is put to different uses by the two different linguistic modules of syntax and phonology, may be appropriate. After having defined a domain-neutral Search algorithm, I demonstrate how this may be applied to NMMs, and also draw parallels to particular cases of spoken language concord phenomena, which could be considered analogous in the spoken modality.

#### *4. Domain-neutral Search algorithm*

In this section, I propose in formal terms a generalised Search algorithm, which can operate over both phonological and syntactic representations. To begin, I consider again the parameters proposed by Samuels (2009) and Ke (2019) for their respective Search algorithms, as summarised in (15). The first two parameters, the Search domain and the target, are simple to unify: the former specifies the structure within the workspace on which Search operates, common to both algorithms, while the latter specifies the feature specification which terminates Search, also common to both algorithms.

(15) Parameters of phonological and syntactic Search per Samuels (2009), Ke (2019)

Parameter	Phonological Search	Syntactic Search
<i>Search domain</i>	$\Sigma$	SD
<i>Target</i>	$\gamma$	ST
<i>Initiator</i>	$\zeta$	n/a
<i>Direction</i>	$\delta$	Assumed in algorithm
<i>Beginning point</i>	$\beta$	Assumed in algorithm

The beginning point and initiator parameters represent areas of difference between the two algorithms. In Samuels' (2009) version, Search is effectively a traversal of the string  $\Sigma$ , beginning at a parametrically-specified point  $\beta$ . By contrast, Ke's (2019) version does not involve such a traversal, due to the possibility of parallel Search into multiple sets simultaneously. Rather, the traversal emerges from the recursive redefinition of SD to include the sets contained within the previous SD. The latter version could be transformed fairly simply into the former by taking the initial SD of the Search to be a beginning-point parameter  $\beta$ . Under Ke's phase-based cyclic application of Search, as described above, along with other potential non-local applications, such a parameter would be necessary also to account for the difference in the starting point of successive Search applications. As a result, I propose a common parameter  $\beta$  for both cases of Search.

The initiator parameter is also absent from syntactic Search. In phonological Search, it represents the element which triggers the Search process and subsequently enters into some relation (such as feature-Copying) with the result of Search. Strictly speaking, it does not participate in Search itself, but rather in a subsequent operation; in a similar vein, the initiator of an operation such as Agree does not participate in the Search process itself, but rather in the later process of feature copying/valuation. Thus, the initiator can be eliminated from the parameters of generalised Search, although it may remain as a parameter of a compound operation involving Search, and may also be involved in the definition of the beginning-point parameter as a position relative to the initiator.

Finally, to account for the difference between phonological and syntactic structures, it is necessary to posit another parameter encapsulating the type of traversal required for each structure. In phonological Search, the traversal follows left-to-right or right-to-left linear precedence, while in syntactic Search it follows set membership (i.e. hierarchical dominance). I therefore posit a relation parameter  $\prec$ , which may take the values  $\rightarrow$ ,  $\leftarrow$  (for phonological structures, representing immediate left-to-right and right-to-left linear precedence respectively), or  $\ni$  (for Merge-generated syntactic structures, representing the relation 'contains as a member'). Note that this parameter subsumes the directionality parameter  $\delta$ , although it must be stipulated that two options for  $\prec$  exist in applications of generalised Search over phonological structures, while a sole third option exists over syntactic structures.

Thus the set of parameters for domain-neutral, generalised Search is illustrated in (16).

(16) Minimal Search

Parameters:

- a.  $\Sigma$  (Search domain)
- b.  $\gamma$  (Target)
- c.  $\beta$  (Beginning point)

d.  $<$  (Relation)

Procedure:

1. Set position  $P$  equal to  $\{\beta\}$ .
2. Set candidates  $C$  equal to  $\{\text{All } X \in \Sigma \text{ such that some element of } P < X\}$ .
3. If no  $X$  matches  $\gamma$ , set  $P$  equal to  $C$  and return to step 1.
4. Else, return all  $X \in C$  such that  $X$  matches  $\gamma$ .

In this algorithm, note that the position and candidate variables,  $P$  and  $C$ , are sets rather than elements. This is necessary to account for the parallel nature of Ke's (2019) breadth-first conception of Search. At first,  $P$  contains only a single element,  $\beta$ , and in phonological Search it will typically only contain one element at any given time, owing to the linear nature of phonological representations.<sup>4</sup>

### 5. Applying domain-neutral Search

By design, this approach to Minimal Search introduces minimal changes to how Search applies in standard feature copying operations in Search-and-Copy in phonology, or as a component of Agree in syntax, as in Ke (2019) and Branen & Erlewine (to appear). In both cases, as before, a particular element in the derivation (which I still denote here  $\zeta_i$ , although it is not a parameter of the Search procedure proper as discussed) initiates a Search procedure for a particular goal  $\gamma$ . The procedure returns  $(\zeta_i, \gamma_i)$ , relating the initiator (or Probe) to a particular other element in the derivation (a Goal). Relations such as Copy or Agree may then hold between  $\zeta_i$  and  $\gamma_i$ .

Returning briefly to the initiator element, I note here that in the majority of phonological cases, particularly Path-type rules, the beginning point parameter will be the segment adjacent to the initiator element  $\zeta$  in the direction  $<$ . That is, Searches usually proceed beginning from the segment which initiates the Search, while skipping the initiator segment itself (which might vacuously satisfy Search in many cases). However, in syntax, Agree is usually considered to involve the c-command domain of the Probe.<sup>5</sup> In the current approach, this would be captured by setting the beginning point parameter to be the sister of  $\zeta$ , as setting it to be the parent of  $\zeta$  would result in Search reaching  $\zeta$  itself. This difference between the two domains is not captured in the architecture of domain-neutral Search as described. However, in both cases it appears that the default value of  $\beta$  is local to  $\zeta$ , and in fact is the closest element to  $\zeta$  which would not cause Search to encounter  $\zeta$  itself.

In the remainder of this section, I present an application of domain-neutral Search beyond the standard applications already captured by Samuels' (2009) and Ke's (2019) instantiations on which it is based. In particular, I examine the mechanism of *spreading* as used in the phonological literature. In analyses such as Piggott's (1988) of Terêna, spreading involves the association of a phonological feature from a source segment onto one or more target segments. In Search-and-Copy this trigger-oriented approach has been subsumed by a target-oriented approach in which the needy target segments themselves initiate the transfer of features from a source; here, however, I argue that an alternative approach could be considered, using the prior, single-operation spreading principle, while still operating within Search-and-Copy.

<sup>4</sup> Nevins (2010:41) suggests a case of bidirectional Search in Woleaian, which might necessitate multiple elements in this set  $P$ , although it could also be accounted for by two consecutive Search operations.

<sup>5</sup> Aside from certain exceptional cases, such as Ke's (2019) phase-based cyclic Agree as discussed above.

To illustrate, I return to the case of Terêna as in (12), with cases reproduced in (17).

(17) Terêna 1st person singular marking

- a. emoʔu ‘his word’    ěmǝʔũ ‘my word’  
 b. owoku ‘his house’    ðwǝŋgu ‘my house’ (Terena; Piggott 1988:(154–5))

In Search-and-Copy, there would be two ways of accounting for the spread of nasality. In Nevins’ (2010) model, all feature-copying processes are from a Goal to a needy Probe (trigger-oriented), and so to account for this, each segment would initiate a leftward Search for a value of [nasal] and copy it back. In the first-person forms, the nasal feature is assumed to be present on the first segment of the word, or perhaps in a delinked slot to the left edge of the word, so that it is accessible to leftward Search. In the FE-type rules of Samuels (2009), by contrast, the [+nasal] feature could itself initiate repeated rightward Searches into the word and associate iteratively to each segment (a target-oriented Copying). However, it is not clear how the derivation would ‘know’ to repeatedly associate [+nasal] until all eligible segments bear it. In a Nevins-style analysis, the directionality of Search accounts for the blocking behaviour of /k/ in (17b), which prevents nasalisation of /u/: it is assumed that oral obstruents such as /k/ are specified as [-nasal], and terminate any Search originating from their right before the [+nasal] feature can be reached and copied.

However, one issue with Nevins’ trigger-oriented approach is that it requires one Search operation from every eligible segment in the word, potentially resulting in a large amount of computation. This also holds for an FE-type rule, in which the new feature must initiate a new Search for every element to which it associates.<sup>6</sup> Furthermore, a trigger-oriented approach also does not appear to capture the intuition that it is the nasal feature which is being introduced into the derivation as a morphological exponent. It would be counter-intuitive to suggest that in every derivation, each vowel will initiate a Search for a nasal feature, just in case this exponent is present. In pre-Search-and-Copy rule-based models (e.g. Piggott 1988), it was standardly assumed instead that features would spread from a source over a number of other segments, with the possibility of being blocked by segments matching a particular specification, such as /k/ in this case. As discussed earlier, the parallels with NMMs in syntax are clear.

I argue that the notion of spreading is compatible with the current approach to Search, and that a domain-neutral Search algorithm can capture the similarities between spreading-like phenomena in both phonology and syntax. Considering Terêna again and applying the domain-neutral Search as presented in (16), nasal spreading can be captured with the Search procedure in (18). This Search procedure is initiated by and begins from [+nasal] vowels, operates over the phonological word, and searches rightwards for a [-sonorant] segment. The difference in the Search procedure from the standard Search-and-Copy formulation is that here the search is rightwards from the donor segment, rather than leftwards from the recipient segments. Once Search has terminated, either by reaching a [-sonorant] segment or the right edge of the word, the spreading domain is defined as all segments between  $\beta$  (the left edge of the word) and the endpoint of Search ( $\gamma_i$ ). The feature [+nasal] is then copied to all segments in this domain.<sup>7</sup>

<sup>6</sup> A similar issue of computational burden arises in Zeijlstra’s (2004, 2012) analysis of Multiple Agree in negative concord as discussed above, whereby one Search operation must take place for every NPI which requires licensing; thank you to the reviewer for pointing out this parallel.

<sup>7</sup> Note that in forms such as ěmǝʔũ, [ʔ] does not receive [+nasal] but is transparent to spreading. I assume here therefore that [ʔ] simply does not surface with a [+nasal] feature, or more specifically that this segment is not contrastive for [nasal].

## (18) Search and Copy procedure for nasal spreading in Terêna

Initiated by [+nasal]

Search:

Parameter	Value
$\Sigma$	word
$\gamma$	[-sonorant]
$\beta$	left edge of word
$\leftarrow$	$\rightarrow$

Copy [+nasal] to all segments in spreading domain between  $\beta$  and  $\gamma_i$ 

The improvement this formulation offers is that only a single operation of Search-and-Copy is required to compute nasal spreading in a given word, rather than one operation per segment that can receive [+nasal]. In languages characterised by the presence of many such spreading procedures, such as those with vowel harmony systems, this approach could significantly reduce the computational burden. Conceptually, one might also argue that it better matches the phonetic intuition that nasal spreading is a continuation of the nasal articulation from one underlyingly nasal segment over a number of following segments, or anticipatory nasal articulation in the case of leftward spreading.

Thus, spreading is conceptualised here as an extension of Search-and-Copy, whereby the outcome of Search determines the domain of one or more segments, rather than a single segment, over which Copy operates. In the following sections, I give further examples of how this version of spreading may apply to other syntactic and phonological phenomena.

### 5.1 Non-manual markers

Returning to NMMs, their spreading behaviour appears to necessitate the definition of a spreading domain within the syntactic (hierarchical) representation, proceeding through c-command from a particular source element. The current approach to Search can account for this behaviour by being used to define the limits of the spreading domain over which NMMs are aligned. Similarly to nasal spreading in Terêna, I assume that the source of the NMM initiates a Search, and then defines the start and endpoint of the spreading domain according to the outcome of that Search. For example, in ASL negative headshake spreading I assume that there is some negative operator (following e.g. Zeijlstra, 2004; Ke, 2019), which initiates a downward Search. However, since the Search does not terminate, but rather continues until the end of the utterance, I assume that the goal parameter is empty, that is, there is no feature which can match the Search conditions and cause it to terminate. Consequently, the Search invariably reaches the end of the utterance, and defines a spreading domain between the source of spreading and the end of the utterance. This is illustrated in (19), where  $\underline{S}$  delineates the extent of the Search and corresponding spreading domain of headshake.



## (19) Search procedure for headshake spreading in American Sign Language

Initiated by  $Op^{-1}$  ( $\zeta = Op^{-1}$ )

Search:

Parameter	Value
$\Sigma$	Current structure
$\gamma$	[ ]
$\beta$	Sister of $\zeta_i$
$<$	$\exists$

S

JOHN [<sub>NegP</sub>  $Op^{-1}$  [ Neg [<sub>VP</sub> BUY HOUSE]]]  
 ‘John is not buying a house’

I assume that when Search fails and returns no goal  $\gamma_i$ , the operation which aligns headshake over the spreading domain defaults simply to aligning it from the beginning point to the end of the structure. If a spreading domain may be defined by two edges — a start- and endpoint — then a domain with only a start point will necessarily extend indefinitely over the remainder of the available structure. This results in the unbounded spreading observed in the case of negative headshake. Note that this unbounded spreading behaviour does not result from the operation of Search itself; rather, a separate copying operation taking the outcome of Search as a parameter (its endpoint, or lack thereof) is what aligns the negative headshake. This secondary operation need not necessarily lie within the narrow syntax, and indeed, it would be problematic to suggest that headshake, a phonological element, would exist there, as discussed previously above. Instead, I suggest only that the edge(s) of the spreading domain are marked within the syntax, to be interpreted post-syntactically as a morphological phenomenon (following e.g. Norris 2014; Deal 2022). Here similarities may be drawn to *spans* as a morphological operation targeting a contiguous sequence of syntactic elements, in this case a contiguous sequence of heads (e.g. Williams 2003; Svenonius 2016), or more broadly, the mechanism of Spell-Out in theories such as Nanosyntax (Caha 2009; Starke 2009). Although the result of Spell-Out differs from the phonological alignment of headshake, there is good reason to suggest a post-syntactic operation which targets a contiguous stretch of hierarchical structure, where the target section is delineated within the syntax by the outcome of a Search operation.

This notion of a Search operation without a goal parameter closely mirrors Deal’s (2022) insatiable probes in her interaction-satisfaction model of Agree, as applied to negative concord. As discussed above, cases of strict negative concord such as Italian or Czech, in which multiple NCIs appear to be licensed by a single, higher negative operator, can be analysed through a probe which interacts with negative features, but has no satisfaction condition. It is therefore free to perform the same interaction on all eligible targets within the c-command domain of the probe, in this case goal-flagging them as NCIs (which Deal links to their morphological realisation as negative, presumably in a post-syntactic operation). In the current proposal, a Search with an empty goal parameter is an insatiable Search, which invariably continues to the end of the Search domain. I tentatively suggest that the current proposal could also apply to cases of strict negative concord in spoken languages. Rather than repeatedly participating in Agree relations, it could be that the negative operator in languages like Italian or Czech simply delineates the same negative spreading domain over its scope within the syntax. Here, the difference in modality is significant: while NMMs may be articulated entirely independently

from and thus simultaneously with manual signs of any kind, negative concord in spoken languages only manifests as negative morphology on particular words. This difference would need to be accounted for in the morphological interpretation of the spreading domain. Such an account is beyond the scope of this discussion, but I contend that this approach offers a compelling link between the syntax of sign language negation and negative concord in spoken languages. As for cases of nasal spreading in languages such as Terêna, this account reduces the number of computational operations that need to be performed to capture negative concord: one Search operation occurs per negative domain, rather than one per NCI, potentially offering an improvement in terms of computational efficiency.

For these analyses of both Terêna and negative concord, it is notable also that there are cases where Search fails to terminate either by chance, as in Terêna when there happen to be no [-sonorant] segments in the Search domain (e.g. in words such as *ẽmõʔũ*), or by design, as with insatiable probes. This is reminiscent of Preminger's (2014) notion of failed agreement, whereby an operation — in this case, strictly Search rather than Agree — is triggered, but the structural conditions for its termination are not met, and yet the output remains grammatical. In this account, operations are obligatorily performed when their trigger enters into the derivation, largely referring to traditional Agree operations with feature-copying to the Probe. In the case where such Agree operations fail to conclude, the feature-copying part of Agree is simply not performed. However, in the cases under discussion where Search fails to terminate, I have assumed that the relevant operation is performed on an unbounded domain from the beginning point of Search to the end of the domain. This is therefore a potential difference between feature-copying Agree and goal-flagging Agree (to use Deal's terms). The former, being the one-time copying of a specific target feature, simply does not occur when the target is not found, whereas the latter, being the copying of a source feature one or more times, occurs to as many targets as possible when it is not restricted by the successful termination of Search.

Returning to concord, the current approach requires adopting a specific view of what task Search actually performs, and what tasks are performed separately as part of a composite operation involving Search. In Deal's version of Agree, the interaction and satisfaction features of the Probe may be specified to trigger feature copying, goal flagging or movement when appropriate goals are found, thereby conflating somewhat the traversal of the structure (Search) and any subsequent operations which apply to the outcome of Search, such as Agree, Copy, (internal) Merge, etc. To decompose this operation, again following Nevins (2010), I emphasise that the only function of Search is to relate an initiator and a goal to each other, based on some desired feature standard. Any subsequent operation, whether feature copying in either direction, movement, or the establishment of a spreading domain (followed by feature copying over it), is immaterial to the actual operation of Search. This is in line with Chomsky (2005), in which Minimal Search is taken to be a single computational algorithm which underlies operations such as Labelling and Agree. The current proposal therefore suggests the extension of this algorithm as a single underlying operation behind certain other processes in the morphosyntactic and phonological domains; in particular, a notion of spreading, which was abandoned in the Search-and-Copy approach to phonology. The question remains, however, as to the exact timing of this spreading operation. Here, I have suggested that in the case of NMMs it may be post-syntactic, as it relates to the alignment of a phonological element. Conversely, in the case of negative concord goal-flagging, and indeed cases of goal-flagging more broadly, it is less clear whether this should be considered part of the narrow syntax.

### 5.2 Further uses of spreading domains

In this section I examine some idiosyncratic cases of feature copying in the phonological literature which have been challenging to rule-based models of phonology, and suggest how the current approach, with reference to spreading domains, may better account for them.

#### 5.2.1 Phonological iterativity

A further proposed parameter of phonological Search-and-Copy not discussed above is that of *iterativity*, which determines whether a given phonological rule applies only once or multiple times within a derivation. Archangeli & Pulleyblank (1994) discuss a minimal pair of phonological processes which are differentiated only by whether they apply once or iteratively. The first is tone spreading in Tonga, as described above in (8), where underlying high tones spread leftward to the edge of the word before delinking from their original segment, as in *imakáni* → *ímákàni* (Archangeli & Pulleyblank 1994:292). The authors compare this example with another from Kinande as illustrated in (20).

(20) Kinande

- a. e-ri-hum-a ‘to hit’
- b. e-ri-na-hum-a ‘to just hit’
- c. e-rí-korogot-a ‘to scrape’
- d. e-ri-ná-korogot-a ‘to just scrape’ (Archangeli & Pulleyblank 1994:(291))

In this example, there is a contrast between roots which cause the immediately preceding prefix to bear high tone (20c,d), and roots which do not (20a,b). As the authors argue, this reflects a non-iterative spreading process, whereby certain roots underlyingly bear a high tone which spreads leftwards a single time before delinking from its original position. As such, these two spreading behaviours differ only in whether they are specified as non-iterative, for Kinande, or iterative, for Tonga. As such, Archangeli & Pulleyblank propose that iterativity should be considered an independent parameter of rules, akin to directionality, as discussed above.

In a similar vein, Andersson et al. (2021) argue that iterativity may also be a necessary parameter in the Search-and-Copy framework, using a pair of cases of optionally-applying phonological rules. The first case is an optional process of rightward [+round] harmony in Tigre (a Semitic language spoken in Eritrea) shown in (21):

(21) Tigre

- [kətəb-ko] ~ [kətob-ko] ~ [kotob-ko]  
 ‘I wrote’ (Andersson et al. 2021, from Faust 2017)

The authors analyse this as an optional, iterative process: each vowel optionally initiates a rightward Search for [round] and copies [+round], with [kətob-ko] arising when only the rightmost /ə/ does so. To contrast, they present a case of optional ATR harmony in Eastern Andalusian Spanish, as in (22):

## (22) Eastern Andalusian Spanish

[mone'ðeroh] ~ [mone'ðeroh] ~ \*[mone'ðeroh] ~ \*[mone'ðeroh]  
 ‘purses’ (Andersson et al. 2021, from Jiménez & Lloret 2007)

In this case, the ATR harmony of the first two syllables is *all-or-nothing*; the authors therefore analyse this as the simultaneous initiation of a rightward Search by both harmonising vowels for [ATR], with the simultaneous Search being optional as a whole. As a result, the forms \*[mone'ðeroh], \*[mone'ðeroh] may not be derived, as both vowels must participate if harmony is selected to apply. The authors show further that iterative Search would incorrectly account for this case: as for Tigre, an iterative Search analysis should permit at least \*[mone'ðeroh], in which only the rightmost vowel initiates Search. Similarly, a simultaneous Search analysis would incorrectly account for Tigre, ruling out the acceptable form [kətoβ-ko]. Thus, within Search-and-Copy, the authors argue for the necessity of an additional Search parameter, denoted  $\iota$ , which encodes this difference in operation.

The current approach may offer a solution that eliminates the need for this parameter. Under a spreading domain analysis, each harmonising vowel initiates a rightward Search for the relevant harmony feature. The endpoint of this Search ( $\gamma_i$ ) then delineates the spreading domain for the feature found in the Search, which is copied to every eligible target within the domain. The difference between the two cases is that in Tigre, both instances of /ə/ can trigger this process (i.e. serve as  $\zeta$  for Search-and-Copy), whereas in Eastern Andalusian Spanish only the initial vowel can. The parameters of Search are therefore the same, as in (23); the difference lies in the segments which carry a trigger for the Search rule, which could be considered comparable, in formal terms, to an unvalued feature or diacritic in a syntactic derivation.

## (23) Copying procedure for Tigre and Eastern Andalusian Spanish

Tigre: initiated by all /ə/ ( $\zeta = /ə/$ )

Eastern Andalusian Spanish: initiated by all /é, ó/ ( $\zeta = /é, ó/$ )

Search:

Parameter	Value	
	Tigre	Eastern Andalusian Spanish
$\Sigma$	word	word
$\gamma$	[round]	[ATR]
$\beta$	$\zeta_i$	$\zeta_i$
$\leftarrow$	$\rightarrow$	$\rightarrow$

Both: Copy  $\gamma_i$  to all segments in spreading domain between  $\beta$  and  $\gamma_i$

## 5.2.2 Nonmyopic spreading

Walker (2010) describes a problematic case of *nonmyopic harmony* in the Romance dialects of Central Veneto and Grado. These dialects display a system of metaphony, whereby a post-tonic high vowel causes the raising of a preceding mid vowel /e, o/ to [i, u]. In these dialects, a mid vowel carrying primary stress, along with any mid vowels between it and the triggering high vowel, undergo raising. For brevity I give only examples from Central Veneto; the systems are identical for these purposes.

## (24) Metaphony in Central Veneto

- a. kals-ét-o kals-ít-i ‘sock (MASC.SG/MASC.PL)’
- b. órden-o úrdin-i ‘order (1SG/2SG)’ (Walker 2010:(170–171))

Thus in (24a) the stressed mid vowel raises when followed by a high vowel. In (24b), the metaphony is long-range, with an extra syllable between the stressed vowel and final vowel. Notably the unstressed /e/ between the stressed vowel and the final vowel also undergoes raising, suggesting a spread of some [+high] feature leftwards from the final high vowel over all vowels until the stressed vowel. However, in some cases, metaphony may fail to occur, as shown in (25).

## (25) Failure of metaphony in Central Veneto

- a. lavórav-a lavórav-i ‘worked, was working (1SG/2SG)’
- b. pérseg-o pérseg-i ‘peach (MASC.SG/MASC.PL)’
- c. ángol-o ángol-i ‘angle (MASC.SG/MASC.PL)’ (Walker 2010:(171–172))

In (25a) *lavórav-i*, the intervening low vowel /a/, which does not undergo metaphony, appears to block the raising of the stressed /o/. This is a standard blocking phenomenon — it could be analysed as the presence of a [-high] feature on /a/ preventing the spread of [+high]. However, in (25b,c), the stressed vowels /é/ and /a/ respectively appear to block the raising of the following unstressed candidate vowel, despite not linearly intervening between the mid vowel and the final /i/. That is, the forms \**pérsig-i*, \**ángul-i* are not observed. Walker categorises this as an apparently *nonmyopic* spreading process: it appears as if the leftward spread of [+high] from the final vowel is looking ahead to check if the stressed vowel is able to undergo raising, and if it is not, then raising does not apply to any intermediate vowels either. In an account of long-range harmony based on iterative feature spreading, such as Nevins’ (2010) Search-and-Copy, this is problematic, as the derivation should not be able to look ahead to a future application site to determine whether a rule should be applied at a prior application site.

A spreading domain analysis may again account for this phenomenon. In this analysis, stressed mid vowels such as *ó* in *órden-i*, *lavórav-i* initiate a rightward Search for [high]. Upon encountering a [+high] vowel, the Search terminates, and the endpoint delineates the spreading domain for the encountered [+high] feature to copy onto. This causes the spreading across the whole word in *úrdin-i*. In contrast, in *lavórav-i*, the presence of the [-high] vowel /a/ terminates the Search early; this implies either that feature copying does not occur for [-high] in this case, or that [-high] is vacuously copied onto /o/. Either way, the Search never reaches the final high vowel, meaning that [+high] is never copied. Finally, in *pérseg-i*, *ángul-i*, the stressed vowels are not mid vowels, and so do not initiate this Search. Consequently, there is no copying process which could copy [+high] onto the unstressed mid vowels.

The Search parameters for Central Veneto/Grado metaphony are therefore as in (26).

## (26) Copying procedure for Central Veneto/Grado metaphony

Initiated by all /ó, ú/ ( $\zeta = /ó, ú/$ )

Search:

Parameter	Value
$\Sigma$	word
$\gamma$	[high]
$\beta$	$\zeta_i$
$\prec$	$\rightarrow$

Copy  $\gamma_i$  to all segments in spreading domain between  $\beta$  and  $\gamma_i$

Thus, these cases present a further area of application of Minimal Search and spreading domains in phonology, offering a solution to phenomena which cannot be captured with the tools available to the original Search-and-Copy paired with its locality constraints.

## 6. Conclusion

This paper has presented an argument from the perspective of theoretical parsimony in the Minimalist context for the desirability of a domain-neutral Minimal Search algorithm, which may reduce the complexity of the description of the innate component of language. The proposed Minimal Search algorithm locates the difference between syntactic and phonological domains, namely the difference in the type of structure used in each domain, in the directionality parameter, while all other parameters are shared. Thus, rather than separate Search algorithms being required for both domains, the same algorithm is used and varies only parametrically across syntax and phonology.

To support the theoretical arguments for a common Minimal Search algorithm, this paper also examined the literature demonstrating the similarity between syntactic and phonological representations and computation under a Minimalist approach. It was argued that the phenomenon of NMMs in sign languages, particularly ASL, represents a striking case of this similarity. In particular, the notion of the spreading domain of an NMM is strongly reminiscent of the spreading behaviour of phonological features, but appears to be located within the syntax, rather than in prosody. Under the proposed approach, I showed that the representational challenge presented by a syntactic spreading domain can be solved through use of Minimal Search to define the edges of the spreading domain within the syntactic structure, in a way which can be interpreted at PF to align the NMM over the relevant domain. Building on this approach, I suggested how the spreading domain analysis could be applied in parallel cases of spoken-language concord, as well as certain challenging cases of idiosyncratic phonological feature spreading, all using a unified Search algorithm.

In general, the broad range of applications of Minimal Search, across linguistic domains and across different operations within those domains, prompt us to consider more closely exactly what task Minimal Search performs. Here I have argued that the purpose of Minimal Search is no more or less than its parametric and procedural description: an initiating element uses Search to establish a relationship with another element which matches some feature standard, and which is reached via some traversal of a structure. The outcome of Search, a pair formed by the initiator and a goal, may then serve as the input to some further operation, whether it be Agree, Labelling, feature copying or the establishment of a spreading domain. The question is then: are there any operations which do not make use of Minimal Search, but instead some other traversal of the structure in question? From the Minimalist principles of Search proposed by

Chomsky (2005) et seq., one should predict that language makes use of a single Search algorithm, and indeed cases such as upward Agree, which imply an upward Search procedure, have in fact been argued as consistent with downward Search. In this vein, it will be fruitful to develop further a theory of Minimal Search, by examining whether other operations in syntax, phonology, or other domains make use of this same traversal procedure.

### Abbreviations

1SG	first person singular	MASC	masculine
2SG	second person singular	NEG	negative
bl	brow lowering	PL	plural
br	brow raising	SG	singular
hs	headshake	y/n	yes/no

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# On the morphosyntax of Spanish (object) relative clauses

Giacomo Presotto

This paper discusses the syntax of Spanish restrictive subject and object relative clauses, focusing on the categorial status of the relative element *que*. Specifically, I extend the influential account of Poletto & Sanfelici (2018) to Spanish, proposing a unified analysis of *que* in terms of a Wh-determiner. In examining the morphosyntactic implications of this hypothesis, I further argue that a single *que* exists that can realise different portions of the same underlying structure, based on a spanning-like derivation *à la* Svenonius (2012; 2016; 2020).

## 1. Introduction

Linguistic theory has long been concerned with relative clauses. Over the years, an incredibly large number of contributions have offered many different analyses of these structures. What is probably at the base of such proliferation is the fact that relative clauses come in disparate types, both intra- and interlinguistically. Research on this topic has traditionally focused on defining the syntax underlying different relativisation strategies, with the aim of unifying their intricate variation under a single analysis. Central to this is the definition of the categorial status of relativisers, or more generally, all elements that introduce relative clauses. Essentially, scholars have debated whether and which such elements should be treated as complementisers or relative pronouns. This paper contributes to this debate by examining the specific case of Spanish subject and object relative clauses. In particular, I propose a unified analysis of *que* as a wh-determiner, extending for the first time to Spanish a prominent analysis that has been proposed for many other Romance languages (cf. Section 4). In doing so, I also review other salient morphosyntactic properties of Spanish relative clauses and show how they can all be derived in a uniform fashion based on up-to-date syntactic assumptions. These properties include i) the variation in the position of the subject in object relative clauses, and ii) the alternation between bare *que* and *al/a la que*. As far as the latter is concerned, I argue that a single *que* exists that can realise different portions of the same underlying structure, calling upon Spanning theory (Svenonius 2012, 2016, 2020).

The paper is organised as follows: Section 2 reviews the main analyses of relative clauses in syntactic theory, with a focus on their derivations; Section 3 illustrates the word order properties of Spanish relative clauses and how to interpret them syntactically, while Section 4 describes the morphosyntactic variation of *que*. In Section 5 I present my analysis. Section 6 concludes.

## 2. Relative clauses in syntactic theory

A relative clause is, at its simplest, a clause that modifies a noun. Traditionally, two major types have been distinguished: *restrictive relative clauses* and *non-restrictive relative clauses*. The former limit the meaning of the noun they modify, *restricting* the identification of its referent to the intersection of the denotations of the relative clause and the head noun. For instance, in *The tree that John planted is a spruce* the relative clause specifies the referent of the noun as the one tree that John planted. On the other hand, non-restrictive, or *appositive* relative clauses do not intersect with the denotation of the noun, but rather provide additional independent information, as in *The tree, which is a spruce, was planted by John*. In semantic terms, restrictive relative clauses behave like other intersective modifiers such as adjectives and predicates, and are described as being of type  $\langle e, t \rangle$  (Heim & Kratzer 1998; Zimmermann & Sternefeld 2013). In contrast, non-restrictive relative clauses are seemingly closer to an independent sentence of type  $t$  that follows the noun, as in e.g. *The tree was planted by John. The tree is a spruce* (Ross 1967; Demirdache 1991; Trabant 2016). In this paper I will be only concerned with restrictive relative clauses and, among these, only subject relative clauses and object relative clauses. I will thus leave aside oblique relative clauses and non-restrictive relative clauses altogether.

At the syntactic level, relative clauses have been at the centre of a fertile debate, giving rise to numerous analyses over the years. In spite of some inevitable idiosyncratic aspects that differentiate single proposals, these can be grouped into three main sets of theories, namely so-called head-external analyses, matching analyses, and raising analyses. These offer (partially) different solutions to what Salzmann (2017) describes as the *connectivity problem* and the *modification problem*. Concretely, any analysis of relative clauses ought to address two issues. First, the grammatical definition of the link between the surface position of the head noun and the RC-internal position to which it is related (connectivity problem). Second, the location where the relative clause attaches to the noun it modifies, and the type of syntactic relation that is established between the two (modification problem). The following subsection briefly illustrates the main characteristics of head-external analyses, matching analyses, and raising analyses, and how these deal with said issues.

### 2.1. Head external analysis, matching analysis, and raising analysis

In the head external analysis, the head noun is not represented inside the relative clause (RC), and a relative operator or a (c)overt pronoun is A'-moved to the C-domain, where it is co-indexed with the external head noun (cf. Plann 1975; Montague 1973; Chomsky 1977; Jackendoff 1977; Boef 2012), as in (1).

- (1) I like the woman [<sub>CP</sub> whom<sub>1</sub>/Op<sub>1</sub> C<sub>rel</sub> John kissed \_\_\_<sub>1</sub>]. (Salzmann 2017:39)

This type of analysis was extensively adopted throughout the Government and Binding era but

later gave way to accounts that posit a representation of the head noun internal to the RC. Indeed, many have regarded such an alternative as superior in many respects. First and foremost, it seems better equipped to analyse the rich typology of relativisation strategies, which includes head-internal RCs (cf. Alexiadou et al. 2000; de Vries 2002; Salzmänn 2017; Cinque 2020). Moreover, assuming a RC-internal representation of the head noun offered a more natural interpretation to a number of properties largely (but not only) related to reconstruction effects. For instance, the fact that certain expressions keep their idiomatic meaning when split between the RC and the matrix clause suggests that the head noun forms a constituent with the RC verb at some stage of the derivation. One such classic example is the one presented by Schachter (1973) and Vergnaud (1974) for French, where the interpretation of the idiom chunk *tirer parti* ‘to take advantage’ keeps intact when *parti* is the head of the RC:

- (2) *Peu de gens ont parlé du parti qu’il a tiré des difficultés économiques.*  
 few of people have spoken of-the advantage that-he has taken of-the difficulties  
 economic

‘Few people have talked about the advantage that he took from the economic crisis.’

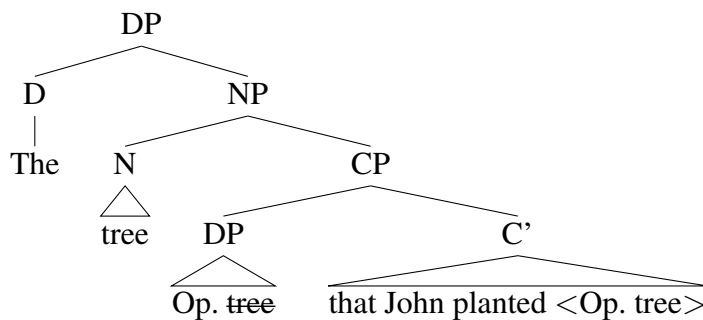
(From Perpiñán 2010:37)

Again, under the assumption that the idiomatic meaning can only be assigned when the verb and its argument (here *tirer* and *parti*) form a constituent, it follows that the head noun in (1) must have occupied the complement position within the RC predicate structure at some point. A somewhat similar case is that of binding effects, and notably Principle A effects (Schachter 1973; Kayne 1994). Consider the sentence in (3). If the relative head *picture of himself* were generated in a position external to the RC, at no point in the derivation could the anaphor *himself* be c-commanded by its antecedent (*John*).

- (3) the picture of himself<sub>i</sub> that John<sub>i</sub> likes \_\_\_ best (Salzmänn 2017:2)

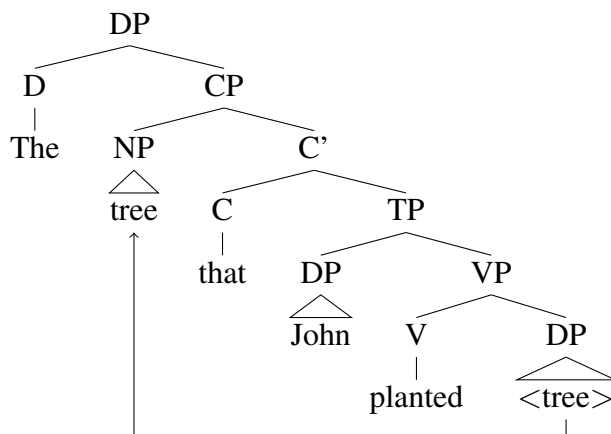
The actual interpretation of (3) is thus only obtained if *picture of himself* is reconstructed within the RC as the internal argument of the verb *like*. After a fashion, both (3) and (2) imply that the head noun can be interpreted as part of the RC predicate. To secure this scenario, the head noun must have a RC-internal representation, which is exactly what constitutes the premises of both matching and raising analyses.

While its original formulations can be traced back to the early 60s (Lees 1960, 1961; Chomsky 1965), the matching analysis has only garnered a renewed consensus in recent years (Sauerland 1998, 2003, 2004; Citko 2001; Salzmänn 2006 a.o.). At its core, the matching approach posits that the head noun is represented twice: once in its surface position (i.e., the matrix clause), and once within the RC, as illustrated in (4).

(4) *Matching derivation*

In this derivation, the RC-internal instance of the head noun moves along with a relative operator to the left periphery of the RC. From there, it gets deleted by its non-distinct, c-commanding copy in the matrix clause, so that only the latter is phonetically realised (Sauerland 2003, 2004).

Conversely, in raising analyses there is a single instance of the head noun. This is base-generated within the RC and then moved (or *raised*) to the CP-layer of the RC (e.g. Kayne 1994; Cinque 2008, 2020) or, in some versions, up to a higher projection in the complement position of the external DP (e.g. Bhatt 2002; Donati & Cecchetto 2011; Cecchetto & Donati 2015). This approach finds its roots in works by Brame (1968), Schachter (1973), and Vergnaud (1974), though likely owes its popularity to Kayne's (1994) influential re-elaborated version, upon which all recent analyses are based (Bianchi 1999, 2000, 2002; Cinque 2008, 2020; Poletto & Sanfelici 2018 a.o.). The tree in (5) illustrates a typical raising derivation.

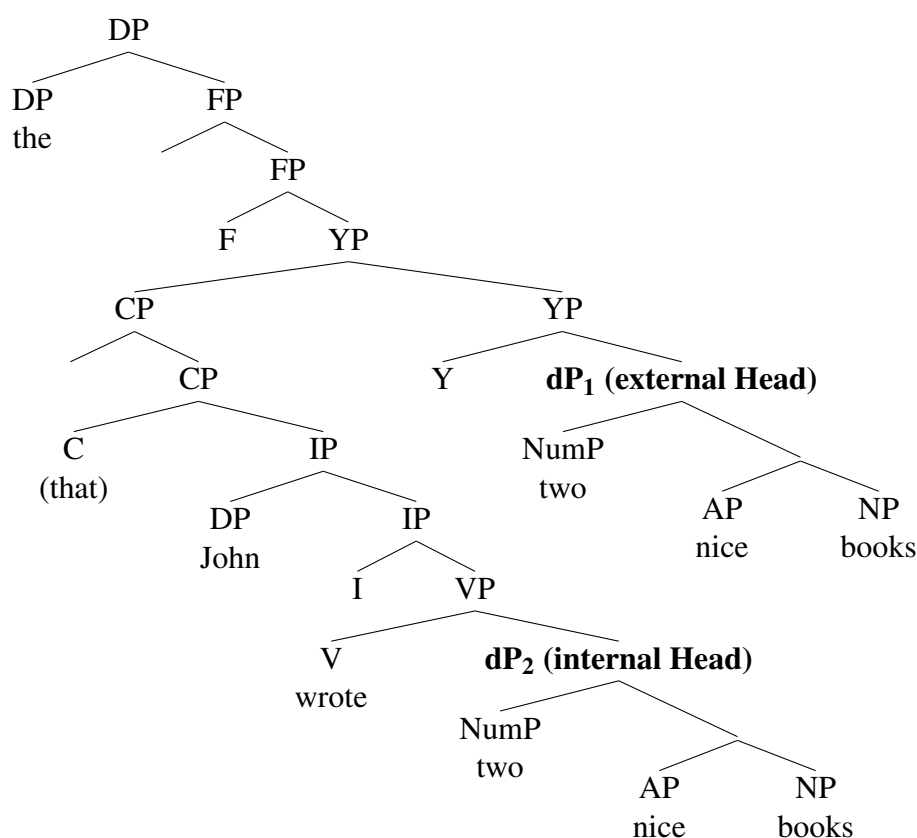
(5) *Raising derivation*

On closer inspection, however, neither matching nor raising derivations are completely immune to criticism. One major aspect that raising accounts tend to leave somewhat unaddressed is the fact that the head noun potentially receives two conflicting theta roles and cases.<sup>1</sup> At the same time, a genuine matching approach is not always fully equipped to accommodate cases like (1), where idioms are seemingly split between the matrix clause and the RC. It is not my purpose to delve into all the arguments and counterarguments of either approach, for which I refer to the comprehensive review of the topic in Salzmann (2017). I will rather limit myself to acknowledging that many scholars have proposed that both raising and matching derivations are

<sup>1</sup> See Kayne (1994:ch:8) and Bianchi (1999) for possible solutions.

supported by substantial evidence, suggesting that they are in principle equally available to UG (Áfarli 1994; Aoun & Li 2003; Sauerland 2003, 2004; Hulsey & Sauerland 2006; Szczegielniak 2004; Cinque 2008, 2020). This is why, when confronted with the vast array of options for analysing Spanish RCs, I opted for a syntactic structure that accommodates both types of derivations, following Cinque (2008, 2011, 2020). Cinque pursues the idea that matching and raising approaches are not mutually-exclusive but, rather, structural variants that emerge from one and the same ‘double-headed’ underlying structure. A representation of the latter is given in (6), where the RC is, much as other pre-nominal modifiers, attached to the functional spine of the external head noun, in accord with standard cartographic assumptions (Cinque & Rizzi 2009; Rizzi 2013b) and Kayne’s LCA (Kayne 1994).

(6) *Double-headed RC structure* (adapted from Cinque 2020)



Cinque’s (2020) book extensively discusses how this base structure adapts to the needs of typologically diverse RC-configurations. In particular, it shows that, depending on the properties of the RC/language at issue, either type of analysis is available. In a matching derivation, the external head moves above the attachment-site of the internal head and deletes it (Cinque 2020:18). In a raising derivation, the external head stays put, while ‘*it is the Head internal to the relative clause that ends up being the overt Head by raising to Spec,CP and licensing the deletion of the external Head*’ (Cinque 2020:16).

In the next sections I will take into account the specific case of Spanish subject and object RCs and, after discussing some relevant properties of the relative *que*, show how these can be analysed based on a (slightly modified version of) double-headed structure *à la* Cinque.

### 3. Spanish RCs - word order

Like all Romance languages (as well as English and Germanic languages), Spanish has head-external, post-nominal RCs.<sup>2</sup> The sentences in (7) and (8) show an example of, respectively, subject RC (henceforth SRC) and object RC (henceforth ORC).

(7) La chica que mira a la profesora es Isabel.  
 the girl that watches DOM the professor is Isabel  
 ‘The girl looking at the teacher is Isabel.’

(8) La chica que la profesora mira es Isabel.  
 the girl that the professor watches is Isabel  
 ‘The girl the teacher is looking at is Isabel.’

Moreover, ORCs can vary with respect to the position of the subject within the RC. Subjects can appear pre-verbally, as seen in (8), but also post-verbally, like in (9).<sup>3</sup>

(9) La chica que mira la profesora es Isabel.  
 the girl that watches the professor is Isabel  
 ‘The girl the teacher is looking at is Isabel.’

Gutiérrez-Bravo (2005) proposed that, unlike in the matrix clause, the unmarked word order in Spanish ORCs requires a post-verbal subject, thus resulting in OVS word order. He further maintains that subjects occurring in that position are foci conveying new information, while pre-verbal subjects rather constitute topics related to old information. Moreover, he observes that the alternation between OVS and OSV orders is not just regulated by the information-theoretical structure. In fact, there seems to be a crucial interaction with factors related to the prosodic weight and intonational prominence of the phonological phrases that are involved. In essence, given that the nuclear accent in Spanish is always clause-final (Contreras 1976; Zubizarreta 1998) and that subjects, as stressed lexical heads, constitute the head of the phonological phrase in which they occur (here the RC), these must follow the verb (i.e. a lighter phonological phrase) as in (9).<sup>4</sup> When such a prosodic configuration is altered, however, the subject realises in its canonical pre-verbal position, as is the case in RCs with two complements, about which ‘*speakers have clear intuitions that the unmarked position of the subject is not the post-verbal position, but rather the canonical pre-verbal position*’ (Gutiérrez-Bravo 2005:160):

(10) *Qué pasó?* ‘What happened?’

a. # Estoy leyendo la carta que le mandó la maestra a Pedro.  
 am reading the letter that DAT-CL sent the teacher to Pedro  
 ‘I am reading the letter that the teacher sent to Pedro.’

<sup>2</sup> See Bianchi (2002); Salzmann (2017); De Vries (2018); Cinque (2020) for a complete review of RC-types.

<sup>3</sup> Note that this sentence is not ambiguous with a SRC reading. Had (9) been a SRC, the RC-internal DP (*la profesora*) should have been introduced by DOM. Because DOM is missing here, the only available reading is the ORC one. See Presotto & Torregrossa (2024) (forth.) for a discussion.

<sup>4</sup> One crucial assumption here is that much as there are light and heavy syllables at the word level (Prince 1990; Hayes 1995; Ryan 2016), there are also light and heavy prosodic phrases at the level of sentence prosody (Gutiérrez-Bravo 2005:156-157).

- b. Estoy leyendo la carta que la maestra le mandó a Pedro.  
 am reading the letter that the teacher DAT-CL sent to Pedro  
 ‘I am reading the letter that the teacher sent to Pedro.’

(Gutiérrez-Bravo 2005:160)

In the above examples, because the accent falls on the indirect object (a heavy phonological phrase), the subject can freely occur pre-verbally without interfering with conflicting prosodic requirements.<sup>5</sup> As the author put it, Spanish can thus be characterised as a ‘*a language that prioritizes intonational considerations over canonical subject position*’, which is, he continues, ‘*not surprising*’ (Gutiérrez-Bravo 2005:157), as similar contingencies can be found elsewhere in the language, for instance with narrow-focused subjects in matrix clauses (cf. Büring & Gutiérrez-Bravo 2001). As a matter of fact, these observations seem to find further support in languages that share similar prosodic properties.<sup>6</sup> In Italian, for instance, subjects in ORCs are typically realised post-verbally in out-of-the-blue contexts (11a). Much as in Spanish, though, a pre-verbal subject is preferred when additional (heavy) phonological material is added after the verb. This could be an argument, as the indirect object in (11b), an adjunct (11c), or even just a single adverb (11d).

(11) *Che fai?* ‘What are you doing?’

- a. Sto leggendo la lettera che ha mandato la maestra.  
 am reading the letter that has sent the teacher  
 ‘I am reading the letter that the teacher sent.’
- b. Sto leggendo la lettera che la maestra ha mandato a Pietro.  
 am reading the letter that the teacher has sent to Pietro  
 ‘I am reading the letter that the teacher sent to Peter.’
- c. Ho incontrato la maestra che Pietro ha disegnato nel suo diario.  
 have.1SG met the teacher that Pietro has drawn in.the his diary  
 ‘I met the teacher who Peter has drawn in his journal.’
- d. Ho incontrato la maestra che Pietro ha disegnato ieri.  
 have.1SG met the teacher that Pietro has drawn yesterday  
 ‘I met the teacher who Peter has drawn yesterday.’

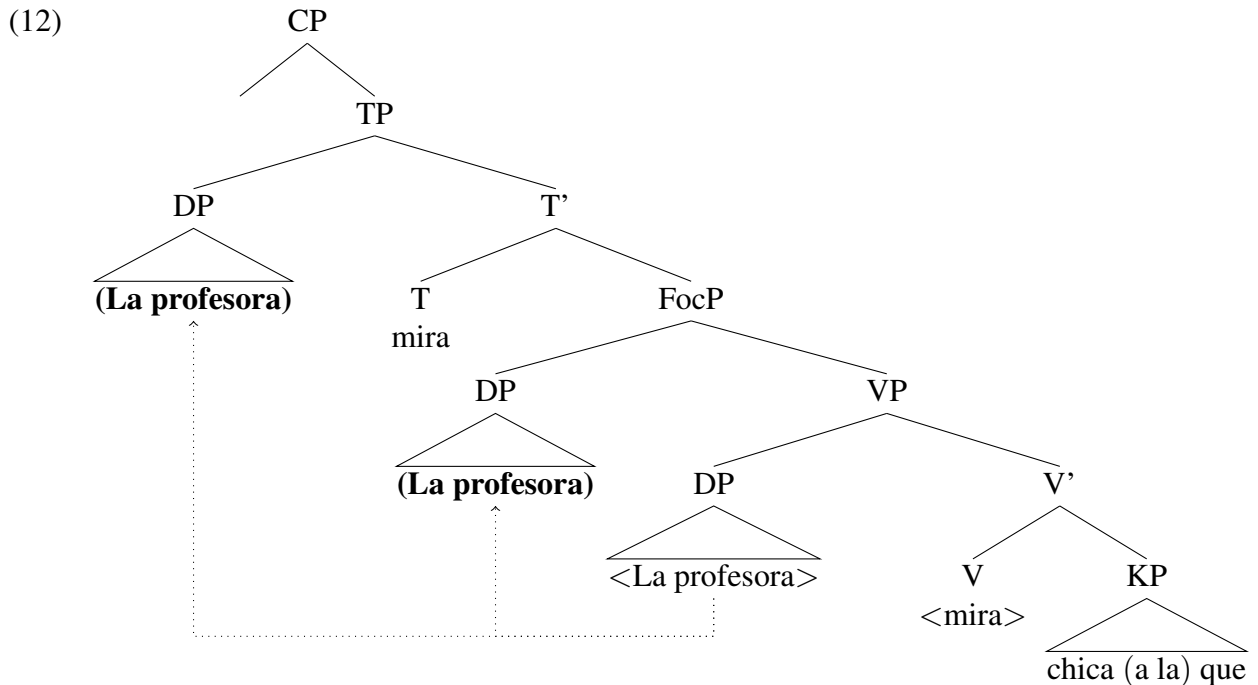
Steady though these contrasts are in Italian, I would not go as far as suggesting that acceptability is ever deeply compromised based solely on subject position. In all displayed cases, both pre- and post-verbal subjects are in fact fully grammatical. This apparently holds true also for Spanish, where the position of the subject does not alter the interpretation of the sentence, nor does either order characterise as non acceptable.<sup>7</sup> In sum, barring said prosodic restrictions, pre- and post-verbal subjects in Spanish ORCs are largely interchangeable and, as far as their syntax

<sup>5</sup> The conflict between syntactic and prosodic requirements is handled by Gutiérrez-Bravo (2005) within an Optimality Theory approach (cf. Prince & Smolensky 2004 and Gutiérrez-Bravo 2005:157-164).

<sup>6</sup> Italian, in particular, is especially close to Spanish in this respect. On top of assigning the nuclear accent to the rightmost constituent (Calabrese 1982; Bocci & Cruschina 2018 a.o.), Italian is, like Spanish, a so-called *stress accent* language, which modulates metrical prominence based on a series of spectral cues such as fundamental frequency (f0), intensity, and duration (D’Imperio 2002).

<sup>7</sup> In this respect, see Betancort et al. (2009:1918), Brown & Rivas (2011:23), del Río et al. (2012:2111), Ezeizabarrena (2012:2-3), and Sagarra et al. (2019:123-124).

is concerned, can be reasonably analysed in a fairly standard fashion. Specifically, I argue that pre-verbal subjects occupy the Spec,TP position, and post-verbal subjects a low Spec,FocP *à la* Belletti (2004), as illustrated in the following tree.<sup>8</sup>



#### 4. Spanish RCs - DOM and the status of *que*

A second source of variation in Spanish ORCs relates to the (non-)realisation of DOM in front of the relative particle *que*. As is well known, Spanish marks a specific class of direct objects with the particle *a*, a case-like marker homophonous with the dative preposition that is frequently referred to as A-marker (Rodríguez-Mondoñedo 2007). In the main clause, at least [human, specific, definite] direct objects are obligatorily A-marked, and the absence of DOM results in ungrammaticality:<sup>9</sup>

- (13) La profesora mira \*(a) la chica.  
 the teacher looks DOM the girl  
 ‘The teacher is looking at the girl.’

In ORCs, however, the marking of the head noun is not as straightforward. In fact, even when the head noun is [human, specific, definite], the realisation of DOM (in conjunction with the definite article *ella*) is optional (cf. Sagarra et al. 2019:123):

- (14) a. la chica a la que la profesora mira  
 the girl DOM the that the teacher looks  
 ‘the girl that the teacher is looking at’

<sup>8</sup> I discuss in greater detail the other relevant steps of the derivation in the following section.

<sup>9</sup> For a comprehensive review of the topic see Bossong (1991); Torrego (1998); Aissen (2003); Leonetti (2008); Rodríguez-Mondoñedo (2008); López (2012); Fábregas (2013).



- b. la chica que la profesora mira  
 the girl that the teacher looks  
 ‘the girl that the teacher is looking at’

To better understand why ORCs seem to allow different conditions on the morphological realisation of DOM, it is worth taking a closer look at the relative particle *que*.

Defining the nature of *que* is not an easy task. Ever since seminal work by Klima (1964), Kayne (1975), and Radford (1981), a prolific strand of research has been concerned with the definition of the categorial status of relative elements. Central to this debate is the question whether these are subordinating heads, like clausal complementisers, or rather relative pronouns. Fortunately, a well-established set of attributes help us distinguishing the two. As reported in (15), indeed, complementisers and relative pronouns/wh-words behave differently with respect to three main properties.

- (15) a. Case marking: complementisers do not inflect for case, relative pronouns can  
 b. Sensitivity to animacy: complementisers do not encode animacy features, relative pronouns can  
 c. Compatibility with prepositions: complementisers cannot be combined with prepositions, relative pronouns can

If we take English, for instance, we can distinguish *that* from *who* and *which* based on these properties. *That* does not inflect for case (16a) *who* can (16b). Similarly, *that* cannot pied-pipe a preposition (17a), while both *whom* and *which* can (17b,c). Finally, whereas *that* is not sensitive to animacy, *who* can only be used with animate head nouns (18).

- (16) a. the boy that you like/likes you  
 b. the boy who/whom you like
- (17) a. \* the girl about that I told you  
 b. the girl about whom I told you  
 c. the car about which I told you
- (18) the car that/\*who Jenna bought

For these reasons, *that* has been traditionally assigned the status of relative complementiser (or relativiser) and *who/which* that of wh-words. But what about Spanish? Well, as all Romance languages, Spanish has a fairly wider paradigm of relative elements. This includes full-fledged relative pronouns like e.g. *el/la cual; los/las cuales*,<sup>10</sup> as well as elements like *que*, whose nature is not as immediately captured. A good starting point to determine its status is, once again, observing how *que* behaves with respect to the properties in (15). Let us start with the third one, namely the possibility to occur with prepositions in pied-piping configurations. The sentence in (19) illustrates that *que* can be preceded by, for instance, the preposition *en*, indicating that in this respect *que* patterns with wh-words rather than relativisers.

- (19) la casa en que Juan vivio  
 the house in that Juan lived  
 ‘the house where Juan lived’

<sup>10</sup> See Zagana (2001:58-60) for a review.

The other two properties concern case-marking and sensitivity to animacy. In a way, the example presented in (14a) already provides evidence suggesting that *que* is somehow responsive to both. By definition, the A-marker encodes (also) animacy and case features. More precisely, it has been interpreted as an accusative marker that applies to animate (and definite, specific, ...) direct objects (Brugè & Brugger 1996; Aissen 2003; Leonetti 2004; Rodríguez-Mondoñedo 2007; Fábregas 2013). Hence, the sheer fact that *que* can be preceded by DOM is sufficient to say that even with regard to case and animacy, *que* shows characteristics typical of wh-words. Additional support in this direction comes from oblique RCs like those in (20). Under the assumption that *cuyas* corresponds to the genitive inflection of *que*, and *quien* to its animate form, we can further emphasise how *que* shows behaviours typical of *bona fide* relative pronouns.

- (20) a. la casa cuyas ventanas son verdes  
 the house whose windows are green  
 ‘the house whose windows are green’
- b. el profesor/\*libro con quien he estudiado  
 the professor/book with that/animate AUX-have.1SG studied  
 ‘the book with which I studied’

If we take Klima tests seriously (cf. the list in 15), these few examples speak for themselves and intimate that *que* is a wh-word and not a relativiser.<sup>11</sup> Regardless, the literature on this subject has not reached a uniform consensus and, in fact, some analyses come to different conclusions. I briefly review in the next paragraph the two most prominent analyses of Spanish *que*. After that, I will present my own proposal.

#### 4.1. The ‘bare que hypothesis’ and the ‘unique que hypothesis’

Suñer (2000) proposed that *que* is a wh-pronoun, but not when it introduces a SRC or an ORC, in which cases it rather characterises as a complementiser. This analysis is known as the ‘bare *que* hypothesis’. Alternative to that is the so-called ‘unique *que* hypothesis’ proposed by Brucart (1992), which assumes that *que* is always a complementiser, independently of the type of RC in which it occurs. The main piece of evidence in support of Brucart’s approach comes from some Canarian and Puerto Rican sentences like *La amiga con la [más confianza] que tengo* (‘The friend I trust the most’), where *que* does not seem to form a constituent with the preposition and the determiner following the head noun. This is readily accounted for if *que* is in the C head, while it becomes more problematic if *que* is analysed as a wh-word. Note, however, that this type of sentences are not allowed in standard Peninsular Spanish. Moreover, Suñer (2000) does not consider these cases to be genuine counter-evidence against a relative pronoun analysis of *que*, as they are probably instances of misanalysis by analogy with other similar structures.<sup>12</sup>

The ‘unique *que* hypothesis’ has the obvious advantage of postulating a simpler, more economical system than the one ensuing from the ‘bare *que* hypothesis,’ as the former posits one

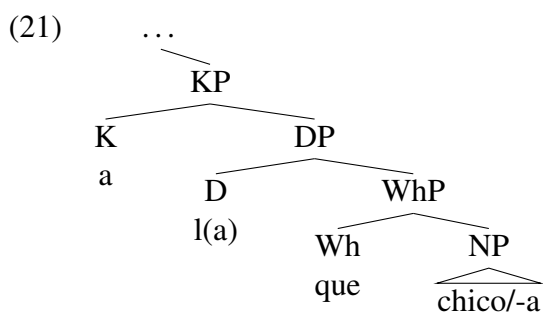
<sup>11</sup> As a matter of fact, Poletto & Sanfelici (2018) claim that there are reasons to believe that the dichotomy between relativisers and relative pronouns is not as clear-cut as originally thought. I will come back on this below and show that my proposal follows the very direction taken by Poletto & Sanfelici (2018).

<sup>12</sup> The discussion of this (counter-)argument is far beyond the scope of this paper, and so is the detailed examination of Brucart’s and Suñer’s complete proposals, for which I refer directly to the cited sources and to Perpiñán’s (2010:49-56) review of the topic.

single *que* in the lexicon. At the same time, however, treating *que* as a C-head leaves open the question of why it shares all the relevant properties of relative pronouns (see above). It thus seems that neither accounts is, on the whole, fully exempt from criticism. On closer look, though, there still remains a third possibility to explore: we could say that *que* is always a wh-word. This way, the desired simplicity of Brucart's analysis is preserved and, at the same time, we can better account for the similarities between *que* and relative pronouns. This is the core of my proposal, which I will elucidate in the next section.

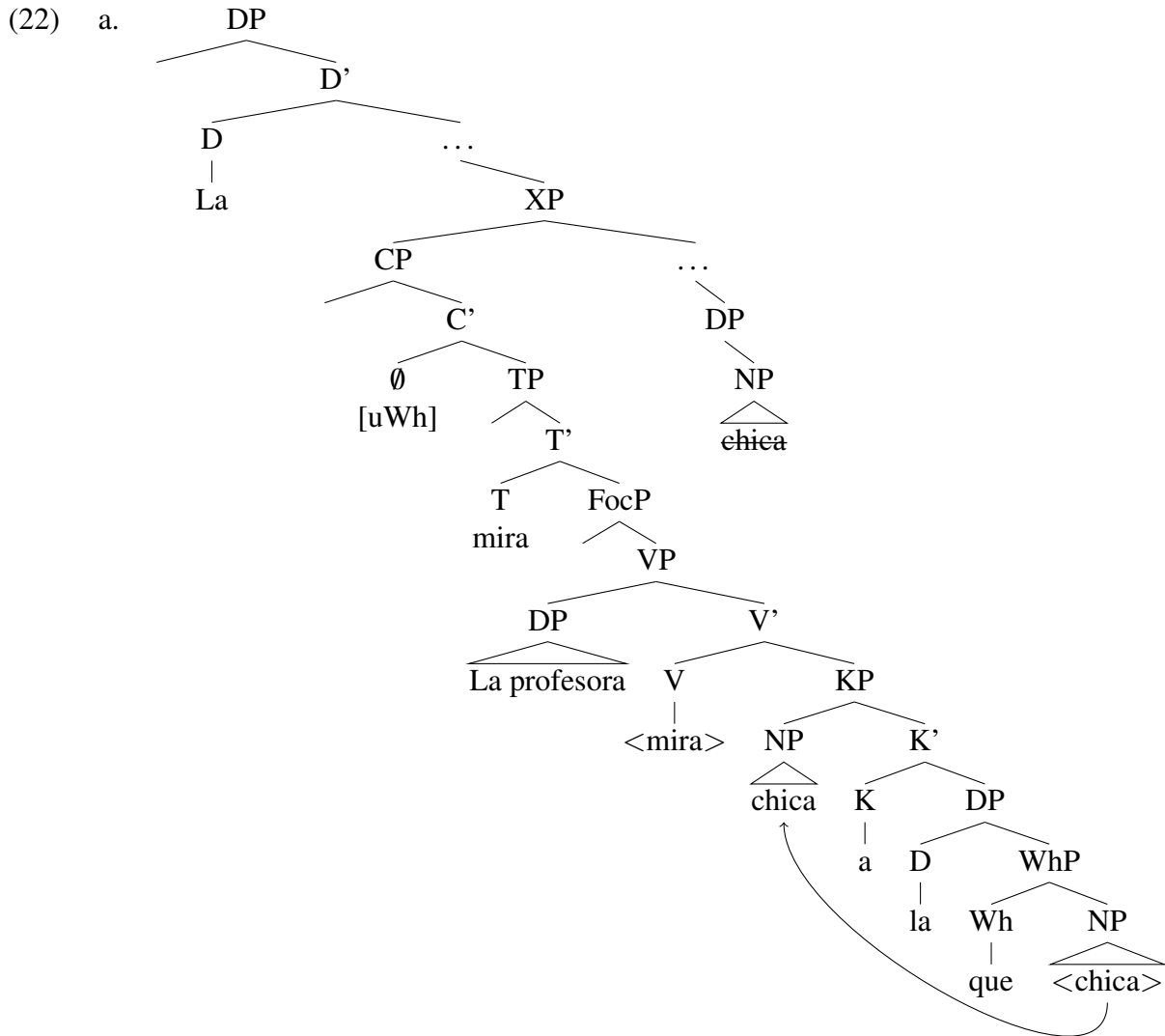
### 5. The proposal: *que* as a wh-word

In essence, I propose that Spanish *que* be analysed as a wh-word, and not as a complementiser. This is perfectly in line with a number of well-established analyses of *que*'s counterparts in other Romance languages. Indeed, that RCs are always introduced by a wh-word has been proposed for Italian (Manzini & Savoia 2003, 2011; Poletto & Sanfelici 2018; Rugna 2023), old and modern Italo-Romance dialects (Poletto & Sanfelici 2018, 2019), French (Rooryck 2000; Sportiche 2011), European Portuguese (Rinke & Aßmann 2017), Brazilian Portuguese (Kato & Nunes 2009). All these accounts can be somehow connected with Kayne's (2008; 2014) claim that there is no real distinction between complementisers and relative pronouns, as the former do not exist and all relative particles are in fact determiners. Based upon such a theoretical stance, Poletto & Sanfelici (2018) maintain that *che* (and its variations) in the Italo-Romance system is always a determiner-like element that bears (at least) a [Wh] feature and has the lexical property of requiring a nominal restriction. I here extend this proposal to Spanish and contend that *que* is a wh-item that merges as a specifier of the internal head's NP. More in detail, I propose that *que* realises a [Wh] feature and is topped by a DP and a KP whose heads are realised by, respectively, the definite article *el/la* and the A-marker *a* (I henceforth refer to this configuration as A + L *que*), as represented in (21).



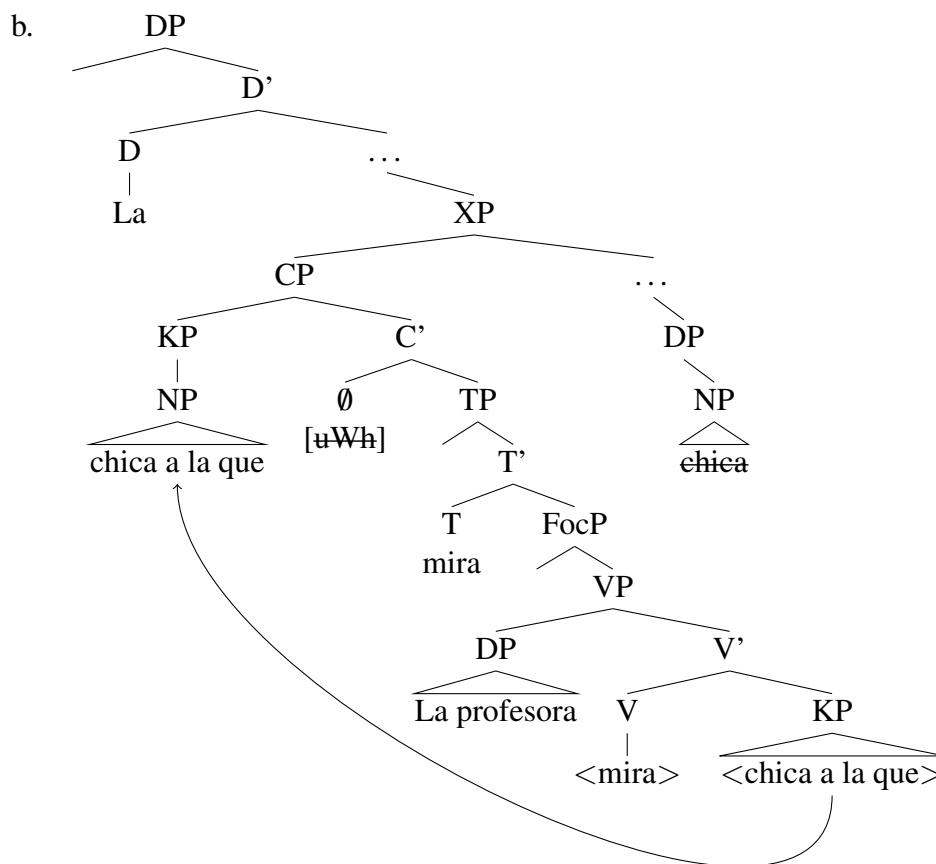
As far as the derivation of the entire RC is concerned, I propose that it proceeds in a raising fashion, with the internal head of a Cinque-style double-headed structure raising to Spec,CP (cf. 6). However, I here adopt an analysis closer to the one proposed by Poletto & Sanfelici (2018), which differs from Cinque's in a few aspects. First, their RC is a CP and not an IP (like in Rizzi 1997 and Bianchi 1999). As already mentioned, moreover, they claim that a wh-element (here *que*) modifies the internal head, similarly to what Kayne (1994) originally proposed for which-relatives. This way, the derivations of which-relatives and that-relatives are evened out. Last, the initial step of Poletto & Sanfelici's (2018) derivation consists of the movement of the internal-head's NP to the specifier of its dominating DP (here KP), to escape binding of the wh-

variable.<sup>13</sup> In the case of Spanish ORCs like (14), then, the derivation proceeds as in (22): the internal-head's NP *chica* moves to Spec,KP to c-command the WhP (22a). Then the entire KP is attracted to Spec,CP to check against a [uWh] feature in C (22b). Finally, the external-head is deleted under (kaynean) c-command and non-distinctness, *a la* Sauerland (2003, 2004).<sup>14</sup>



<sup>13</sup> The rationale underlying this claim is based upon the different semantics of the nominal expression in wh-questions and RCs. In the former, the NP introduces a variable in an open set, while in RC-contexts the NP introduces a fixed referent. As such, the nominal expression in RCs needs to reach a position that is generally occupied by (in)definite articles and encodes the presupposition of existence (Poletto & Sanfelici 2018:287).

<sup>14</sup> Under Kayne's antisymmetric c-command based on categories, and not segments, the NP in question can c-command the lower external-head as the former is in the specifier of the phrase which is, in turn, the specifier of the CP.



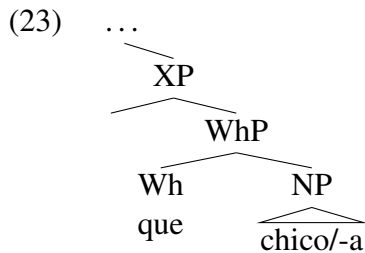
The decision to endorse a raising analysis for Spanish ORCs is mostly driven by the fact that this is, I believe, the type of derivation that better accounts for intervention effects. In (22), the copy of *chica* that is eventually realised is the one that directly crosses over the subject of the RC and hence triggers the disruption predicted by Relativised Minimality principles (Rizzi 1990, 2004, 2013a; Friedmann et al. 2009).<sup>15</sup> If we want to construe these effects syntactically, this looks like the most reasonable analysis, although one could handle these facts even with a matching approach.<sup>16</sup>

<sup>15</sup> In brief, the fact that the object crosses over the subject is what should make ORCs more costly than SRCs, an asymmetry that has long been acknowledged across different languages and populations (see Lau & Tanaka 2021 for an overview). This has been confirmed for Spanish with both child (Presotto & Torregrossa 2024) and adult (Presotto & Torregrossa, in prep.) populations. See also Presotto (2024) for further insights on these aspects.

<sup>16</sup> As discussed above, the literature has reached a fairly uniform consensus about the fact that matching and raising need not be mutually-exclusive. In the Spanish RCs at issue here, one could adopt a matching analysis without major drawbacks. After all, even if the head that gets realised in a matching derivation is the external one, the movement of the object over the subject within the RC would still be part of the derivation (cf 4, and Cinque 2020:fn.21). I do not consider this specific matter crucial for the purposes of the present paper, as nothing that is discussed here directly hinges on the choice between these alternatives. As a last note, the only analysis that would probably prove inadequate to handle Relativised Minimality effects is the head-external analysis represented in (1). In such a derivation, the object moves over an empty category, which, due to the lack of relevant features, could not trigger intervention effects, at least in Rizzian terms.

## 5.1. The case of covert DOM

It still remains to be explained what happens in cases like (14b), where DOM is not realised, at least overtly. There are two ways I can think of to account for this. The first one is to say that when DOM is absent it is simply because the heads that are relevant for its emergence have not been merged. This is represented in (23), where the internal-head is composed of an NP topped by the WhP hosting *que* and at least an XP (evidently different from DP, since the definite article is missing, too) to whose specifier the NP is moved (cf. fn. 13).



Alternatively, one could argue that KP and DP are always realised as in (21) above, and that they are occupied by null elements when *que* occurs in its bare form (cf. e.g. Collins & Kayne 2023 for how to handle this formally). In fact, yet another possibility is available that I personally consider a more elegant variant of the latter, whereby *que* can alternatively spell-out its own head or the entire K-D-Wh sequence. Put differently, in this latter view there is just one type of *que* in the lexicon that is always merged as a modifier of the NP and is capable of spelling-out different portions of the structure. In one case, it realises the Wh head alone, and D and K are spelled-out one-by-one by their respective lexical items *el/la* and *a* (i.e. the definite article and the A-marker). Otherwise, *que* can spell-out also K and D. This is handled rather smoothly in any system that allows for a one-to-many mapping between lexical items and heads, as commonly described in frameworks like e.g. Nanosyntax (Starke 2009; Caha 2009a,b; Baunaz et al. 2018) and DM (Halle & Marantz 1993, 1994; Harley & Noyer 1999). Here I call upon the formal tools provided by Svenonius' theory of spanning (Svenonius 2012, 2016, 2020), which I briefly summarise in the next paragraph.

## 5.1.1. Spanning theory

According to Svenonius, the operation of Spell-out targets SPANS. A SPAN is defined as a syntactic head (a *trivial span*) or a sequence of syntactic heads (a *non-trivial span*) in a functional projection. That is, given an extended projection (e.g. N and all its functional heads), a span characterises as a subpart of a *complement line* that links an unbroken sequence of heads in a complement-relation. This is formally defined in (24):<sup>17</sup>

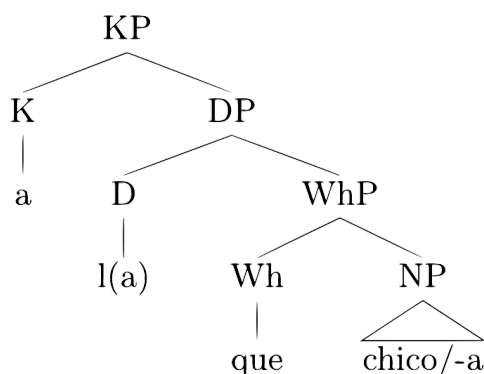
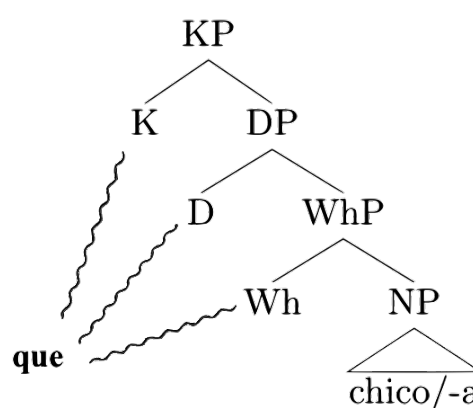
(24) *Definition of Span* (from Svenonius 2020)

- a. A span is a head (a minimal  $X^0$ ) or a sequence of heads  $\langle h_1, h_2 \dots \rangle$  such that for each  $n > 1$ ,  $R_C(h_{n-1}, h_n)$  (REF svenonius 2012, merchant 2015)
- b.  $R_C(h_m, h_n) = h_m$  is the head of the complement  $h_n$

<sup>17</sup> The definition assumes that there exists a complement relation  $R_C$  whereby each head in a functional sequence takes the immediately lower head in the sequence as a complement (cf. Grimshaw 2005). Crucially, this relation must be distinct from the relations that apply to specifiers and to adjuncts (cf. Svenonius 2020).

Each morphological exponent is associated with a span, be this trivial or non-trivial. This association takes place during Spell-out, defined as the operation that maps syntactic structures onto representations that serve as input to the phonological component (Chomsky 1995). Spell-out, according to Svenonius, operates cyclically (Chomsky 2000, 2001), and in a two-steps fashion.<sup>18</sup> In a first step, called L(exical)-Match, the syntactic structure is associated with lexical entries. These, in a way, mediate the pairing between (portions of) syntactic representations and their phonological realisation. Crucially, the L-Match operation is exclusively concerned with features ‘on the syntactic side of the pairing’ (Svenonius 2012:3), as it is only in the second step of Spell-out, called Insert (Bye & Svenonius 2010, 2012), that the phonological properties of the matched exponents are interpreted.

In the case of the Spanish ORCs at issue here, L-Match has two options. As hinted at above, the lexical entry *que* can L-match either a trivial Span represented by the single Wh-head (25a), or the non-trivial Span including the sequence K-D-Wh (25b).<sup>19</sup>

(25) a. **Trivial Span L-Match**b. **Non-trivial Span L-Match**

## 5.1.2. Why Spanning?

At this point, though, a crucial question legitimately arises. Is there any evidence for postulating the presence of the entire K-D-Wh sequence even when bare *que* realises? Why not saying that in such cases KP and DP are simply absent from the underlying representation (see above)? A first possible way to look at the problem is to consider the parallelism with the main clause. As mentioned earlier, it is somehow surprising that the same direct objects need to be overtly A-marked in the matrix clause but not in RC-contexts. This asymmetry becomes less perplexing if *que* is capable of realising all the relevant DOM-projections. In this scenario, the only difference between the matrix clause and RCs would be restricted to independent lexicalisation properties of *que*: DOM does not overtly surface when *que* realises the whole K-D-Wh sequence, but the underlying syntax is always the same. This is, however, hardly enough support to the span-based

<sup>18</sup> This would be motivated by the strict modular disjunction that holds between phonology and syntax (Zwicky 1969, 1987; Zwicky & Pullum 1986). Although see Bruening (2018, 2019) and Richards (2010, 2016) for perspectives rejecting the hypothesis of a Phonology-free-Syntax.

<sup>19</sup> The representations in (25) are probably a simplification, as it might be more accurate to distinguish two different lexical entries for *que*: one endowed with [K-D-Wh] features and the other only with [Wh]. This does not affect the core of my analysis and, in fact, the two alternatives are not necessarily mutually exclusive (Svenonius p.c.).

analysis illustrated above. One could still argue that the difference between bare *que* and A + L *que* lies with the possibility that in the former case the direct object merged in the RC need not meet DOM requirements. Put it simply, we could propose that bare *que* occurs when the direct object in the RC is not specific (or perhaps even definite), so that it does not require DOM. If that be the case, the projections responsible for A-marking (KP) and specificity/definiteness (DP) would just not be merged.<sup>20</sup> In contrast, when (animate) specific, definite direct objects are selected at the RC-level, the conditions for DOM are there, determining the need for both KP and DP (and the ensuing emergence of A + L *que*). Now, as minimal as this alternative analysis seems, it still leaves some issues unaddressed. First of all, one needs to explain why there are no interpretative differences whatsoever between ORCs featuring bare *que* vs A + L *que*. Again, sentences like (14a) and (14b), repeated in (26), are semantically equivalent.

- (26) a. la chica a la que la profesora mira  
           the girl DOM the that the teacher looks  
       b. la chica que la profesora mira  
           the girl that the teacher looks  
           ‘the girl that the teacher is looking at’

One might argue that in (26b), the interpretation of the head noun perfectly matches that of (26a) not because of an identical underlying structure, but rather because the ultimate semantics is assigned, in both cases, by the external DP, whose features override those assigned RC-internally. I believe this analysis to be neither superior nor conclusive. First, it is not the null hypothesis, it is *a* hypothesis, much as the span-based one proposed above. Moreover, there seem to exist cases where positing the absence of DOM-relevant projections in the syntactic representation is quite problematic, regardless of whether *que* appears in its bare form or is preceded by A + L. I discuss a few such examples in the following paragraph.

In his seminal monograph, López (2012) discusses cases where DOM must be obligatorily realised.<sup>21</sup> In particular, beside reviewing some well-described semantic requisites of the direct object, he illustrates that there are specific syntactic configurations that impose the realisation of DOM. These include small clauses, clause union, and object control (López 2012:23-25). For instance, (27) shows that the nominal phrase in the small clause must be A-marked:

- (27) El profesor consideró a/\* $\emptyset$  un estudiante inteligente  
       The professor considered DOM a student intelligent  
       ‘The professor considered a student intelligent’ (López 2012:(56))

Similarly, affected direct objects in clause union also require DOM. This can be seen with causative constructions like in (28), as ‘[t]he causee of an intransitive predicate is accusative [and] obligatorily introduced by accusative A’ (López 2012:23), but also with complements of perception verbs, as in (29).

- (28) María hizo llegar tarde a/\* $\emptyset$  un niño  
       María made arrive late DOM a boy

<sup>20</sup> For a similar idea, see Cinque (2020:15-19), where the RC-internal head is described as a dP rather than a full DP.

<sup>21</sup> Lopez only takes into account indefinite objects, while I am considering definite ones. Nonetheless, whenever DOM is obligatory with indefinites, it is *a fortiori* obligatory with definites, the latter being evidently higher in the definite scale (Aissen 2003).



‘María made a boy be late’ (López 2012:(58))

- (29) María vio caer a/\* $\emptyset$  un niño  
María saw fall DOM a boy

‘María saw a boy fall’ (López 2012:(64) )

In all these (and similar) contexts, DOM cannot be omitted. What makes these cases particularly interesting for the present discussion is the fact that the conditions imposing the A-marker are strictly syntactic and have nothing to do with the specificity of the marked objects, as demonstrated by the fact that these can be naturally interpreted as non-specific (López 2012:25). Thus, if we embed the above examples into a RC-structure, we expect the very same conditions to apply, independently of the semantic contribution of the external D-head. That is, because the A-marking is imposed by the argument-structure of the RC-internal predicate, potential interactions with the definiteness/specificity features of the external DP will not affect the realisation of DOM. This means that the projections relevant for DOM (here described as the K-D sequence) must be there. How is this relevant? Well, if *que* can introduce these types of RCs, then we do have some evidence in support of the span approach advanced above. Let us see the relevant examples. The sentences in (30) reproduce the case of small-clause complements illustrated in (27). A + L *que* is perfectly fine and, in fact, seems to be the more natural form to use. Albeit probably more marginal, however, also bare *que* can fit this context.

- (30) a. Un estudiante al que considero inteligente fue admitido en Oxford.  
a student DOM.the that consider.1sg intelligent was admitted in Oxford  
‘A student I consider intelligent was admitted to Oxford.’  
b. ? Un estudiante que considero inteligente fue admitido en Oxford.  
a student that consider.1sg intelligent was admitted in Oxford  
‘A student I consider intelligent was admitted to Oxford.’

The same holds true for (31) and (32), which reflect their matrix-counterparts (reported in 28 and 29). Again, even though A + L *que* is preferred here, too, bare *que* remains a viable option, at least in some speakers’ grammar.<sup>22</sup>

- (31) a. El chico al que María hizo llegar tarde se llama Juan.  
the boy DOM.the that María made arrive late REFL call Juan  
‘The boy Maria made late is called Juan.’  
b. ? El chico que María hizo llegar tarde se llama Juan.  
the boy that María made arrive late REFL call Juan  
‘The boy Maria made late is called Juan.’  
(32) a. El niño al que María vio caer se hizo daño.  
the child DOM.the that María saw fall REFL made damage  
‘The child that Mary saw fall hurt himself.’

<sup>22</sup> It would be interesting to run a controlled study to gauge the extent to which these sentences are accepted across participants and in different sentences. Due to space and time restrictions, I had to limit myself to collect judgements through an online form. Twenty native speakers (most of which were linguists) completed the forms and gave various answers. In the sentences displaying bare *que* reported here, at least 50% of my informants considered the sentences acceptable. As always when DOM is concerned, I suspect there is much variability depending on (sub-)regional varieties.

- b. ? El niño que María vio caer se hizo daño.  
 the child that María saw fall REFL made damage  
 ‘The child that Mary saw fall hurt himself.’

If we were to believe that bare *que* can only realise (the head of) WhP, the acceptability of (30b, 31b, 32b) would escape an immediate explanation. On the contrary, if the Span account defended here is on the right track, these facts are actually predicted: DOM is always represented at the syntactic level, it simply does not surface with its typical *a* morpheme whenever *que* realises the entire K-D-Wh span. This is not to say that this is necessarily the case. I am only suggesting that *que* (in its bare form) *can* realise DOM, but need not to. It is thus possible that bare *que* also serves all cases where the direct object internal to the RC need/must not be introduced by DOM.

That an alternation between different exponents in syntactically equivalent environments exists should not sound too surprising. Similar cases can be found elsewhere in the Romance domain, confirming that this is indeed an option available to grammars. Take the case of Italian *cui* ‘to whom’. *Cui* is a relative element introducing indirect object RCs. Interestingly, it can occur either alone or preceded by the dative preposition *a*.

- (33) a. La professoressa cui devo consegnare la tesi è in ferie.  
 the professor that-DAT must.1SG submit the thesis is in holiday  
 ‘The professor to whom I have to hand in my thesis is on holiday.’  
 b. La professoressa a cui devo consegnare la tesi è in ferie.  
 the professor to that-DAT must.1SG submit the thesis is in holiday  
 ‘The professor to whom I have to hand in my thesis is on holiday.’

The use of either form has no reflexes in the interpretation, as both *cui* and *a cui* unquestionably bear dative case in the given examples.<sup>23</sup> Once again then, we are looking at an example in which two different morphological exponents presuppose the same underlying syntax, and one of these exponents is morphologically richer. Although there is probably more than one way to modulate this alternation, Spans seem to offer a particularly agile account. In (33a), *cui* realises a K-Wh span, while in (33b) K is realised by the dative marker *a* and Wh by *cui*, in the exact same fashion discussed for Spanish (A + L) *que*.

## 6. Summary and conclusions

This paper focuses on restrictive SRCs and ORCs in Spanish. The literature on the syntax of these structures offers a host of different analyses, sometimes differing in only a few marginal aspects. After evaluating the alternatives, I decided to implement a raising approach based on Cinque’s double-headed RC-structure, whereby the internal-head raises to a position c-commanding the external-head and deletes it. As mentioned, however, I do not exclude that other analyses (notably a matching derivation) can equally serve the purpose.

A second important aspect that was taken into account is the categorial status of *que*. Again, there is a vast literature discussing the nature of relative elements, and at the centre of the

<sup>23</sup> The only difference between the two forms can be related to their register. *Cui* is more likely used in a higher diaphasic context, while *a cui* is preferable in every-day speech. Interestingly, some Spanish speakers have very similar intuitions and reported that A + L *que* might sound more formal than bare *que*.

debate is the question about whether and when these should be considered complementisers or wh-words. I argue that Spanish *que* is always a wh-word that merges as a modifier of the NP in the internal-head position, extending to Spanish the (by now standard) analysis adopted for most Romance languages.

Last, I considered the variability in the surface forms of ORCs in Spanish. Without affecting the interpretation, these can vary along two dimensions, namely the position of the subject within the RC and the realisation of overt DOM in front of the relative element *que*. As far as word order is concerned, I followed work by Gutiérrez-Bravo (2005) and argued that the preference for a pre- or post-verbal subject is likely determined by independent phonological conditions. At the syntactic level, I represent pre-verbal subjects in the specifier of TP, and post-verbal subjects in the specifiers of a low FocusP, as is standardly assumed. Accounting for the alternation between bare *que* and A + L *que* is less immediate, however. Also in this case the interpretation is not affected, but the question of what constitutes the underlying syntax of the two forms remains a complex one. I propose that the syntactic representation need not be different, and that both *que* and A + L *que* can realise the same structural portions, crucially including the projections that are relevant for DOM. I modulate this adopting Svenonius' theory of spanning, whereby single lexical entries can realise sequences of heads of different sizes. In the case in question, *que* solely realises a Wh head when it is preceded by *al/a la* (i.e. A + L, which realise respectively a K head and a D head), and the full K-D-Wh sequence when it occurs in its bare form.

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# Defective Voice in Italian *tough*-constructions

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This paper addresses two main syntactic issues posed by Italian *tough*-constructions (TCs), which, unlike English TCs, are an A-dependency: (i) TCs can only extract the object of a transitive verb, without passivisation of the infinitive; (ii) TCs are monoclausal configurations. Building on Bryant et al. (2023), I propose that *tough*-adjectives can select a defective Voice head (Voice<sub>R</sub>), unable to assign accusative and introducing an external argument as an unvalued feature (cf. long passives). Furthermore, I show that Voice<sub>R</sub> is only available in extremely reduced verbal complements, as it must be directly selected by the embedding predicate.

## 1. Introduction

*Tough*-constructions (TCs) are sentences typically consisting of a copular structure with an adjective like *easy* or *tough* and a clausal complement missing the object, which instead surfaces as the matrix subject. In the Romance languages, TCs have not been studied extensively, despite their many differences with the extremely problematic and heatedly debated English TCs.

In this paper, I focus on Italian TCs (exemplified in 1) and their syntax.

- (1) *Questi libri sono difficili da leggere.*  
these books be.3PL hard.PL DA read.INF  
'These books are hard to read.'

The motivation for this choice is twofold. First, as I will argue, Romance TCs do not seem to have ever received a satisfactory account, even if the previous literature has recognised some crucial clues. Therefore, at least a detailed empirical investigation and a well-grounded analysis are much needed. Secondly, TCs are of great theoretical relevance: the unusual dependency and the resulting argument realisation pattern TCs display can tell us many things about Voice, and what factors can alter its behaviour. As I will show here, TCs are a good testing ground to find out how Voice works depending on the size of the clause it is in: Italian in particular allows us



to assess the interaction between Voice and extremely small clausal complements. In addition, the study of these constructions and their unusual properties can be very helpful in improving theories of clausal complementation, where Italian-type TCs currently do not fit well.

As I explain in §2, the starting point for the present work is a crucial difference between TCs in English and in other languages, including Italian: namely, the locality of the dependency connecting the matrix subject to the embedded object. Italian TCs being an A-dependency begs the question of how the internal argument (IA) of the infinitive can move across a potential intervener, i.e. the external argument (EA) of the infinitive. After presenting these facts, I review the main suggestions/claims offered by previous literature and outline what shortcomings they have.

In §3, I address the way arguments surface in TCs, showing the syntactic constraints found in these constructions and highlighting the similarities and differences with other infinitival configurations and passives.

In §4, I apply various syntactic tests in order to detect the presence of any functional structure in the embedded clause. These reveal that TCs are monoclausal and involve a very small infinitival complement, i.e. just a VoiceP.

Finally, in §5, I introduce my analytical proposal: the facts of Italian TCs can be explained by positing that, like in other lexical restructuring/clause union configurations cross-linguistically, the matrix predicate selects a defective Voice head which does not assign accusative and encodes an EA through an unvalued feature. I also show with micro-variation data from other (Italo-)Romance varieties that the distribution of such a head is highly sensitive to clause size, which can be explained as a constraint on selection.

In the concluding remarks (§6), I summarise my findings and outline a few directions for future research.

## 2. Background

### 2.1. Tough-constructions outside English

The syntax of TCs has received extensive attention in the generative literature, usually focusing on the properties displayed by English sentences like (2a) (Lasnik & Fiengo 1974; Chomsky 1977, 1981; Rezac 2006; Hicks 2009; Longenbaugh 2017; Keine & Poole 2017 among many others, see Hicks 2017 for a recent review).

- (2) a. *John is tough to please.*  
 b. *It is tough to please John.*

In particular, the issues highlighted by previous studies mostly relate to the dependency linking the matrix subject and the embedded object positions, especially if the TC is compared to its impersonal counterpart with an expletive subject (2b). These include whether the subject is base-generated in the matrix, how the dependency targets an argument that is not the highest one in the infinitival, how the dependency crosses the clausal boundary, and what can intervene in this dependency.

Although similar problems are posed by TCs cross-linguistically, there are some important differences among languages in which TCs have been studied that suggest that there can be very different syntactic strategies for the realisation of TCs. Therefore, the analytical solutions

proposed for English might not be suitable for languages where TCs have a different syntactic behaviour. One of these fundamental points of variation between English and many other languages is whether the TC dependency is bounded or not; in English, TCs are unbounded (Chomsky 1977), as shown in (3), where the matrix subject is interpreted as the object of the most embedded infinitive.

- (3) *Those books were hard for me to convince Joan to read.* (Longenbaugh 2017:(4b))

As a consequence, the literature has concluded that there must be at least an A'-movement step in the derivation of English TCs (with various formalisations), which can also explain why the object position of the embedded clause can participate in the dependency without incurring in a locality violation.

On the other hand, TCs in languages such as German (Wurmbrand 1994), Greek (Russo Cardona & Sitaridou 2023), and most of the Romance languages (Aissen & Perlmutter 1976; Rizzi 1982; Montalbetti & Saito 1983; Canac Marquis 1996; Giurgea & Soare 2010) are clearly bounded. For Italian, which is the main focus of this paper, see the examples in (4).

- (4) a. *Questi libri sono difficili da leggere.*  
 these books be.3PL hard.PL DA read.INF  
 'These books are hard to read.'
- b. \**Questi libri sono difficili da convincere un bambino a leggere.*  
 these books be.3PL hard.PL DA convince.INF a kid A read.INF  
 'These books are hard to convince a kid to read.'

This contrast implies that TCs in these languages must involve an A-dependency, and do not involve an A'-movement step, as shown by the presence of this stricter locality constraint (hence, I will refer to these constructions as A-TCs, as opposed to A'-TCs). However, this approach raises the problem that the TC dependency targets the embedded object, crossing another A-position, i.e. the embedded subject position, which potentially creates an intervention configuration for Relativised Minimality (Rizzi 1990).

## 2.2. Previous claims on A-tough-constructions

There are two main recurring claims/suggestions in previous works which recognised the A-dependency nature of TCs in the above-mentioned languages. These can be summarised as follows:

- (5) a. A-TCs resemble passives in several respects;  
 b. A-TCs involve (some type of) restructuring.

As for (5a), various studies highlight that A-TCs are similar to passives in that they promote the object of a transitive verb to subject position. For instance, that A-TCs involve some sort of passivisation is suggested by Giurgea & Soare (2010), Bosque & Gallego (2011), and Zwart (2012), although these works do not offer a detailed proposal for how this passivisation takes place. Giurgea & Soare (2010:75ff) and Zwart (2012:155) assume that infinitival morphology

is not specified for Voice and can therefore be interpreted as either active or passive. This is a problematic assumption, as in almost all cases infinitives do have to be passivised for extraction of the object to be possible (see §3.1). Moreover, A-TCs do not generally have an alternative ‘active’ interpretation where the matrix subject is the agent of the embedded verb; this implies that the infinitive in A-TCs is not really ambiguous. Similarly, Bosque & Gallego (2011:38) assume that the passive properties of A-TCs stem from the nature of the matrix adjective, rather than from verbal morphology as is usually the case, but do not formalise this intuition. In addition, Authier & Reed (2009) find many striking similarities between French TCs and copular passives in the licensing of idioms and in other lexical constraints. On the other hand, they show that TCs are different from passives as the material that can modify the infinitive (adverbs, clitics, auxiliaries) is severely restricted. They conclude, then, that the infinitive in TCs is (covertly) nominalised, and therefore does not have an EA or agreement/inflectional projections. However, this would predict that unaccusative verbs, which can be nominalised, would be acceptable in TCs, which is not the case. For instance, the nominalisation of the unaccusative verb *apparître* (‘appear’) is grammatical (6a), but its use in a TC is not (6b).

- (6) a. *l'apparition de l'ange*  
 the=appearance of the=angel  
 ‘the appearance of the angel’ (French)
- b. \**Les anges sont difficiles à apparaître.*  
 the angels be.3PL hard.PL A appear.INF  
 ‘It is hard for angels to appear.’ (French)

As for (5b), Aissen & Perlmutter (1976), Rizzi (1982), and Kayne (1989) associate Romance A-TCs with restructuring: this is a well-known phenomenon (or set of phenomena) found in Romance and many other languages, whereby sentences with more than one verb can be shown to be monoclausal. In particular, according to Kayne, TCs involve an abstract equivalent of clitic climbing,<sup>1</sup> on the basis of sentences like (8a-b), where an additional level of embedding in the embedded clause is only acceptable with (aspectual) restructuring verbs (compare 9a-b, which involve control verbs).

- (8) a. ?*Ce livre serait impossible à commencer à lire aujourd'hui.*  
 this book be.FUT.3SG impossible.SG A start.INF A read.INF today  
 ‘This book will be impossible to start reading today.’ (French; Kayne 1989:(37a))

<sup>1</sup> Clitic climbing is a typical manifestation of restructuring in Romance: the term refers to the ability of clitic pronouns thematically related to the embedded verb to surface on the main verb, as in (7a) with a modal restructuring verb and (7b) with an aspectual restructuring verb.

- (7) a. *(Lo) voglio veder(lo).*  
 OCL.3.M.SG want.1SG see.INF=OCL.3.M.SG  
 ‘I want to see him.’
- b. *(Gli) finirò di spiegar(gli) il problema domani.*  
 DATCL.3.M.SG finish.FUT.1SG DI explain.INF=DATCL.3.M.SG the problem tomorrow  
 ‘I will finish explaining the problem to him tomorrow.’

- b. *Questa canzone è facile da cominciare a cantare.*  
 this song be.3SG easy.SG DA start.INF A sing.INF  
 ‘This song is easy to start singing.’ (Rizzi 1982:(110b))

- (9) a. \**Ce genre de livre est facile à promettre de lire.*  
 this type of book be.3SG easy.SG A promise.INF DE read.INF  
 ‘This type of book is easy to promise to read.’ (French; Kayne 1989:(37b))

- b. \**Questo lavoro è facile da promettere di finire per domani.*  
 this job be.3SG easy.SG DA promise.INF DI finish.INF for tomorrow  
 ‘This job is easy to promise to finish by tomorrow.’ (Rizzi 1982:(107b))

For the same reason, Roberts (1997:442ff) explicitly proposes that Romance TCs are derived through restructuring: the adjective triggers incorporation of the embedded verb, creating a unified locality domain. This allows the embedded object to move across a PRO in the embedded subject position. Under this type of view, however, several things remain unexplained: first, why the construction is restricted to transitive verbs (a constraint not found with typical restructuring verbs); secondly, it is unclear why lexical objects rather than subjects move to the matrix clause (again a difference with restructuring verbs). In a similar vein, Wurmbrand (1994, 2001) also proposes that TCs involve restructuring in German and are thus monoclausal: according to her, the embedded V attaches to the matrix AP and does not have an EA. As a result, the embedded object has to get Case from the matrix predicate, thereby becoming the subject. This analysis, too, however, makes the prediction that unaccusative verbs should be acceptable in TC, as they do not have an EA. Such a prediction is not borne out in German, just like in Romance (cf 6b). For German, compare (10a), which has a transitive verb, to (10b), which has an unaccusative verb.

- (10) a. *Dieser Baum ist schwer zu fällen.*  
 this tree be.3SG hard ZU cut.INF  
 ‘This tree is hard to cut down.’ (German)

- b. \**Dieser Baum ist schwer zu fallen.*  
 this tree be.3SG hard ZU fall.INF  
 ‘It is hard for this tree to fall down.’ (German)

In the next sections, I will assess (5a-b) in light of the Italian TC data, capitalising on these previous insights and attempting to solve their shortcomings through a detailed empirical investigation.

### 3. Observation 1: internal argument promotion

I will show here that TCs in Italian share some (but not all) properties with passive configurations due to the movement of the (embedded) IA to the (matrix) subject position across another potential A-position, i.e. the embedded EA position.

## 3.1. Restrictions on the embedded verb

First, the matrix subject of TCs can only be the IA of a transitive verb (11a), whereas IAs of unaccusative verbs (11b) and EAs (11c) are unacceptable as TC subjects.

- (11) a. *Questo cibo è difficile da cuocere.*  
 this food be.3SG hard.SG DA cook.INF  
 ‘This food is hard to cook.’
- b. \**Questo cibo è difficile da scadere.*  
 this food be.3SG hard.SG DA expire.INF  
 ‘It is hard for this food to expire.’
- c. \**Mario è difficile da cuocere questo cibo.*  
 Mario be.3SG hard.SG DA cook.INF this food  
 ‘It is hard for Mario to cook this food.’

Naturally, this constraint is reminiscent of canonical passive configurations, where only IAs of transitive verbs can be promoted to subject position.

However, copular passive morphology is not only unnecessary, but ungrammatical in TCs.

- (12) *Questo cibo è difficile da \*essere cotto /cuocere.*  
 this food be.3SG hard.SG DA be.INF cook.PPRT cook.INF  
 ‘This food is hard to cook.’

In other infinitival configurations, we do not find such restrictions: conversely, under control, raising, and restructuring under functional verbs, the EA (rather than the IA) of the embedded transitive verb enters a dependency with the matrix subject position. If the embedded verb is unaccusative, the dependency is grammatical and it targets the only argument present, namely the IA. This is expected under the widely held view that control, raising, and restructuring under functional verbs are local dependencies, i.e. they can only target the highest argument of the embedded verb. Therefore, unless the infinitive is passivised, the IA of a transitive verb cannot be targeted. This fact is illustrated by (13a-c), in contrast with (12).<sup>2</sup>

- (13) a. *La pasta è pronta per essere mangiata /\*mangiare.*  
 the pasta be.3SG ready PER be.INF eat.PPRT eat.INF  
 ‘The pasta is ready to be eaten.’ (Control)
- b. *La pasta sembra essere mangiata /\*mangiare in tutto il mondo.*  
 the pasta seem.3SG be.INF eat.PPRT eat.INF in all the world  
 ‘Pasta seems to be eaten worldwide.’ (Raising)
- c. *Le domande mi possono essere fatte /\*fare a fine lezione.*  
 the questions DATCL.1SG can.3PL be.INF make.PPRT make.INF at end class  
 ‘Questions can be asked to me at the end of the class.’ (Functional restructuring)

<sup>2</sup> Whereas Italian has subject control adjectives like *pronto* (‘ready’) in (13a), it does not have raising adjectives (unlike English) or functional restructuring adjectives; for this reason, the examples in (13b-c) have to feature verbs, even though adjectives would offer a more minimal contrast with TCs.

As a result, I need to explain why in TCs we find the opposite pattern.

### 3.2. *The external argument of the infinitive*

Like in passives, there seems to be an implicit EA (ImpEA) in TCs. This can be shown by tests of ‘syntactic activity’ like the acceptability of agent-oriented adverbs and control of purpose clauses (e.g. Baker et al. 1989; Collins 2005), which signal that an EA is present at least in the interpretation, and arguably in the syntax. These tests yield a positive result for passives (14a-b), where, respectively, the ImpEA controls the purpose clause and is modified by the adverb.

- (14) a. *Questo muro sarà distrutto per ingrandire la stanza.*  
 this wall be.FUT.3SG destroy.PPRT for enlarge.INF the room  
 ‘This wall will be destroyed to enlarge the room.’
- b. *Questo muro sarà distrutto volontariamente.*  
 this wall be.FUT.3SG destroy.PPRT voluntarily  
 ‘This wall will be destroyed voluntarily.’

We find the same pattern in TCs (cf. Giurgea & Soare 2010):

- (15) a. *Questo muro sarà facile da distruggere per ingrandire la stanza.*  
 this wall be.FUT.3SG easy.SG DA destroy.INF for enlarge.INF the room  
 ‘This wall will be easy to destroy to enlarge the room.’
- b. *Questo muro è facile da distruggere involontariamente.*  
 this wall be.3SG easy.SG DA destroy.INF involuntarily  
 ‘This wall is easy to destroy involuntarily.’

This fact, combined with the ban on unaccusative verbs, again points to a similarity with passives in the requirements imposed on the verb’s argument structure. Therefore, it cannot be true that the embedded verb is just a VP with no EA (*pace* Wurmbrand 2001; Authier & Reed 2009).

Moreover, it can be shown that the ImpEA in TCs is not PRO (*pace* Roberts 1997). To this end, Landau (2010) argues that only PRO and not a passive ImpEA can be modified by *together*. The contrast seems to be valid in Italian, too, as shown by (16a-b).<sup>3</sup>

- (16) a. *È importante cucinare insieme i pasti.*  
 be.3SG important.SG cook.INF together the meals  
 ‘It is important to cook meals together.’ (Control)
- b. *?\*I pasti saranno cucinati insieme.*  
 the meals be.FUT.3PL cook.PPRT together  
 ‘The meals will be cooked together.’ (Passive)

<sup>3</sup> In both (16a-b), there is an alternative irrelevant reading whereby *together* refers to the IA *i pasti* (‘the meals’), which is grammatical in both cases.

TCs pattern like passives in this respect:<sup>4</sup>

- (17)?\* *Questi cibi sono facili da cucinare insieme.*  
 these foods be.3PL easy.PL DA cook.INF together  
 ‘These foods are easy to cook together.’

The same is true for the quantifier *tutti* (‘all’), as noticed by Canac Marquis (1996:40) for French TCs. See (18a-c) for Italian.

- (18) a. *È importante aiutare tutti la mamma.*  
 be.3SG important.SG help.INF all the mum  
 ‘It is important that we all help mum.’ (Control)
- b. \**La mamma sarà aiutata tutti.*  
 the mum be.FUT.3SG help.PPRT all  
 ‘Mum will be helped by everyone.’ (Passive)
- c. \**La mamma è facile da aiutare tutti.*  
 the mum be.3SG easy.SG DA help.INF all  
 ‘Mum is easy for everyone to help.’

However, the comparison with passives breaks down when it comes to making the ImpEA explicit. Whereas passives allow *by*-phrases (which in Italian employ the preposition *da*), TCs do not.

- (19) a. *Questi libri saranno letti da Mario.*  
 these books be.FUT.3PL read.PPRT by Mario  
 ‘These books will be read by Mario.’
- b. *Questi libri sono facili da leggere (\*da Mario).*  
 these books be.3PL easy.PL DA read.INF by Mario  
 ‘These books are easy (for Mario) to read.’

This contrast has been disregarded by proposers of passivisation accounts of Romance TCs, due to the existence of some admittedly rare and stylistically marked examples in French (20a) and Spanish (20b):

- (20) a. *Bien que ce saut soit difficile à exécuter par un débutant...*  
 although this jump be.SUBJ.3SG hard.SG A execute.INF by a beginner  
 ‘Although this jump is hard for a beginner to carry out...’  
 (French; Authier & Reed 2009:(23a))
- b. *un recurso penal imposible de rechazar por cualquier jurado*  
 a appeal criminal impossible.SG DE refuse.INF by any juror  
 ‘a criminal appeal impossible for any juror to reject’  
 (Spanish; Bosque & Gallego 2011:(50a))

<sup>4</sup> Once again, *together* is grammatical under the interpretation in which it refers to the IA *questi cibi* (‘these foods’).

Sentences like these - to the extent that they are grammatical - consistently involve only indefinite or generic *by*-phrases. This restriction is not found with true passive *by*-phrases, which can be definite and specific (as in 19a). I should also mention that equivalent examples are not grammatical in Italian (21a-b):

- (21) a. *Questo salto è difficile da eseguire (\*da un principiante).*  
 this jump be.3SG hard.SG DA execute.INF by a beginner  
 ‘This jump is hard (for a beginner) to carry out.’
- b. *Questo ricorso è difficile da respingere (\*da qualunque giuria).*  
 this appeal be.3SG impossible.SG DA refuse.INF by any jury  
 ‘This appeal is impossible (for any jury) to refuse.’

We can thus conclude that genuine *by*-phrase are excluded in TCs.

Interestingly, though, adjectives in TCs can have an overt experiencer, often realised as a dative clitic, as in (22).

- (22) *Questa decisione mi è impossibile da accettare.*  
 this decision DATCL.1SG be.3SG impossible DA accept.INF  
 ‘This decision is impossible for me to accept’.

The ImpEA is always interpreted as co-referential with the experiencer, in a relationship resembling control. This may seem contradictory with my previous claim that there is no PRO in the embedded clause of TCs: in §5, my analysis will provide a solution for this apparent paradox.

#### 4. Observation 2: monoclausality

In addition to displaying an unexpected pattern in argument realisation, TCs also seem to have some properties in common with restructuring/clause union configurations. As the data in this section show, these stem from the size of the infinitival complement of TCs, which does not project the CP and the TP layers, but is just a VoiceP. This is consistent with the idea that in all cases of restructuring/clause union there are no CP/TP functional layers separating the main and the embedded verb (Rizzi 2000; Wurmbrand 2001; Cinque 2006). As to what kind of monoclausality is involved in Italian TCs, see §5.

##### 4.1. No CP

The first clue that the infinitival clause in TCs has very little (if any) functional structure of its own is the impossibility of moving focalised elements to the clause boundary, although they can stay *in situ* or, sometimes less naturally, move to the matrix left periphery (23a-b).



- (23) a. (?A MARIO) *questo libro è perfetto* (\*A MARIO) *da* (\*A MARIO)  
 to Mario this book be.3SG perfect.M.SG to Mario DA to Mario  
*regalare* (A MARIO) (*non a Luigi*).  
 give.INF to Mario not to Luigi  
 ‘This book is ideal to give TO MARIO (not to Luigi).’
- b. (IN UN GIORNO SOLO) *questo libro è impossibile* (\*IN UN  
 in one day only this book be.3SG impossible.SG in one  
 GIORNO SOLO) *da* (\*IN UN GIORNO SOLO) *leggere tutto* (IN UN  
 day only DA in one day only read.INF all in one  
 GIORNO SOLO) (*non in tre*).  
 day only not in three  
 ‘This book is impossible to read completely IN JUST ONE DAY (not in three).’

This fact highlights the absence of an embedded left periphery.

Another piece of evidence pointing to the monoclausal nature of TCs is the ungrammaticality of PPs appearing at the clausal boundary, which has been discussed by Bruening (2014) for Romance TCs. This is a well-known diagnostic initially proposed by Rizzi (1976) to detect restructuring/clause union structures; Cinque (2006:16) argues that the test reveals the absence or presence of functional projections where the PP can be realised – a conclusion confirmed by Bruening’s finding that ungrammaticality is triggered regardless of the argument/adjunct status of the PP. See (24) for the relevant contrast between TCs (a-b) and control (c).

- (24) a. *Questi colori sono difficili* (\**al crepuscolo*) *da vedere* (*al*  
 these colours be.3PL hard.PL at=the dusk DA see.INF at=the  
*crepuscolo*).  
 dusk  
 ‘These colours are hard to see at dusk.’ (adapted from Bruening 2014:(18b))
- b. *Questi libri sono impossibili* (\**da anni*) *da trovare* (*da anni*).  
 these book be.3PL hard.PL from years DA find.INF from years  
 ‘These books have been hard to find for years.’
- c. *Sono pronto* (*da mesi*) *a cambiare lavoro* (*da mesi*).  
 be.1SG ready.M.SG from months A change.INF job from months  
 ‘I have been ready to change job for months.’ (Control)

In addition, the infinitival clause cannot be stranded via cleft sentence formation (25a-b), another test which can be taken to distinguish biclausal configurations (like standard control complements as in 25c) from more reduced structures (see discussion in Rizzi 1976; Cinque 2006:ch.1):

- (25) a. \*È *da leggere fino in fondo che questo libro è difficile*.  
 be.3SG DA read.INF until in end that this book be.3SG hard.SG  
 ‘It is to read this book until the end that it is hard.’

- b. \*È da spiegare a un bambino che questi problemi sono  
 be.3SG DA explain.INF to a child that these problems be.3PL  
*impossibili.*  
 impossible.PL  
 ‘It is to explain these problems to a child that it is impossible.’
- c. È a nuotare velocemente che sono bravo.  
 be.3SG A swim.INF fast that be.1SG good.M.SG  
 ‘It is swimming fast that I am good at.’ (Control)

In the absence of other tests that would allow us to distinguish CPs from non-CPs (like the English *for*-complementiser) in Italian, we can take this evidence to suggest that TCs’ infinitival clauses may lack a CP layer altogether. Furthermore, this claim is corroborated by the lack of lower projections of the clausal functional spine, as shown below.

#### 4.2. No TP

There is evidence that the TP layer is not present in the infinitival complement of TCs either. The first diagnostic is whether the matrix predicate and the embedded verb can be modified by two distinct temporal adverbs: monoclausal configurations are expected not to allow this (Wurmbrand 2001). This is also what we observe in TCs:

- (26) \*Oggi questi libri sono impossibili da trovare domani.  
 today these book be.3PL impossible.PL DA find.INF tomorrow  
 ‘Today these books are impossible to find tomorrow.’

Moreover, as noticed by Rizzi (2000), TCs do not allow clausal negation (27a-b) and clitics (28a-b) in the infinitival.

- (27) a. \*Questo problema è facile da non capire.  
 this problem be.3SG easy.SG DA NEG understand.INF  
 ‘This problem is easy not to understand.’ (Rizzi 2000:(15e))
- b. \*Questo errore è facile da non commettere mai.  
 this mistake be.3SG easy.SG DA NEG make.INF never  
 ‘This mistake is easy to never make.’
- (28) a. Questo teorema è difficile da spiegar(?\*gli).  
 this theorem be.3SG hard.SG DA explain.INF=DATCL.M.SG  
 ‘This theorem is hard to explain to him.’ (Rizzi 2000:(10b))
- b. Questo ingrediente è impossibile da aggiungere(\*ci).  
 this ingredient be.3SG impossible.SG DA add.INF=LOCCL  
 ‘This ingredient is impossible to add to it.’

Once again, the data support the idea that the infinitival in TCs does not have the relevant functional projections (in this case TP projections).

In conclusion, assuming the simplified structure in (29) for a full clause containing a transitive verb, the infinitival complement of TCs seems to be just a VoiceP.

(29) [CP C [TP T [VoiceP EA Voice [VP V IA ]]]]

This claim is consistent with the facts mentioned in §2.2 regarding the acceptability of aspectual restructuring verbs (30a-b), as well.

- (30) a. *Questa canzone è facile da cominciare a cantare.*  
 this song be.3SG easy.SG DA start.INF A sing.INF  
 ‘This song is easy to start singing.’ (Rizzi 1982:(110b))
- b. *Questo libro è impossibile da finire di leggere.*  
 this book be.3SG impossible.SG DA finish.INF DI read.INF  
 ‘This book is impossible to finish reading.’

According to Cinque (2006:ch.2), such verbs realise Asp(ect) projections *below* Voice because they allow long passivisation (31). Alternatively, these verbs would be considered to be lexical restructuring verbs in the framework proposed by Wurmbrand (2001), for the same reason. Either way, the grammaticality of (30) reinforces the idea that the infinitival is just a VoiceP.

- (31) *La casa sarà cominciata a /finita di costruire domani.*  
 the house be.FUT.3SG start.PPRT A finish.PPRT DI build.INF tomorrow  
 ‘The house will start/finish being built tomorrow.’

Furthermore, other restructuring verbs, which are higher than Voice in Cinque’s (2006) split TP and would be considered to be functional in Wurmbrand (2001) as they do not allow long passives, are not acceptable in TCs:

- (32) a. \**Questo errore è facile da tendere a fare.*  
 this mistake be.3SG easy.SG DA tend.INF A make.INF  
 ‘This mistake is easy to tend to make.’
- b. \**Il cibo italiano è facile da voler mangiare ogni giorno.*  
 the food Italian be.3SG easy.SG DA want.INF eat.INF every day  
 ‘Italian food is easy to want to eat every day.’

Similarly, a perfective auxiliary, also commonly analysed as the realisation of a functional head in the TP, is ungrammatical in TCs.

- (33) \**Questo problema è difficile da aver già risolto dopo un minuto.*  
 this problem be.3SG hard.SG DA have.INF already solve.PPRT after a minute  
 ‘This problem is hard to have already solved after one minute.’ (Rizzi 2000:(16c))

Again, these facts testify to the absence of a functional layer above the embedded infinitive of TCs.

4.3. The status of *da*

A possible objection to the claim that there are no functional projections above Voice in the TC infinitival might arise due to the presence of the introductory element *da*, which *prima facie* looks like a complementiser (see again the canonical example of a TC in 34).

- (34) *Questi libri sono difficili da leggere.*  
 these books be.3PL hard.PL DA read.INF  
 ‘These books are hard to read.’

As a matter of fact, *da* can be a complementiser: this is the case in result clauses like (35a-b).

- (35) a. *Gianni è così furbo da non poter neanche lei sperare di  
 ingrogiarlo.*  
 Gianni be.3SG so smart DA NEG can.INF even she hope.INF DI  
 deceive.INF=OCL.3SG.M  
 ‘Gianni is so smart that not even she can hope to deceive him.’ (Cinque 1996:(14a))
- b. *Gianni è così ignorante da forse non saper neanche scrivere.*  
 Gianni be.3SG so ignorant DA perhaps NEG know.INF even write.INF  
 ‘Gianni is so ignorant that he might even not know how to write.’

With the examples above, Cinque (1996) shows straightforwardly that *da* introduces a full CP in result clauses, as evidenced by the possibility of Aux-to-C movement over a lexical subject (in 35a), of modal verbs (in both 35a-b), of clausal negation (in both 35a-b), of clitics (in 35a), and of high epistemic adverbs (in 35b). These possibilities are all excluded in TCs, as discussed in the previous subsections and as shown by the ungrammaticality of these elements in (36):

- (36) *Questo problema è facile da (\*poter) (\*un bambino) (\*forse)  
 capire(\*lo).*  
 this problem be.3SG easy.SG DA can.INF a kid perhaps  
 understand.INF=OCL.3SG.M  
 ‘This problem is easy for a child to perhaps be able to understand.’

Therefore, Cinque claims that we are dealing with two different versions of *da*: a prepositional complementiser for result clauses, and something else for TCs.

In light of the positive results of the tests for monoclausality, I propose the following solution: in TCs, *da* is a prepositional element like those ordinarily found with restructuring verbs (*iniziare a* ‘start’, *finire di* ‘finish’, etc.). According to Cinque (2006:45), these are dummy prepositions whose presence is required as a way of introducing the complement clauses of certain predicates for selectional reasons.

## 5. Analysis

Before turning to my analytical proposal for Italian TCs, let me first summarise the empirical observations made in the previous sections:

- (37) Argument realisation in TCs
- a. Only IAs of transitive verbs can be promoted to subjects;
  - b. No passive morphology is allowed on the infinitive;
  - c. The infinitive has an ImpEA;
  - d. The ImpEA has the same syntactic status as the ImpEA of a passive rather than PRO;
  - e. *By*-phrases are impossible;
  - f. There can be an overt dative experiencer in the matrix clause coreferential with the ImpEA.
- (38) Size of the TC infinitival
- a. No left periphery;
  - b. No position for PPs between matrix and infinitival;
  - c. Clefting is impossible;
  - d. No independent tense;
  - e. No clausal negation and clitics;
  - f. Only aspectual restructuring verbs permitting the long passive are allowed (as opposed to auxiliaries and other restructuring verbs).

Now, the natural question is whether these properties are connected, and, if they are, how the connection can be explained. To this end, I will argue that Italian TCs are a case of Voice restructuring in the sense of Bryant et al. (2023): in particular, the functionally impoverished nature of the embedded clause is reflected in its VoiceP, which does not introduce a full EA (but nevertheless requires the presence of one) and cannot thus assign accusative. As a result, the ImpEA co-refers to an argument of the matrix predicate (the experiencer) and the IA becomes the matrix subject for Case reasons.

### 5.1. Voice restructuring

A significant line of work going back to Wurmbrand (2001) analyses different phenomena having as a common denominator the lack of functional structure in certain embedded clauses, generally known as restructuring complements. For instance, consider an example of the German long passive in (39), which is one of the constructions associated with lexical restructuring by Wurmbrand, i.e. a matrix lexical verb selecting an extremely reduced complement.

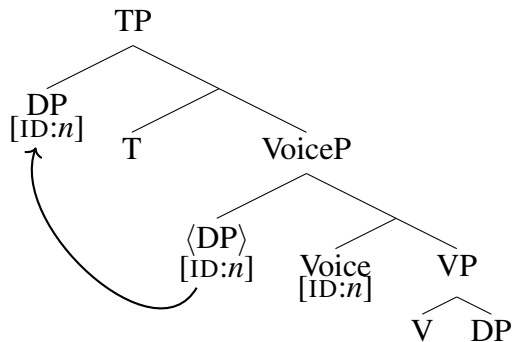
- (39) *dass der Traktor zu reparieren versucht wurde.*  
 that the.NOM tractor ZU fix.INF try.PPRT be.PST.3SG  
 ‘that they tried to repair the tractor.’ (German, Wurmbrand 2001:(46a))

In (39), passive morphology is found on the matrix verb, but not on the infinitive, whose IA is promoted to subject. At the same time, the (implicit) agent of the matrix verb “controls” the

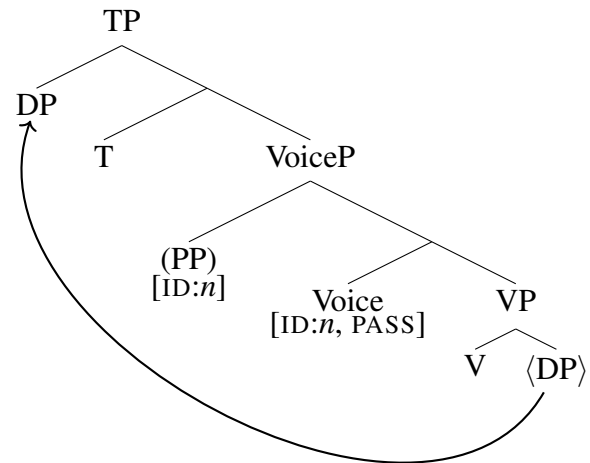
ImpEA of the embedded verb: in other words they are obligatorily coreferential, although there is no PRO in the embedded clause, as extensively argued by Wurmbrand (2001). According to Bryant et al. (2023), who review some of the phenomena originally studied by Wurmbrand (2001), sentences like (39) are instances of Voice restructuring, where a defective Voice head fails to assign accusative Case and to introduce an independent EA in the embedded clause.<sup>5</sup>

Let us now introduce Bryant et al.'s (2023) proposal more in detail. They start from the assumption that regular active/passive Voice bears a valued [ID] feature, whose value  $n$  is an index for the agent it licenses, and an optional feature [PASS] specifying the morphological realisation of passive Voice. Active Voice introduces an EA as a DP in its Specifier with the same [ID] value as the head, and it assigns accusative to the IA. Passive Voice does not have a DP in its Specifier and cannot assign accusative to the IA (in compliance with Burzio's generalisation), but it can optionally have a *by*-phrase with the same [ID] value as the head.<sup>6</sup> The two adapted representations are shown in (40-41).

(40) Active



(41) Passive



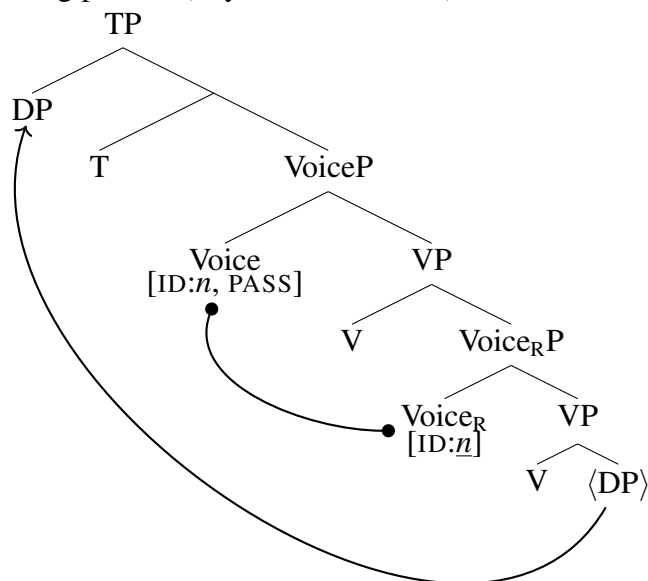
On the other hand, reduced infinitival clauses selected by certain lexical predicates have a defective Voice head ( $\text{Voice}_R$ ), which has unvalued [ID] and therefore cannot assign accusative.<sup>7</sup> This defective Voice head must then establish an (upward) Agree dependency with another head bearing a valued [ID] feature, whereby the feature value is shared with  $\text{Voice}_R$ . So, the apparent control relationship these configuration show is derived through Agree in [ID]. At the same time, the IA of the embedded verb must get Case from the matrix. This is what happens in long passives like (39), as shown in (42).

<sup>5</sup> See also Wurmbrand (2016); Wurmbrand & Shimamura (2017) for other versions of the theory of Voice restructuring.

<sup>6</sup> I add this remark on *by*-phrases, which I think fits naturally in this model, even if Bryant et al. (2023) do not mention them at all.

<sup>7</sup> Alternatively, the assumption that [ID] exists can be dispensed with if we assume that there is a minimal pronoun ( $\text{PRO}_{\min}$ ) in  $\text{Spec, Voice}_R$ , following a suggestion by Pesetsky (2023).  $\text{PRO}_{\min}$  is highly defective and its presence does not trigger accusative assignment in the embedded clause nor does it block A-movement of a lower argument (as opposed to standard PRO). At the same time,  $\text{PRO}_{\min}$  is controlled by a matrix argument, deriving the desired coreference relation.

(42) Long passive (Bryant et al. 2023:7)



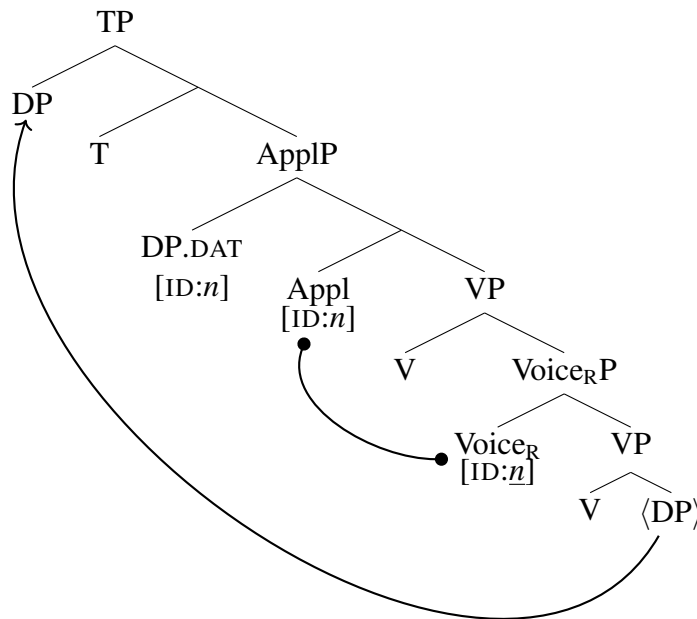
In other words, the embedded clause in (42) simply consists of a VoiceP headed by Voice<sub>R</sub>. Voice<sub>R</sub> does not have its own EA (i.e. it has no Specifier and unvalued [ID]), and does not assign accusative to the IA. Matrix Voice, on the other hand, is passive and encodes an (implicit) EA through an [ID] value. This value is transmitted to Voice<sub>R</sub> through Agree (I represent this in 42 by underlining the transmitted feature value), so both verbs are ultimately interpreted as having the same EA. The IA in the embedded clause can now receive nominative Case from matrix T and become the subject. So, embedded Voice is not passive, but just defective: this is why we only find passive morphology in the matrix clause, whereas Voice<sub>R</sub> is spelt out with default infinitival morphology.

Notice that the head bearing valued [ID] in the matrix need not be a Voice head in order to be probed by Voice<sub>R</sub>. In fact, Bryant et al. (2023) suggest that Voice<sub>R</sub> is also involved in the unaccusative construction exemplified by (43):

(43) *weil mir der Brief auf Anhieb zu entziffern gelungen ist.*  
 since me.DAT the.NOM letter straightaway ZU decipher.INF manage.PPRT be.3SG  
 ‘since I managed straightaway to decipher the letter.’ (German, Wurmbrand 2001:(13a))

In (43), the unaccusative verb *gelingen* (‘manage’) has a dative argument (introduced by an Appl head) which seems to control the EA of the infinitive, while the IA of the infinitive is promoted to subject. Like active/passive Voice, Appl also has a valued [ID], tracking the reference of the argument this head introduces. They propose the structure in (44) for this construction.

- (44) Voice restructuring with unaccusatives (Bryant et al. 2023:Appendix)



### 5.2. Italian tough-constructions

The claim that Voice<sub>R</sub> is available in the grammar of Italian is highly plausible since Italian, too, has long passives, as I previously mentioned. This can be exemplified by (31), repeated here as (45).

- (45) *La casa sarà cominciata a /finita di costruire domani.*  
 the house be.FUT.3SG start.PPRT A finish.PPRT DI build.INF tomorrow  
 ‘The house will start/finish being built tomorrow.’

So, (45) is parallel to the German example in (39) and should receive the same analysis in terms of Voice<sub>R</sub>. This implies accepting Wurmbrand’s (2001) claim that restructuring verbs allowing the long passive are lexical (*contra* Cinque 2006), and can therefore have their own argument structure (i.e. matrix Voice, since they are transitive) as well as select a VoiceP complement.

I propose that Italian TCs, too, involve Voice restructuring.<sup>8</sup> In particular, the *tough*-adjectives are lexical and select a VoiceP complement, like lexical restructuring verbs (*iniziare a, finire di,...*). Unlike these verbs, though, *tough*-adjectives are not transitive and do not have a matrix Voice head, but they are unaccusative predicates, with an (explicit or implicit) dative experiencer. Thus, they are more similar to the German *gelingen* construction than to long passives.

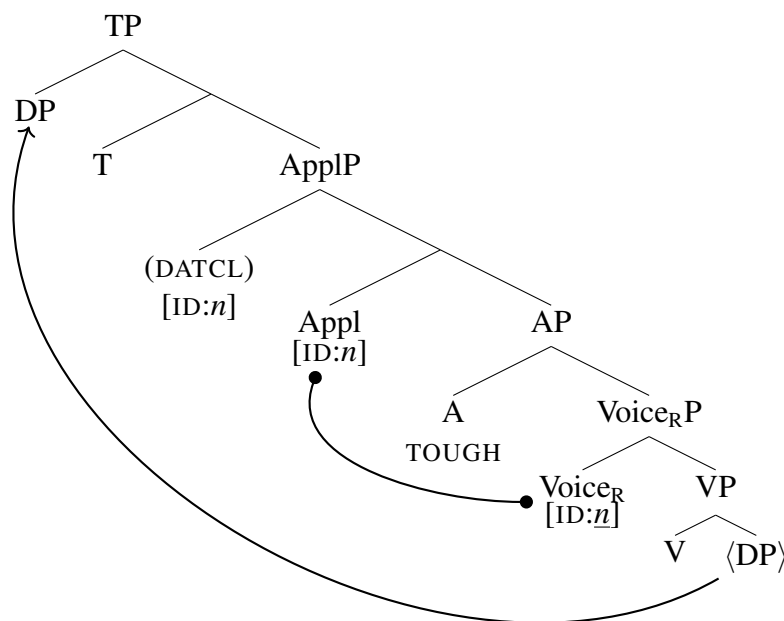
The proposed derivation for (46) is shown in (47).

<sup>8</sup> A reviewer asks whether the same analysis can be recast in the framework proposed by Müller (2020), whereby restructuring derives from a process of Structure Removal. Although for reasons of space I cannot provide a full-fledged adaptation of my proposal to Müller’s assumptions on restructuring, as far as I can tell a Structure Removal analysis of TCs would not run into any significant problems, if additional assumptions are made on the derivation of the long passives, too, following Müller (2021).



- (46) *Questa decisione (mi) è impossibile da accettare.*  
 this decision DATCL.1SG be.3SG impossible DA accept.INF  
 ‘This decision is impossible (for me) to accept.’

(47)



Following Keine & Poole (2017:318ff) and references therein, I take *tough*-adjectives to merge an oblique experiencer argument as part of their argument structure. Keine & Poole (2017:319) specifically claim that the projection above the adjective introducing the experiencer (which they call ExpP)<sup>9</sup> is equivalent to an Appl projection in the verbal domain: for ease of comparison, I just label this as ApplP in (47).<sup>10</sup> I also assume that the ApplP is nonetheless present in the structure when the experiencer is not overtly realised, in which case its [ID] has value *arbitrary*. This is parallel to the (fairly standard) assumption that a passive Voice head still encodes the presence of an arbitrary EA when a *by*-phrase is not present.

The proposal in (47) seems to accommodate all the empirical observations about Italian TCs summarised in (37-38), as I explain below.

First, (47) derives the argument realisation facts: the matrix adjective selects a VoiceP, so only transitive verbs are possible. At the same time, the selected Voice is defective, and it does not introduce a lexical EA nor a PRO, but just an unvalued [ID] feature. This is why the ImpEA of the infinitive in TCs is so similar to the ImpEA of a passive: also in passives the ImpEA is just a feature on the Voice head (see 41). However, Voice in TCs is different from passive Voice because [ID] is only valued by Agree with another head. In other words, the ImpEA of the TC infinitive has the same syntactic status as the passive ImpEA but it is ‘controlled.’ In addition, the fact that Voice in TCs is defective rather than passive also explains why it does

<sup>9</sup> I am somewhat simplifying the structure of the adjective here: according to Keine & Poole (2017), there is an aP projection above the experiencer introducing head.

<sup>10</sup> See also Berro & Fernández (2019) for the claim that ApplPs can appear in the structures of nouns and adjectives and introduce experiencers.

not have passive morphology and it does not allow *by*-phrases, which are only associated with passive Voice. Similarly, the promotion of the IA to matrix subject is a consequence of  $\text{Voice}_R$ 's inability to assign accusative, due to the lack of a DP as EA.

Secondly, the clause size identified by the diagnostics I employed is exactly the necessary one for  $\text{Voice}_R$  to be possible, as  $\text{Voice}_R$  only seems to be available in reduced complement clauses with no additional functional structure.<sup>11</sup> In other words,  $\text{Voice}_R$  must be directly selected by the matrix adjective; so, if there were intervening functional projections, this could not happen, and only regular active/passive Voice would be available. I show in §5.3 that this requirement is indeed real by comparing Italian and some closely related languages where TCs have more functional structure: in these languages, we always find an overtly passivised verb or a resumptive object clitic in the embedded clause, showing that  $\text{Voice}_R$  is not available.

There is now a clarification to be made: the claim that Italian TCs involve a defective Voice head (i.e. Voice restructuring) ties in nicely with the observation that these constructions are monoclausal. However, this is not to say that all monoclausal configurations in Italian involve this specific type of restructuring. The more familiar cases of restructuring configurations discussed extensively in the literature, e.g. modal verbs, do not seem to involve  $\text{Voice}_R$ , but they should be analysed as functional verbs realising T projections and selecting normal active/passive Voice (Wurmbrand 2001; Cinque 2006). In other words, we can make a distinction between at least two types of monoclausal configurations:

- (48) a. 'Functional restructuring' (Wurmbrand 2001) or just 'restructuring' (Rizzi 1982; Pineda & Sheehan 2022);  
 b. 'Lexical restructuring' (Wurmbrand 2001) or 'clause union' (Pineda & Sheehan 2022).<sup>12</sup>

The common property of (48a-b) is that there are no intervening CP/TP layers between the two verbs in the sentence, which can be shown by various well-known tests (including those I used in §4). There are various differences between these two types of monoclausality in Italian/Romance (Rizzi 1982, 2000; Sheehan 2016; Pineda & Sheehan 2022), though:

- (49) a. Lexical restructuring/clause union predicates are sensitive to the transitivity of the embedded verb, functional ones are not;  
 b. Functional restructuring predicates do not have an argument structure, whereas lexical/clause union ones can introduce arguments;  
 c. Functional restructuring predicates allow passive morphology/perfective auxiliaries in their complement, lexical/clause union ones do not.

Under this view, Voice restructuring is a property only of clause union/lexical restructuring configurations, since  $\text{Voice}_R$  needs to be selected by a lexical predicate. Conversely, functional

<sup>11</sup> See Rizzi (2000) for evidence that the infinitival complement of Italian long passives is also extremely reduced, consistently with this claim.

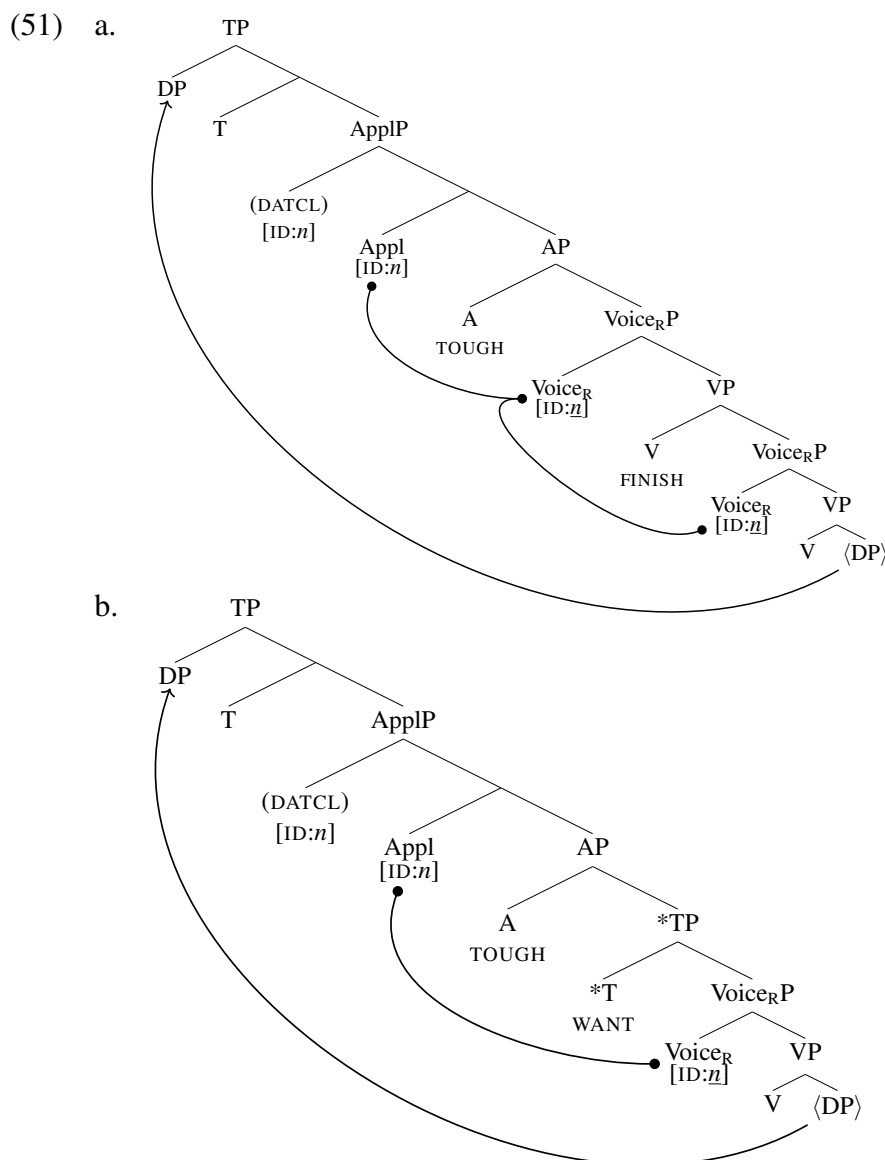
<sup>12</sup> Romance causatives and perception verbs are usually taken to be the typical (if not the only) examples of monoclausal configurations belonging to this class by previous work on Romance (Rizzi 1982; Sheehan 2016; Pineda & Sheehan 2022). I do not address the similarity between causatives and TCs here due to limited space, but it can be shown that the display a very similar pattern in the relevant respects (in particular regarding 49) (see Russo Cardona 2024).

restructuring configurations must involve normal active/passive Voice. This is why TCs are not just different from control and raising configurations, but also from modal verbs and other functional restructuring configurations (as shown in §3.1).

Now, let me go back to the data initially noticed by Rizzi (1982) showing the grammaticality of lexical restructuring verbs in TCs (50a): my proposal can easily derive this as well as the contrast (already mentioned in §4.2) with functional restructuring verbs, which are ungrammatical in TCs (50b).

- (50) a. *Questo libro è impossibile da finire di leggere.*  
 this book be.3SG impossible.SG DA finish.INF DI read.INF  
 ‘This book is impossible to finish reading.’
- b. \**Il cibo italiano è facile da voler mangiare ogni giorno.*  
 the food Italian be.3SG easy.SG DA want.INF eat.INF every day  
 ‘Italian food is easy to want to eat every day.’

The derivations for (50a-b) are shown in (51a-b).



In other words, (51a) is grammatical because (i) *finire di* ('finish') is a transitive verb (so it can be selected by the Voice<sub>R</sub> selected by the *tough* adjective; and (ii) it is a lexical restructuring verb so it, in turn, selects Voice<sub>R</sub> as the head of its complement (like in the long passive). As a result, we obtain feature sharing of the [ID] value down to the lowest Voice<sub>R</sub>, eventually leaving the IA Case-less and able to move to the matrix subject position. On the contrary, the problem in (51b) is that *volere* ('want') realises a T projection and it cannot select Voice<sub>R</sub>, making the structure illicit.

### 5.3. Further evidence from (Italo-)Romance

In this section, I will offer some additional evidence (mainly from Russo Cardona 2023) that Voice<sub>R</sub> is incompatible with the presence of functional structure in the embedded clause.

In particular, varieties behaving like Italian in not allowing any functional projections in the embedded clause consistently realise the embedded verb as a bare infinitive with no passive morphology (like in Italian). Therefore, they can be captured by the same analysis with a Voice<sub>R</sub> in the embedded clause. This is the case, for instance, of Sicilian (52a) and Trevisan (52b), where the lack of functional structure is evidenced, respectively, by the ungrammaticality of an epistemic high adverb and of clausal negation:

- (52) a. *Sti libri su ffacili di (\*fursi) truvari.*  
 these books be.3PL easy.PL DI perhaps find.INF  
 'These books are easy to (perhaps) find.' (Sicilian)
- b. *Sto albero zè duro da (\*no) veder.*  
 this tree be.3 tough.M.SG DA NEG see.INF  
 'This tree is hard (not) to see.' (Trevisan)

On the other hand, TCs in other varieties accept functional material in the verbal complement. In this case, the infinitive always has obligatory passive morphology or a resumptive object clitic. For instance, this pattern is observed in Sardinian (53a) and Lucano (53b), where negation signals the presence of functional structure and we find, respectively, a passive infinitive and an active infinitive with a resumptive object clitic.

- (53) a. *Cust' arbur el fazole a no esser vidu.*  
 this tree be.3SG easy.SG A NEG be.INF see.PPRT  
 'This tree is easy not to see.' (Sardinian)
- b. *Sta casa è ddifficile a non \*(la) vedè.*  
 this house be.3SG hard.SG A NEG OCL.3.F.SG see.INF  
 'This house is hard not to see.' (Lucano)

This is clear evidence that Voice<sub>R</sub> is not available in these infinitival complements having functional projections on top of the VoiceP, but only passive Voice or active Voice (which licenses the object clitic) can be selected.

Similar data are provided by European Portuguese, a language where infinitives can be inflected for person. In TCs the infinitive can be inflected or not (Raposo 1987): when it is, passive

morphology (either as a copular passive or a *se*-passive) becomes obligatory. See the contrast in (54), adapted from Raposo (1987:104-105).

- (54) a. *Esses relógios são difíceis de arranjar(\*mos/\*em).*  
 these watches be.3PL hard.PL DE fix.INF.1PL/3PL
- b. *Esses relógios são difíceis de {se arranjam / serem arranjados}.*  
 these watches be.3PL tough.PL DE PASS fix.INF.3PL be.INF.3PL fix.PPRT  
 ‘These watches are hard to fix.’ (Eur. Portuguese)

In (54a), the *tough*-adjective directly selects Voice<sub>R</sub>: as a result, there can be no inflectional projections in the embedded clause and the infinitive cannot agree either with an implicit agent nor with the moving IA. Conversely, in (54b), the *tough*-adjective selects a bigger complement (at least a TP), as shown by the grammaticality of the inflectional marker on the infinitive. In this case, the infinitive has to be overtly passivised, showing that Voice<sub>R</sub> is unavailable in bigger complement clauses.

In conclusion, micro-variation evidence from other Italo-Romance varieties and European Portuguese shows that my claim about the availability of Voice<sub>R</sub> seems to be on the right track: Voice<sub>R</sub> must be selected by the embedding lexical predicate, and is therefore banned from complement clauses that comprise more functional structure.

## 6. Conclusion

In this paper, I investigated the syntax of Italian TCs. TCs in the Romance languages lack one of the fundamental properties found in English: unboundedness. As a result, despite the vast amount of work concerned with English TCs, Romance TCs cannot be captured by most analyses because of this crucial difference. In fact, the main challenging aspect of Italian TCs is the opposite pattern in argument realisation they show (55a) in comparison to other bounded dependencies such as raising (55b), control (55c), and restructuring under functional verbs (55d).

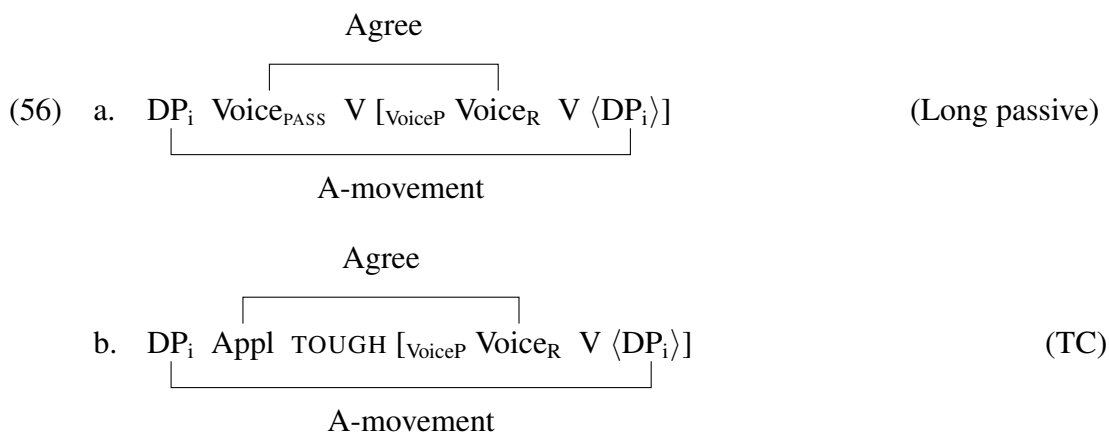
- (55) Simplified structures for A-dependencies with an embedded transitive verb
- a.  $DP_i$  TOUGH [<sub>7P</sub> ImpEA ... V ⟨DP<sub>i</sub>⟩] (TC)
- b.  $DP_i$  V/A [<sub>CP</sub> PRO<sub>i</sub> ... V DP] (Control)
- c.  $DP_i$  V [<sub>TP</sub> ⟨DP<sub>i</sub>⟩ ... V DP] (Raising)
- d.  $DP_i$  T [<sub>VoiceP</sub> ⟨DP<sub>i</sub>⟩ ... V DP] (Functional restructuring)

TCs are different from the other configurations in (55) as the argument targeted by the dependency is not the highest one in the embedded clause. Furthermore, TCs are also unique in that they do not allow an unaccusative verb in their complement clause.

The previous literature on this type of TCs has suggested that (i) these facts stem from the covertly passive nature of the morphologically active infinitive in TCs; or that, (ii) assuming TCs involve restructuring, the embedded verb either does not have an EA at all or the EA can be crossed by the dependency.

After pointing out some flaws of these previous claims in light of additional observations, I argued that there are indeed many similarities between TCs, passives, and restructuring configurations; however, there are also significant differences. In particular, I established that TCs have an ImpEA, which is not PRO but has the same status as a passive ImpEA, even if it can be ‘controlled’ by a matrix experiencer (introduced by an Appl head), while passive morphology and *by*-phrases are ungrammatical. Moreover, TCs seem to be ‘restructuring’ configurations in that they are monoclausal and the verbal complement is just a VoiceP.

As a result of these empirical considerations, I argued that the embedded verbal complement of TCs is headed by a defective Voice head (Voice<sub>R</sub>), proposed by Bryant et al. (2023) to derive phenomena tied to ‘lexical restructuring’ (cf. Wurmbrand 2001) such as the long passive. The proposed derivations (simplified) for Italian long passives and TCs are shown in (56a-b), respectively:



As I argued, Voice<sub>R</sub> can explain the argument realisation facts in TCs, as it does not assign accusative (leaving the embedded IA without Case) while it encodes the presence of an ImpEA, whose reference is determined via Agree with a matrix thematic head. Consequently, the IA is promoted without actual passivisation of the embedded verb: this is why passive morphology and *by*-phrases are not acceptable in TCs. As for the reduced size of the verbal complement, this seems to stem from a selectional requirement: Voice<sub>R</sub> can only be selected directly by a lexical category in the matrix clause, so there cannot be any functional material separating Voice<sub>R</sub> from the matrix clause in TCs. This conclusion seems to be confirmed by varieties closely related to Italian, where TCs involve a bigger clausal complement and Voice<sub>R</sub> is not available.

My findings provide an argument in favour of the distinction between different types of restructuring in Italian: functional restructuring *à la Cinque* (2006) (e.g. with modal verbs) on one hand, and clause union (Rizzi 1982; Sheehan 2016; Pineda & Sheehan 2022) or lexical restructuring (Wurmbrand 2001) on the other hand. Furthermore, the present work shows that TCs can be a useful tool to assess the syntactic behaviour of Voice depending on clause size. This could have important consequences for the improvement of existing typologies of clausal complementation, by comparing them to a typology of TCs.

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## Abbreviations

ACC	accusative	LOCCL	locative clitic
DATCL	dative clitic	NEG	negation
EA	external argument	OCL	object clitic
FUT	future	PL	plural
IA	internal argument	PPRT	past participle
IMPEA	implicit external argument	SG	singular
INF	infinitive	TC	<i>tough</i> -construction
1, 2, 3	first, second, third person		

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***Dou* and homogeneity removal**  
A new perspective to the co-occurrence puzzle

Zeqi Zhao

Plural definites are known to exhibit *homogeneity* and *non-maximality* effect. The two phenomena are reported to appear and disappear together; universal quantifiers (UQs) like *every/all* can remove both (Križ 2015). The nature of Mandarin UQs has long been contested since they canonically co-occur with *dou*, which also seems to also exert UQ force. In this paper, I will present novel data that *dou* has the *true* UQ power due to its ability to remove homogeneity. Building on the view that homogeneity results from pluralization (since Schwarzschild 1993), I treat *dou* as a universal pluralization operator  $\forall$ -PL (Bar-Lev 2021); homogeneity removal is thus a by-product of agreement between UQ and  $\forall$ -PL.

*1. Introduction*

Plural definite descriptions (PDs) cross-linguistically are known to exhibit *homogeneity*: in out-of-the-blue contexts, we can infer from (1a) that all the kids smiled while from (1b) that none of kids smiled. This puzzling fact that PDs seem to have different interpretation in different linguistic contexts is called homogeneity.

- (1) Homogeneity
- a. The kids smiled.
    - (i)  $\approx$  All of the kids smiled. ( $\forall$ )
    - (ii)  $\not\approx$  Some of the kids smiled. ( $\exists$ )
  - b. The kids did not smile.
    - (i)  $\approx$  None of the kids smiled. ( $\neg\exists$ )
    - (ii)  $\not\approx$  Not all the kids smiled. ( $\neg\forall$ )

Note that PDs' interpretation in (1a) is only quasi-universal rather than *truly* universal because in certain contexts, sentences containing PDs can have *non-maximal* readings. In a context like

(2a), the sentence *the kids smiled* is judged true even if a few kids did not smile (see Brisson 1998, Lasersohn 1999, Malamud 2012, Križ 2015, 2016).

(2) Non-maximality

- a. *Context: John hired a professional costumed character for his son's birthday party. Someone is wondering whether the kids are entertained and asks John. John replies:*
- b. The kids smiled.

In a context like (3a) where the distinction between all and not all of the kids smiled is crucial, the sentence containing PD only has a maximal reading.

- (3) a. *Context: John is willing to give the party entertainer a 5-star review only if they made all the kids smile. The entertainer says:*
- b. *The kids smiled.*

The non-accidental link between homogeneity and non-maximality has been emphasized in the literature (Löbner 2000, Malamud 2012, Križ 2015, 2016, a.o.) based on the observation that the two phenomena seem to appear/disappear together: universal quantifiers (UQs) like *every/all* can remove both. Sentence (4a) can not be uttered in the non-maximal context in (2a); homogeneity is removed in (4b) in the sense that under negation the “not all” reading becomes available again.

(4) Removal of homogeneity and non-maximality

- a. Every kid/All the kids smiled.
  - (i)  $\rightsquigarrow$  The kids all smiled with no exception. ( $\forall$ )
  - (ii)  $\rightsquigarrow$  Some but not all kids smiled. ( $\neg\forall$ )
- b. Every kid/All the kids did not smile.
  - (i)  $\rightsquigarrow$  Not all of the kids smiled. ( $\neg\forall$ )
  - (ii)  $\rightsquigarrow$  None of the kids smiled. ( $\neg\exists$ )

This paper intends to explore some of the various issues brought up by these facts above. If homogeneity and non-maximality are truly two sides of the same coin, then expressions that give rise to non-maximality must also give rise to homogeneity, and *vice versa*. However, the behaviors of expressions like *Mary and John* and *the three kids* indicate otherwise: they give rise to homogeneity but do not allow non-maximal interpretations (see Bar-Lev 2021).

(5) Only maximal readings:

- a. Mary and John smiled.  
 $\approx$  *Both* Mary and John smiled.
- b. The three kids smiled.  
 $\approx$  *All* of the three kids smiled.

(6) Homogeneity arises:

- a. Mary and John did not smile.  
 $\approx$  Neither Mary nor John smiled.
- b. The three kids did not smile.  
 $\approx$  None of the three kids smiled.

The fact that non-maximality disappears while homogeneity persists calls for a fundamental

reconsideration of the origin of homogeneity and how exactly it is removed by UQs. In this work, I will show that Mandarin provides fertile grounds for probing which view of homogeneity removal should be entertained. Unlike in English, Mandarin UQs canonically co-occur with *dou*, a morpheme whose semantics is still open to discussion.

The roadmap is as follows: as background, section 2 details the puzzling licensing conditions of Mandarin UQs and the limits of previous approaches. Then in section 3, I will present novel data showing that a) *dou*, not Mandarin UQs, removes homogeneity; b) not all Mandarin UQs remove non-maximality. In section 4, I will explain the relevant Mandarin data based on the assumption that homogeneity is not attributed to PDs but to the workings of the pluralization operator which applies to VP predicates (following Schwarzschild 1993, Križ 2015). I will import the denotation of two types of pluralization operators ( $\exists$ -PL and  $\forall$ -PL) from Bar-Lev (2021). The gist of the proposal is that whatever removes homogeneity is not to be hard-wired into the semantics of UQs; homogeneity removal is instead a side effect of agreement between UQ and  $\forall$ -PL, which is subject to cross-linguistic variation. Section 5 considers some remaining issues and concludes.

## 2. UQs in Mandarin

UQs seem to be omnipresent in natural languages. However, there has not been a consensus on their representations in Mandarin. Mandarin *mei* and *suoyou* have been considered as strong contenders given their power to exert *maximality*. Traditionally translated as ‘every’, *mei* selects for a *numeral + classifier + noun* complex (henceforth referred to as *NumP*) as in (7a), while *suoyou*, translated as ‘all’, attaches directly to bare nouns (with an optional *de*- linker) as in (7b).

- (7) a. mei yi \*(ge) haizi  
 MEI one CLF kid  
 ‘every kid’  
 b. suoyou (\*yi ge) (de) haizi  
 SUOYOU one CLF DE kid  
 ‘all (of the) kids’

### 2.1. The puzzles of *dou*

But the UQ nature of *mei* and *suoyou* has long been contested (since Lin 1998) by the “co-occurrence” puzzle as exemplified in (8). *mei* and *suoyou* subjects are canonically licensed by another morpheme *dou* within a clause.<sup>1</sup> In a sentence containing *mei*- and *suoyou*-subjects, *dou* is in a position following the *mei/suoyou*-subjects and preceding the verb and its aspect markers. So all else being equal, the word order of a clause with *dou* would be [*mei/suoyou* Subject – DOU – Verb].

<sup>1</sup> A reviewer pointed out that *mei* and *suoyou* can also appear without *dou*. I have no intention to make a strong claim that *mei* must be accompanied by *dou*. *Mei-dou* “co-occurrence” is far from being a strict constraint due to the existence of some, if not many, exceptions. It is just the case that one of them (see next page) is centered in this paper.

- (8) a. mei-(yi)-ge haizi \*(**dou**) qu-le gongyuan.  
 MEI-ONE-CLF kid DOU GO-PRF park  
 ‘Every kid went to the park.’  
 b. suoyou-(de) haizi \*(**dou**) qu-le gongyuan.  
 SUOYOU-DE kid DOU GO-PRF park  
 ‘All (of the) kids went to the park.’

Such observations seem to suggest that *mei* and *suoyou* lack proper UQ force and thus require assistance from *dou*. But here is an exception to *mei-dou* co-occurrence: with the presence of a NumP object in the VP as in (9), *dou*’s presence becomes optional (first observed by Huang 1996). Unlike *mei*, *suoyou* ( $\approx$  ‘all’) behaves differently in the sense that in subject positions it requires *dou*’s presence, regardless of what is in the object position as shown by (10).

- (9) mei-(yi)-ge haizi (dou) hua-le **yi-fu-hua**.  
 every-one-CLF kid DOU draw-PRF one-CLF-picture  
 ‘Every kid drew one picture.’  
 (10) suoyou-(de) haizi \*(dou) hua-le **yi-fu-hua**.  
 SUOYOU-DE kid DOU draw-PRF one-CLF-picture  
 ‘All (of the) kids (each) drew one picture.’

The co-occurrence data reported above are further complicated by what is known as the *subject/object asymmetry*: *mei* and *suoyou* can appear in object positions without *dou* and still manage to express true UQ force on their own.<sup>2</sup> *mei* and *suoyou* in (11) blocks non-maximality – the sentence is judged true iff the kids, without any exception, are liked by John.

- (11) yuehan xihuan mei-(yi)-ge/suoyou haizi.  
 John like MEI-ONE-CLF/SUOYOU kids  
 ‘John likes every kid/ all (of the) kids.’

## 2.2. Previous approaches

Previous solutions to these puzzles differ in terms of technical details but have been along similar lines: they try to strip away either *mei/suoyou*’s or *dou*’s quantificational force. For example, Lin (1998) treats *mei* as picking out the maximal plural individual in the domain provided by its sister. In a context where  $\llbracket \text{kid} \rrbracket = \{a, b, c, d\}$ ,  $\llbracket [\text{mei} [1 \text{ CLF kid}]] \rrbracket = \bigoplus(\{x | \mathbf{kid}(x) \wedge |x| = 1\}) = \{a, b, c, d\}$ . Under such an approach, *mei*+NumP is treated on a par with English PDs (as non-quantificational of type *e*); *dou*, analyzed a distributive operator, supplies the UQ force. Such an analysis, although pointing out a promising direction for solving the puzzles, failed to account for the exceptional cases where *mei* can appear without *dou* in (9), repeated below in (12).

- (12) a. mei-ge haizi hua-le yi-fu-hua.  
 MEI-CLF kid draw-PRF one-CLF-picture

<sup>2</sup> A very puzzling fact is that objects *mei*, in contrast to in subject positions, can occur more freely without *dou*. For *dou* to be inserted in *mei*-object sentences, *mei*-object must moved to somewhere that precedes *dou*, either to a sentence initial position or a position following the subject. This is in fact one of the puzzle of *dou* — once *dou* is merged, it seems to be associated with movements. A detailed discussion of these cases with *mei*-objects is out of the scope of this paper.

- ‘Every kid drew one picture.’
- b. mei-ge haizi (dou) hua-le yi-fu-hua.  
 MEI-CLF kid DOU draw-PRF one-CLF-picture  
 ‘Every kid drew one picture.’

At first glance, the minimal pair (12a) and (12b) with/without *dou* are semantically equivalent. This observation motivates recent analyses of *dou* as truth-conditionally vacuous (e.g. Liu 2021). According to Liu, *dou*, as a focus-sensitive particle, carries the presupposition that the prejacent clause is the strongest (in terms of entailment) among all alternatives. *mei* is treated on a par with *every* as a true UQ<sup>3</sup>. When *mei* and *dou* co-occur, *dou*’s presupposition is always satisfied since the prejacent containing *mei* is always the strongest among all alternatives (see more details in Liu 2021). *mei-dou* co-occurrence is thus an instance of obligatory presupposition regulated by *Maximize Presupposition* (MP, Heim 1991).

Although Liu makes inadequate predictions regarding *dou*’s semantic contribution (which I will elaborate on in section 3), this account is still of considerable reference value as it brings forth a more nuanced characterization of *dou*’s presence/absence. The contrast between the (13a) and (13b) (an example from Liu 2021) suggests that *dou*’s occurrence reflects the current *Question Under Discussion* (QUD as in Roberts 2012).

- (13) Context: At a secondhand bookstore. . .
- a. The bookstore owner: “Our store is having a big sale,  
 mei-ben shu 10 yuan.  
 MEI-CLF book 10 yuan  
 ‘Every book is TEN YUAN.’ **QUD: How much is every book?**
- b. John: ‘This book looks brand-new and super expensive. Is it also 10 bucks?’ The owner replies:  
 mei-ben shu dou 10 yuan.  
 MEI-CLF book DOU 10 yuan  
 ‘EVERY book is 10 yuan.’ **QUD: Is every book 10 yuan?**

Utilizing the idea that QUDs can shape the set of alternatives *Alt* with respect to contextual relevancy, Liu makes the following predictions: in the context where (13a) is uttered, the focus was on the price of every book ‘10 yuan’; the QUD is therefore regarding the price of every book, under the natural assumption that every book costs the same in this sale. In such a context, the sub-domain alternatives are intuitively not relevant to the QUD and are thus pruned. The result is that *Alt* becomes a singleton set containing only the prejacent. Assuming that *dou* behaves similarly to other focus-sensitive operators, the principle of *non-vacuity* (Xiang 2020) blocks its occurrence.<sup>4</sup>

<sup>3</sup> An important ingredient of Liu (2021)’s treatment of *mei* as a true UQ is that UQs obligatorily trigger sub-domain alternatives (Chierchia 2013, Zeijlstra 2017). This ensures that entailment relations hold among the corresponding propositional alternatives of *mei*-sentences.

<sup>4</sup> Non-vacuity is motivated by felicity conditions of the overt *only*. As exemplified in (i), the answer (ib) is infelicitous because no alternative is stronger than the prejacent and thus none of them is excludable, leaving the overt exhaustifier *only* semantically vacuous. See more discussion on the ban on vacuous exhaustifications in Xiang (2014a) and Fox & Spector (2018).

But in a context as in (13b), the QUD is about whether a universal statement is true, i.e. whether EVERY book costs 10 yuan. According to Liu, the evaluation of the truth/falsity of a universal statement requires checking the truth/falsity of each individual instantiation. In this case, sub-domain alternatives are contextually relevant and thus remain in *Alt*. Since *dou* carries an extra presupposition that the prejacent must be the strongest, MP blocks the *dou*-less sentence.

Liu’s pragmatic account provides convincing evidence that a purely grammatical view, without any admixture, is inadequate to capture the complexity of obligatory *dou*. However, such an account imposes the following undesired licensing constraint on *dou*: in contexts like (13a) where the QUD is not about a universal statement, *dou* is predicted to be absent due to non-vacuity. Such prediction does not align with native speakers’ intuitions — my informants reported that both versions of the sentence with/without *dou* can be uttered in context (13a). This discrepancy is presented in Table 1.

	Liu (2021)	Mandarin speakers
<i>dou</i> in context (13a)	<i>absent</i>	<i>optional</i>
<i>dou</i> in context (13b)	<i>obligatory</i>	<i>obligatory</i>

Table 1. Liu (2021)’s predictions comparing to native speakers’ judgments of (13)

To take stock of the discussion so far: Both the grammatical (Lin 1998) and the pragmatic account (Liu 2021) suffers from several issues which make them inadequate to account for *dou*’s obligatoriness/optionality. In the following section, I will provide evidence that homogeneity and non-maximality, as two aspects of the phenomenon overlooked by the previous literature, might shed light on the puzzles at hand.

### 3. Revisiting the role of *dou* and *mei*

In this section, I will show that the puzzling minimal pair of *mei*-sentences with/without *dou* provides fertile grounds for testing the removal of homogeneity and non-maximality. Contrary to what is traditionally accepted in the literature, I will provide evidence that a) *dou*, not *mei*, removes non-maximality; b) *dou*, not *mei/suoyou*, removes homogeneity;

#### 3.1. *Dou*, not *mei*, blocks non-maximality

Recall that the use of *mei/suoyou* seems to always enforce maximality as shown by the data in section 2.1. This motivates the “sum operator” analysis where *mei/suoyou* picks out the maximal plural individual in the domain by their sister. For example,  $\llbracket [mei [1_{CLF} \text{ kid}]] \rrbracket = \bigoplus(\{x | \mathbf{kid}(x) \wedge |x| = 1\})$ . This semantics is, however, challenged by the cases where *mei* combines with a NumP with  $|NUM| > 1$  (Sun 2017). In the scenario below, instructions (14a) and (14b) describe different intended outcomes.

- 
- (i) A: Who made the kids laugh?  
 a. B: Only ANN, (not Bea).  
 b. B: # Only BOTH (Ann and Bea).

(14) Scenario: The teacher is giving instructions to the 4 kids *a, b, c, d* in an art class:

- a. **mei-liang-ge** haizi hua yi-fu-hua!  
 MEI-TWO-CLF kid draw one-CLF-picture  
 ‘Groups of 2 kids draw 1 picture!’
- b. **mei-liang-ge** haizi **dou** hua yi-fu-hua!  
 MEI-TWO-CLF kid DOU draw one-CLF-picture  
 ‘Every conceivable pair of kids, draw 1 picture!’

(14a) would be made true iff any of the following three possibilities is true:

- (15) a.  $\{\{a, b\}, \{c, d\}\}$  drew 1 picture  
 b.  $\{\{a, c\}, \{b, d\}\}$  drew 1 picture  
 c.  $\{\{a, d\}, \{c, b\}\}$  drew 1 picture

(14b) would be true iff

- (16)  $\{\{a, b\}, \{c, d\}, \{a, c\}, \{b, d\}, \{a, d\}, \{c, b\}\}$  drew 1 picture.

The different interpretations above are not predicted by the “sum operator” analysis: [*mei* 2 CLF kid] in (14a) is not interpreted as  $\oplus(\{X|\mathbf{kid}(X) \wedge |X| = 2\})$ ; it instead picks a contextually salient non-overlapping *cover* (Schwarzskid 1996) among the 3 possible covers. Note that when *dou* is inserted as in (14b), the “all conceivable pairs” reading becomes the only possible reading.

Cases like (14) call for serious reconsideration of *mei*’s ability to remove non-maximality. It seems that the presence of *dou*, *de facto*, ensures the maximal reading. Such an issue has yet not received much attention because most of the previous studies only focus on the interpretation of [*mei*+1+CLF+N]. The minimal pair in (12), repeated below in (17), indeed appears to be semantically equivalent. Now the question is: how is *mei* by itself exerting maximality in (17a) but not in (14a)?

- (17) a. mei-ge haizi hua-le yi-fu-hua.  
 MEI-CLF kid draw-PRF one-CLF-picture  
 ‘Every kid drew one picture.’
- b. mei-ge haizi (dou) hua-le yi-fu-hua.  
 MEI-CLF kid DOU draw-PRF one-CLF-picture  
 ‘Every kid drew one picture.’

I want to point out one potential way to understand *mei*’s seemingly inconsistent behavior: *coverage* and *maximality* are two separate concepts. *mei* in (14a) only ensures a weaker reading where every kid belongs to a group of 2 kids that draw 1 picture; I call this reading the “cover reading”. Only the co-occurrence of *mei* and *dou* in (14b) blocks non-maximality with respect to the domain of  $\llbracket 2 \text{ CLF kid} \rrbracket$  — (14b) has the truly “maximal reading” where every conceivable pair of kids should follow the teacher’s instruction and draw 1 picture.

This also explains the seemingly maximal power of *mei* in (17a):  $\llbracket 1 \text{ CLF kid} \rrbracket$  imposes the requirement that each cell of the cover contains an atomic kid; therefore, there is one and only one way to partition the set  $\{a, b, c, d\}$ , namely  $\{\{a\}, \{b\}, \{c\}, \{d\}\}$ . In such cases, the “cover reading” and the “maximal reading” are truth-conditionally equivalent. This, of course, brought us right back to the initial question — what is the role of *dou* in (17b) when its power to enforce maximality is trivial? I have proven in section 2.2 that Liu (2021)’s analysis is inadequate by

deeming *dou* as truth-conditionally vacuous; on top of this, it fails to predict the optionality of *dou*. In the next section, I will draw attention to the missing piece of the puzzle — the presence of *dou* is necessary for homogeneity removal.

### 3.2. *Dou*, not *mei*, removes homogeneity

Although *dou*'s ability to give rise to maximality has long been under the spotlight (Giannakidou & Cheng 2006, Xiang 2008, Cheng et al. 2013)<sup>5</sup>, its connection to homogeneity is by far overlooked.

Similarly to English PDs, Mandarin bare plurals (which can have a definite interpretation) give rise to the homogeneity effect. They receive a quasi-universal interpretation that allows non-maximality (depending on the contexts, as discussed in section 1); but in downward-entailing contexts,<sup>6</sup> they are interpreted existentially, resulting in noticeably stronger truth-conditions.

- (18) a. haizi-men xiao-le.  
 kid-PL laugh-PRF  
 'The kids laughed.'  
 b.  $\approx$  All/Almost all of the kids laughed. (V)  
 c.  $\neq$  Some of the kids laughed. (E)
- (19) a. *A asks B:*  
 haizi-men xiao-le ma?  
 kid-PL laugh-PRF SFP  
 'Did the kids laugh?'  
 b. *B replies:*  
 mei-you.  
 NEG-PRF  
 'No.'  
 (i) B's answer  $\approx$  None/Nearly none of the kids laughed. ( $\neg$ E)

<sup>5</sup> Note that for these authors, the term maximality is used differently than in this work. For these maximality-based accounts of *dou*, the maximal interpretation stems from definiteness; the presence/absence of *dou* manifests the definite vs. indefinite split in Mandarin. In this sense, *dou* is treated on a par with the definite determiner.

<sup>6</sup> Here I use questions with negative answer as diagnostics to avoid undesired complications introduced by two different forms of Mandarin negation *mei* vs. *bu*. They have been argued to take scope over and below aspect, respectively (see Xiang 2014b). Since the origin of the quasi-UQ force provided by Mandarin plurals is to be determined, the possibility that the strong reading "none of the kid laughed" could be derived from a lower scope negation should be entirely ruled out. This is due to the observation that homogeneity is not conditioned by scopal relations (Kriz et al. 2015). For example, the sentence below in (i) contains a bound variable which prevents the definite plural from taking wide scope, the only possible reading is still the "not any" reading.

- (i) No boy found his presents.  
**The only reading:** No boy found any of his presents.

One might wonder whether homogeneity is found in the domains of questions. Kriz et al. (2015) did note a parallel between the behavior of expressions containing definite plurals and embedded questions. One possible explanation is provided by Blok & Chark (2021): they showed the semi-lattice homomorphism between the question domain Q (with distributive predicates) and the domain of plural individuals.



- (ii) B's answer  $\neq$  Not all of the kids laughed. ( $\neg\forall$ )

As discussed in the previous section, evidence shows that *dou*, not *mei*, blocks non-maximality. This is also illustrated by (20). Notably, homogeneity also disappears when *dou* is inserted. In negative contexts, the quasi-universal interpretation of the bare plural *haizi-men* 'kids' in (21) is revived by the occurrence of *dou*.

- (20) haizi-men *dou* xiao-le.  
 kid-PL DOU laugh-PRF  
 'The kids all laughed.'  
 $\rightsquigarrow$  The kids all laughed with no exception.

- (21) a. *A asks B:*  
 haizi-men *dou* xiao-le ma?  
 kid-PL DOU laugh-PRF SFP  
 'Did kids all laugh?'  
 b. *B replies:*  
 mei-you.  
 NEG-PRF  
 'No.'  
 (i) B's answer  $\rightsquigarrow$  Not all of the kids laughed. ( $\neg\forall$ )  
 (ii) B's answer  $\rightsquigarrow$  None of the kids laughed. ( $\neg\exists$ )

Now returning to *mei*-sentences: if *mei* only ensures *coverage* but exerts no maximality, then homogeneity should also survive with the presence of *mei*. This is indeed the case in Mandarin, illustrated below in (22):

- (22) a. *A asks B:*  
**mei-liang-ge** haizi hua-le yi-fu-hua ma?  
 MEI-TWO-CLF kid draw-PRF one-CLF-picture SFP  
 'Is it the case that groups of 2 kids each draw 1 picture?'  
 b. *B replies:*  
 bu-shi.  
 NEG-FOC  
 'No. (In fact, groups of 2 kids each drew 2 pictures.)'  
 (i) B's answer  $\rightsquigarrow$  No groups of 2 kids drew 1 picture. ( $\neg\exists$ )  
 (ii) B's answer  $\rightsquigarrow$  Not all groups of 2 kids drew 1 picture. ( $\neg\forall$ )

But when *dou* is inserted in *mei*-sentences as in (23), from a negative answer we can only infer that not all groups of 2 kids drew 1 picture; homogeneity is removed.

- (23) a. *A asks B:*  
**mei-liang-ge** haizi **dou** hua yi-fu-hua ma?  
 MEI-TWO-CLF kid DOU draw one-CLF-picture SFP  
 'Is it the case that every conceivable pair of kids drew 1 picture?'

b. B replies:

bu-shi.

NEG-FOC

‘No. (Ann and Bea left early to have ice cream.)’

(i) B’s answer  $\rightsquigarrow$  Not all groups of 2 kids drew 1 picture.  $(\neg\forall)$

(ii) B’s answer  $\rightsquigarrow$  No groups of 2 kids drew 1 picture.  $(\neg\exists)$

The diagnostic above points us to a novel way to think about *dou*: it plays an indispensable role in homogeneity removal due to its power to enforce maximality by introducing the UQ force. The fact that *dou*, not *mei*, removes homogeneity provides cross-linguistic support for the following view: whatever removes homogeneity is not to be hard-wired into the semantics of UQs; instead, homogeneity arises/disappears under the working of how different types of DP subjects can license different types of pluralization operators (Bar-Lev 2021). In the next section, I will spell out my analysis of *dou* as a universal pluralization operator in detail.

#### 4. Obligatory *dou* as overt pluralization operator

##### 4.1. Basic assumptions: homogeneity and the basic weak semantics of PDs

My proposal has the following ingredients. First, following Križ (2015), I assume the PDs like *the kids* have the standard denotation  $\oplus(\{x|\mathbf{kid}(x)\})$ . Their existential interpretation comes from an existential pluralization operator  $\exists$ -PL at the LF (Bar-Lev 2021). This deviates from the classical approaches where pluralization is realized by the DIST operator (e.g. Link 1987, 1996). The reason why I adopt Bar-Lev (2021)’s approach<sup>7</sup> is as follows: the insertion of a universal DIST operator will lead to serious problems when PDs in negative contexts — the UQ force introduced by DIST operator is unable to be manipulated; the attested “not all” reading would arise. The interpretation of *mei*-sentences constitutes another counterargument: as observed in (14), despite only having a distributive reading, *mei* + 2 CLF *kid* is in fact interpreted existentially, denoting a possible cover of kids. To some extent, Bar-Lev (2021)’s proposal is parallel to Schwarzschild (1993)’s idea that to combine with plural DPs, their sisters must also be pluralized. So a simple sentence like *The kids smiled* has the LF in (24a). With the lexical entry defined in (24b), the sentence has the weak reading that at least one of the kids smiled.

- (24) a. [The kids] [ $\exists$ -PL smiled]<sup>8</sup>  
 b.  $\llbracket \exists\text{-PL} \rrbracket = \lambda P_{et}.\lambda x_e.\exists y \sqsubseteq x [P(y) = 1]$

This yields the desired “ $\neg\exists$ ” reading of sentences containing PDs in negative contexts. As for the positive cases, Bar-Lev (2021) appeals to an implicature account where the basic existential meaning is strengthened to a universal one.<sup>9</sup>

- (25) LF with exhaustification:  
 $[\text{EXH} [\text{[The kids] } [\exists\text{-PL smiled}]]]$

<sup>7</sup> See more evidence for the presence of Bar-Lev (2021)’s  $\exists$ -PL from Dynamic Semantics discussed in Chierchia (2022).

<sup>8</sup> I left out the domain variable restricting the quantifier domain and the world variable for the sake of simplicity.

<sup>9</sup> I will not elaborate on the details of how the system of implicature calculation works since it is beyond the scope of this paper. See details in Bar-Lev & Fox (2017) and Bar-Lev (2021).

The second ingredient of my proposal concerns how homogeneity is removed. By adopting the idea that PDs have the basic weak meaning, the job of homogeneity removers like *all*, *every* or *dou*, intuitively speaking, is to switch the existential meaning of plural DPs into a universal one. One potential way, which is briefly sketched in Bar-Lev (2021), is to treat homogeneity removers on a par with overt exhaustifiers. Such an approach is not very appealing to account for *mei*-sentences with *dou*. As shown by (17), repeated below in (26), *dou* is semantically trivial as (26a) and (26b) are truth-conditionally equivalent. In such cases, *dou* gives rise to vacuous exhaustifications, which would lead to violation of the non-vacuity condition (Xiang 2014a, 2020, Fox & Spector 2018).

- (26) a. mei-ge haizi hua-le yi-fu-hua.  
 MEI-CLF kid draw-PRF one-CLF-picture  
 ‘Every kid drew one picture.’  
 b. mei-ge haizi (dou) hua-le yi-fu-hua.  
 MEI-CLF kid DOU draw-PRF one-CLF-picture  
 ‘Every kid drew one picture.’

I therefore entertain a different approach brought up in Bar-Lev (2021), which at the time suffers from the problem of being purely stipulative. This analysis hinges on the idea that different types of plural DPs can license different types of pluralization operators; the licensing pattern is subject to cross-linguistic variation. Based on the behaviors of English plural DPs, Bar-Lev (2021) assumes that English non-quantificational DPs like *the kids* require a  $\exists$ -PL while DPs with UQ force require the universal counterpart  $\forall$ -PL to be present at LF.

- (27) a. [The kids] [ $\exists$ -PL smiled]  
 b. [All the kids] [ $\forall$ -PL smiled]

Building on this idea, I propose that Mandarin offers empirical support for such an assumption. *dou*, as an overt instantiation of the universal pluralization operator  $\forall$ -PL, defined in (28), is required to head the sisters of Mandarin plural DPs that exert maximality, like *suoyou* DPs; other plural DPs, including *mei* DPs, without *dou* occurring overtly, a covert  $\exists$ -PL is present by default. The licit and illicit LFs are illustrated below:

- (28)  $\llbracket \text{DOU} \rrbracket = \lambda P_{et} . \lambda x_e . \forall y \in x [P(y) = 1]$   
 (29) a. ✓[kids] [DOU smiled]  
 b. ✓[kids] [ $\exists$ -PL smiled]  
 c. ✓[suoyou kids] [DOU smiled]  
 d. ✗[suoyou kids] [ $\exists$ -PL smiled]  
 e. ✓[mei 2 kid] [DOU smiled]  
 f. ✓[mei 2 kid] [ $\exists$ -PL smiled]

#### 4.2. Explaining the *mei-dou* puzzles

With the above ingredients, *mei-dou* puzzles (at least part of them) can be explained. I assume that *mei* creates an ensemble of all minimal covers, defined in (30) and (31), of the domain provided by the NumP. I also assume plural individuals are *e*-type entities just like singular

individuals (Link 1983), so  $\llbracket 2_{\text{CLF}} \text{ kid} \rrbracket$  denotes a property.

(30) **Minimal Cover** :  $X$  minimally covers  $Y \stackrel{\text{def}}{=}$

a.  $X$  is a subset of  $Y$ .

$$X \subseteq Y$$

b. The sum of the  $X$ 's blocks (members) is equal to the sum of  $Y$ 's blocks.

$$\bigoplus X = \bigoplus Y$$

c.  $X$  does not contain the empty set  $\emptyset$ .

d.  $X$ 's blocks do not overlap.

$$\forall Z, Z' \in X \wedge Z \neq Z': Z \cap Z' = \emptyset$$

(31)  $\llbracket \text{mei} [ 2_{\text{CLF}} \text{ child} ] \rrbracket = \lambda C_{\text{et}}. C$  minimally covers  $\llbracket 2_{\text{CLF}} \text{ child} \rrbracket$   
defined only if such  $C$  exists

In the “picture drawing” scenario discussed above in (14) where there are 4 kids  $a, b, c$  and  $d$ , the desired meaning of both sentences with/without *mei* can be derived with the LF in (33a) and (34a) respectively.

(32) a.  $\llbracket 2_{\text{CLF}} \text{ kid} \rrbracket = \lambda X_e. \forall x \in X : \mathbf{kid}(x) \wedge |X| = 2 = \{a \oplus b, c \oplus d, a \oplus c, b \oplus d, a \oplus d, c \oplus b\}$

b.  $\llbracket \text{mei} [ 2_{\text{CLF}} \text{ kid} ] \rrbracket = \{\{a \oplus b, c \oplus d\}, \{a \oplus c, b \oplus d\}, \{a \oplus d, c \oplus b\}\}$

(33) a.  $\llbracket \text{mei} 2_{\text{CLF}} \text{ kid} \rrbracket [\exists\text{-PL drew } 1_{\text{CLF}} \text{ picture}]$

b. (33a) is true iff  $\{a \oplus b, c \oplus d\} \vee \{a \oplus c, b \oplus d\} \vee \{a \oplus d, c \oplus b\}$  drew 1 picture.

(34) a.  $\llbracket \text{mei} 2_{\text{CLF}} \text{ kid} \rrbracket [\text{DOU drew } 1_{\text{CLF}} \text{ picture}]$

b. (34a) is true iff  $\{a \oplus b, c \oplus d\} \wedge \{a \oplus c, b \oplus d\} \wedge \{a \oplus d, c \oplus b\}$  drew 1 picture.

For the cases involving  $[\text{mei}+1_{\text{CLF}} \text{ N}]$  where *dou*'s semantic contribution is trivial, our current grammatical view correctly predicts that *dou*'s presence is obligatory when the QUD is about the universal statement by blocking the otherwise present  $\exists\text{-PL}$ ; as a result, homogeneity is removed since UQ force supplied by *dou* stays intact under negation, giving rise to the desired “not all” reading. This aligns with native speakers' general intuitions that expressing the “not all” meaning without *dou* is almost impossible in Mandarin.<sup>10</sup>

### 5. Conclusion and remaining issues

The presence/absence of *dou* poses a special problem for the nature of UQ force in Mandarin. Evidence that shows *dou*, not *mei*, is responsible for removing homogeneity and non-maximality helps us to further pinpoint the origin the UQ force in Mandarin: the supplier of the UQ force that can remove both homogeneity and non-maximality seems to reside in the process of pluralization.

Further work is still needed for a few remaining issues. First, the subject/object asymmetry remains unexplained: how come only *mei*-subjects, but not *mei*-objects, require the presence of *dou*? Another issue left behind in this work is why NumPs in the object position can license

<sup>10</sup> Another way to express “not all” in Mandarin requires the help of *quan*, a morpheme that resembles *dou* in many ways. A discussion of their nuanced differences will be left for another occasion.

optional *dou* in *mei*-sentences. One potential way to approach these two issues is to assume the interpretation of *mei* DPs varies depending on their syntactic positions, which has been entertained in the literature on how pluralization is carried out (Haslinger & Schmitt 2018, Schmitt 2019, Chatain 2022). It remains to be seen how this idea can be implemented to have proper explanatory value.

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### Abbreviations

UQ	universal quantifier	CLF	classifier
PD	plural definite description	MP	maximize presupposition
PRF	perfect	DIST	distributivity operator
NUM	numeral	EXH	exhaustifier
QUD	question under discussion		

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# On reconstruction in German ATB-movement and the optimization of experimental designs

Timea Szarvas

This paper reports on an experimental study of principle C reconstruction in German ATB-movement. The results indicate that the previously reported asymmetry between the two conjuncts is due to distance between the referent and the pronoun. The findings suggest that principle C reconstruction is not suitable to probe into underlying syntactic structures, while prompting a discussion about experimental designs for coreference tasks. I hypothesize that binding phenomena in ATB-dependencies show different patterns due to their own nature, not some inherent trait of ATB-movement.

## *1. Introduction*

In across-the-board (ATB) constructions, a single filler ('what') is related to multiple gaps in a coordinate structure ('does John like and Mary hate').

(1) [What] does John like \_\_\_\_ and Mary hate \_\_\_\_?

Approaches differ with respect to how each of the gaps is created. While they make clear predictions about (a-)symmetries between the conjuncts, the evidence is delicate and mostly based on individual judgments. Syncretism has been argued to ameliorate case mismatches (Dyła 1984; Franks 1995; Citko 2005; te Velde 2005), yet experimental evidence is argued to support this only for Polish (Rothert 2022), not for German (Hartmann et al. 2016). In English, variable binding, idioms and strong crossover are reported to behave symmetrically, but principle A and C as well as weak crossover induce violations only in the initial gap (Citko 2005; Salzmann 2012). Experimental evidence for English has challenged the claim that reconstruction for principle C is asymmetric (Bruening & Al Khalaf 2017), stressing the need to test the predictions of existing theories systematically to better understand and evaluate the evidence. In this paper, the focus is on principle C reconstruction in German ATB-dependencies. I will show that principle C reconstruction in German ATB-movement appears to display a weak asymmetry as reported

for English, arguing that this is not due to the syntactic structure of ATB-movement, but the lack of robustness found in principle C reconstruction generally. I will conclude that principle C reconstruction is not a reliable test for the underlying structure of ATB-movement and that the differences between binding phenomena in ATB-movement arise from their own nature, rather than some eclectic properties of ATB-movement (as proposed for right node raising by Barros & Vicente 2011). The paper is structured as follows: section 2 provides some theoretical background on principle C reconstruction and ATB-movement. Section 3 presents the current experiment. Section 4 discusses previous reports on the properties of ATB-movement and how these should be viewed in light of the current experimental findings, as well as discussing the direction of future research on this matter. Section 5 concludes.

## 2. Background

### 2.1. Binding principle C reconstruction

Binding principle C states that a referring expression (R-expression) must be free (Chomsky 1981). For an R-expression to be bound, it needs to be c-commanded by the binder. Principle C rules out this binding relation resulting in disjoint reference between the R-expression and the c-commanding pronoun in (2).

- (2) \*He<sub>i</sub> says that Poirot<sub>i</sub> is leaving. (Haegeman 1994:226)

Coreference and binding are often treated as separate phenomena based on the observation that coreference does not require c-command, but binding does (Reinhart 1983a,b). Coreference can be specified in a discourse model and is available to R-expressions in addition to binding. This observation goes back to strict and sloppy readings in ellipsis, where sloppy readings arise due to binding and strict readings due to coreference (Sag 1976; Reinhart 1983b; Heim & Kratzer 1998). Nevertheless, some approaches maintain that coreference should too be regulated by the binding principles (Heim 2007; Bruening 2021).

- (3) Gina called her mother. The teacher did, too.  
 a. *sloppy reading*: ‘The teacher called the teacher’s mother.’  
 b. *strict reading*: ‘The teacher called Gina’s mother.’

Coreference and binding possibilities in  $\bar{A}$ -movement dependencies, such as wh-movement or topicalization, are sensitive to reconstruction. The displaced syntactic element is interpreted in a position it has occupied in an earlier cycle of the derivation, either an intermediate landing site or its base position. It is maintained that constituents reconstruct to their base positions for the evaluation of binding principle C, meaning that the constituents must obey the condition in their base positions, but can violate it in intermediate ones (Nissenbaum 2000; Sportiche 2017).

- (4) a. \*I wonder [whose picture of a successful athlete<sub>i</sub>] he<sub>i</sub> reminded Bill that you saw \_\_\_\_\_.  
 b. I wonder [whose comments about him<sub>i</sub>] no one<sub>i</sub> reported \_\_\_\_\_.  
 (Sportiche 2017:16)

The observation that the pronoun cannot be bound by in (4-a) but can be bound in (4-b) indicates



that the *wh*-extracted object reconstructs to the internal argument position of the verb. While it is clear that the head noun reconstructs in such dependencies, it is highly debated how its complements behave. While the general consensus is that adjuncts do not reconstruct, researchers are divided with respect to whether arguments do, as reported in (5).

- (5) a. \*Which investigation of Nixon<sub>i</sub> did he<sub>i</sub> resent \_\_\_\_?  
 b. Which investigation near Nixon<sub>i</sub>'s house did he<sub>i</sub> resent \_\_\_\_?

(Safir 1999:589)

The claim is as follows: in (5-a), the PP *of Nixon* reconstructs to the base position alongside the noun and yields a principle C violation, disallowing coreference with the pronoun and making the reading intended in (5-a) unacceptable. In (5-b), the PP *near Nixon's house* does not reconstruct to the base position, therefore no violation obtains and coreference between *Nixon* and the pronoun is possible. Under this view, there is a syntactic distinction between arguments and adjuncts of nouns (van Riemsdijk & Williams 1981; Freidin 1986; Barss 1988; Lebeaux 1988; Chomsky 1995; Sauerland 1998; Takahashi & Hulsey 2009). Other researchers have argued that (5-a) is acceptable as well, proposing that neither arguments nor adjuncts of the head noun reconstruct (Bianchi 1995; Lasnik 1998; Safir 1999; Kuno 2004; Henderson 2007). Both positions need to explain why (in some or all cases) only part of the complex NP is interpreted in the base position. The most prominent proposal explaining this phenomenon is adjunct or Wholesale Late Merger, where the complement is merged countercyclically (Lebeaux 1988, 1991; Takahashi & Hulsey 2009). More recently, it has been proposed that a syntactic mechanism achieving the observed results should be available by default, making it possible to interpretively ignore up to all occurrences of an interpretable syntactic object but one (Sportiche 2016, 2019). The question then remains whether this operation is exclusively available for adjuncts or all complements of a noun.

Experimental work on English led to mixed conclusions about the argument-adjunct asymmetry. Adger et al. (2017); Bruening & Al Khalaf (2019) conclude that neither arguments nor adjuncts reconstruct, while Stockwell et al. (2021, 2022) argue that principle C reconstruction is stable. All authors found that increasing the length of the dependency boosted coreference. It is to be noted that the conflicting claims may result from distinct designs, item complexity and item structure, but also from how individual researchers interpret the results. Because coreference and disjoint reference do not usually manifest in clear floor or ceiling effects, researchers often have to work with arbitrary thresholds when determining whether an effect is strong enough, especially when comparing surface principle C violations to underlying ones. The experimental study on German principle C reconstruction by Salzmann et al. (2023) attempted to tackle some of the non-syntactic and design-related issues. In the experiments reported therein, each item was accompanied by two forced choice tasks inquiring about the co-reference possibility with the R-expression in the displaced NP (called embedded referent in the following) or the R-expression in the matrix clause (called the matrix referent), respectively. Participants were explicitly asked about the possibility of coreference and were instructed to consider each reading carefully.

- (6) Lisa erzählt, welche Geschichte über Hannah sie \_\_\_\_ ärgerlich  
 Lisa.NOM tell-3SG which story.ACC about Hannah.ACC she.NOM upsetting



gap.<sup>1</sup>

(8) [What] does John like \_\_\_\_ and Mary hate \_\_\_\_?

*What* serves as the direct object of one verb in each conjunct, a relation that cannot be created by a simple implementation of *wh*-movement. One strand of approaches to ATB-movement maintains that there is an instance of the filler moving from each gap, having to explain why only one filler is pronounced. Qualifying explanations are that the additional instance of the filler is deleted at Phonological Form (Wilder 1994; Biskup 2018), that the two instances fuse together over the course of the derivation (Ross 1967; Williams 1978; Hein & Murphy 2020), or that the structure is multidominant, meaning that there is only one instance of the filler, but it is dominated by multiple nodes at the same time, occupying multiple distinct positions at once (Williams 1978; Citko 2005; Bachrach & Katzir 2009). These approaches will be called symmetric in the following because they assume that sub-extraction targets all existing conjuncts symmetrically.

The second strand of approaches argues that there is only one instance of the filler in the derivation that is extracted from either one of the conjuncts, having to explain why there are multiple gaps. Proposals include empty operator movement (Munn 1992, 1993, 2001; Franks 1995; Bošković & Franks 2000) or *pro* (Zhang 2010) in the non-initial conjunct, while ellipsis has been proposed to target either the non-initial (Salzmann 2012) or the initial conjunct (Ha 2008). These approaches will be called asymmetric, for they postulate that material is extracted asymmetrically from only one of the conjuncts.

There is a third type of approach that is neither symmetric nor asymmetric, strictly speaking. A special type of movement is proposed where the two conjuncts are built in two independent work spaces, and the extracted constituent is only base-generated in the non-initial one, moving to the matrix CP through the initial conjunct (Nunes 2001). In a sense, this kind of sideward movement in ATB-constructions treats the initial gap site as an intermediate landing position. Notice that sideward movement gives up the assumption that the landing site needs to c-command the launch site of movement.

All of the approaches make straightforward predictions, and particularly clear ones for reconstruction, which should directly reveal the positions that were occupied by the extracted constituent over the course of the derivation. The puzzling observation is, however, that different types of interpretive tests are reported to yield different reconstruction patterns in ATB-movement. All following examples are taken from Citko (2005), but see also Salzmann (2012). Principle C violations are reported if the pronoun c-commands the initial gap, but not if it c-commands the non-initial gap, taken to indicate that material is only extracted from the initial conjunct. Under symmetric reconstruction to both gaps, the reading in (9-b) where *John* and *he* refer to the same individual would also be ruled out.

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

<sup>1</sup> ATB-dependencies can in principle involve infinitely many conjuncts. For the sake of conciseness, this paper only includes descriptions and examples of constructions with two conjuncts, but all concepts equally apply to dependencies with more conjuncts. In asymmetric approaches, no matter how complex the coordination, there is only one conjunct targeted by proper  $\bar{A}$ -movement.

(Citko 2005:494)

Note that the validity of the principle C test rests on the assumption that PP arguments of nouns fully reconstruct. Strong crossover effects as in (10) obtain regardless of which conjunct the pronoun is in, meaning that the extracted material seems to cross over the pronoun in both cases.

- (10) a. \*Whose<sub>i</sub> mother did we talk to and he<sub>i</sub> never visit?  
 b. \*Whose<sub>i</sub> mother did he<sub>i</sub> never visit and we talk to?

Variable binding likewise behaves symmetrically. The pronoun *his* in (11-a) is bound by *every Italian* in the first conjunct and *every Frenchman* in the second, yielding a strict reading. Ungrammaticality arises if there is no suitable binder in one of the conjuncts, as in (11-b) and (11-c), meaning that the extracted material must reconstruct into both conjuncts.

- (11) a. Which picture of his mother did every Italian like and every Frenchman dislike?  
 b. \*Which picture of his mother did every Italian like and Mary dislike?  
 c. \*Which picture of his mother did Mary dislike and every Italian like?

Idiom interpretation (12) and scope reconstruction (13) is also possible in both of the conjuncts.

- (12) a. Which picture did John take and Bill pose for?  
 b. Which picture did John pose for and Bill take?
- (13) a. How many books did every student like and every professor dislike?  
 b. Seven books. (*how many* > & > *every*)  
 c. Student A liked seven books and Prof. B disliked two books; Student C liked nine books and Prof. D disliked four books. (& > *every* > *how many*)  
 d. Every student liked seven books and every professor disliked three books. (& > *how many* > *every*)

The different effects found with different types of binding in ATB-movement are puzzling, but note that experimental evidence for English has been argued to indicate symmetrical reconstruction for principle C after all (Bruening & Al Khalaf 2017). There is reason to assume that the introspective data reports may not be systematic enough to pinpoint the source of the observed patterns. The aim is to broaden the empirical coverage not only by providing more experimental data, but also data from different languages to assess potential cross-linguistic variability.

### 3. Experimental investigation

#### 3.1. Method

To test if and how ATB-movement reconstructs for principle C in German, a coreference judgment experiment was designed. In each trial participants saw a sentence with three referents and a pronoun. The pronoun matched the features of the matrix and the embedded referent, yielding a principle C violation under reconstruction. Participants were given two forced choice tasks per item, asking about the possibility of coreference with either of the matching referents. Participants saw each item in only one out of the four conditions. Metalinguistic terms were

avoided by repeating the sentence with the intended reading (Salzmann et al. 2023). The task was untimed. Participants were instructed to read the sentences carefully, but to make decisions based on their first impression.

### 3.2. Participants

A total of 300 participants with mean age 31.2 (sd = 9.92) were recruited over Prolific. Participants were native speakers of German located in Germany with a monolingual upbringing and no language related disorders. The data from 33 participants were excluded from the analysis based on failed attention checks. All participants who successfully completed the study received monetary compensation, regardless of whether their data were used in the analysis or not.

### 3.3. Materials

The experiment only tested displaced nouns with PP arguments based on reports about a weak adjunct-argument asymmetry in German (Salzmann et al. 2023). Sentences involved a referent in the matrix clause ('I asked Julian...'), a displaced wh-phrase with a PP argument containing another referent ('... which idea of Arthur's...'), followed by the coordinate structure with two conjuncts, one of them containing a pronoun matching both referents ('... he explained...'), and the other a mismatched referent ('... and Iris misunderstood.'). The experiment manipulated two factors with two levels each: PHRASE, denoting the grammatical function of the displaced constituent with levels 'object' and 'subject', and POSITION denoting which conjunct the matching pronoun is in with levels 'initial' vs. 'non-initial'. The factors were fully crossed, yielding a 2x2 design, i.e. four conditions in total. Participants saw 12 target items, each appearing in only one of the four conditions, and 48 distractors. An example of a target item is given in (14).

- (14) Ich habe Julian gefragt, [welche Idee von Arthur]...  
 I have-1SG Julian.ACC ask.PST which.NOM/ACC idea of Arthur.DAT  
 'I asked Julian which idea of Arthur's...'
- a. *object, initial*  
 er \_\_\_\_\_ erläutert und Iris \_\_\_\_\_ missverstanden hat.  
 he.NOM explain.PST and Iris.NOM misunderstand.PST have-3SG  
 ...he explained and Iris misunderstood.'
- b. *object, non-initial*  
 Iris \_\_\_\_\_ missverstanden und er \_\_\_\_\_ erläutert hat.  
 Iris.NOM misunderstand.PST and he.NOM explain.PST have-3SG  
 ...Iris misunderstood and he explained.'
- c. *subject, initial*  
 \_\_\_\_\_ ihn angespornt und \_\_\_\_\_ Iris geschockt hat.  
 he.ACC motivate.PST and Iris.ACC shock.PST have-3SG  
 ...motivated him and shocked Iris.'
- d. *subject, non-initial*

\_\_\_ Iris geschockt und \_\_\_ ihn angespornt hat.  
 Iris.ACC shock.PST and he.ACC motivate.PST have-3SG  
 ... shocked Iris and motivated him.'

The logic of the design is as follows: reconstruction of the extracted constituent to the gap c-commanded by the pronoun should rule out coreference between the pronoun and the referent in the reconstructing phrase, i.e. *Arthur* in the examples above. The research question at hand is whether this effect occurs in both conjuncts, as predicted by symmetric extraction approaches, or only one of them, as predicted by asymmetric approaches. Each sentence was accompanied by a neutral context introducing the referents to avoid making either of them more prominent than the other. Making the referent in the matrix clause the direct object of *fragen* 'to ask' was a conscious choice to avoid prominence effects associated with subjects and topics (Cowles et al. 2007; Kaiser 2011), trying to minimize the factors distracting from the embedded referent.

### 3.4. Procedure

The experiment was set up through the platform L-Rex (Starschenko & Wierzba 2024). The sentences were displayed simultaneously with the context, the latter in italics. The two questions were shown below the sentence with the answer options 'yes', indicating coreference, and 'no', indicating disjoint reference. The first block included two training items in non-randomized order, showing sentences with two referents matching the pronoun, in one case allowing for coreference with both and in one case allowing for coreference with only one of them. The second block contained target items and fillers in pseudo-randomized order, such that two items from the same set of materials were never shown consecutively. The order in which the questions were presented was randomized. (15) illustrates how each trial was set up.

(15) Context:

*Julian, Arthur und Iris arbeiten gemeinsam an einer Seminararbeit in Philosophie, wobei viele Unklarheiten entstehen.*

'Julian, Arthur and Iris are doing coursework for their philosophy class together, during which a lot of confusion arises.'

Target:

Ich habe Julian gefragt, welche Idee von Arthur er erläutert und Iris missverstanden hat.

'I asked Julian which idea of Arthur's he explained and Iris misunderstood.'

Questions:

*Kann der Satz so verstanden werden, dass Julian eine Idee erläutert hat?*  ja  nein

'Can the sentence be understood such that Julian explained an idea?'  yes  no

*Kann der Satz so verstanden werden, dass Arthur eine Idee erläutert hat?*  ja  nein

'Can the sentence be understood such that Arthur explained an idea?'  yes  no

### 3.5. Predictions

In the following, the term ‘coreference rate’ indicates the proportion of yes-responses to the forced choice task asking about coreference with the embedded referent. For object conditions, there are three distinct reconstruction patterns predicted by the theories of ATB-movement. A symmetric approach where the displaced element is base-generated in and extracted from both conjuncts predicts no difference between the gaps, as shown in Figure 1 below.<sup>2</sup> The constituent should reconstruct symmetrically and a violation should obtain symmetrically as well. Again, disjoint reference was not expected to manifest in coreference rates close to 0% due to non-syntactic factors, but below chance level. No additional significant effects were expected since the position of the pronoun should be irrelevant.

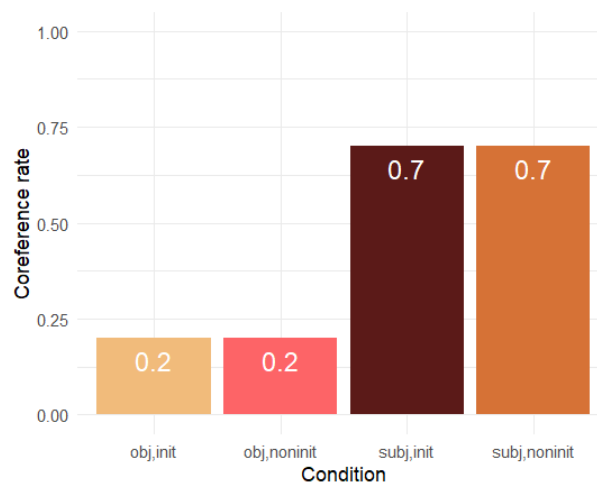


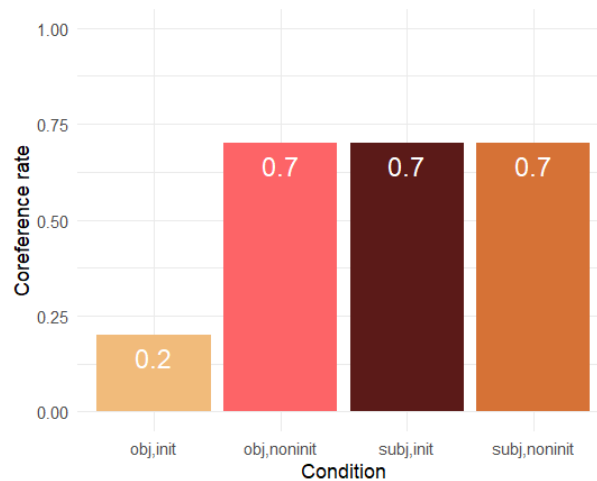
Figure 1. Predicted coreference rates if ATB-movement is symmetric, targeting all conjuncts.

In asymmetric approaches where the shared element only moves from the initial gap and is eliminated by some other operation in the non-initial gap, reconstruction should only target the initial gap, as shown in Figure 2. An empty operator or *pro* should circumvent a principle C violation and therefore, these approaches predict disjoint reference only in the condition ‘object, initial’. In an ellipsis approach, the aforementioned asymmetric reconstruction pattern is predicted due to vehicle change under ellipsis, avoiding a principle C violation (Fiengo & May 1994). Here, a significant interaction between PHRASE and POSITION is expected.

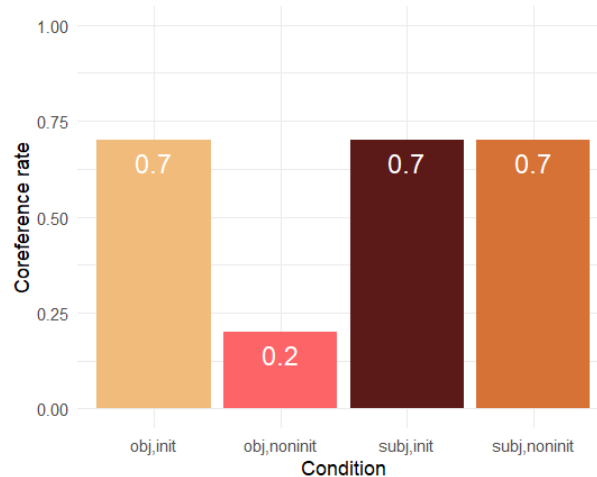
The asymmetric approach where ellipsis targets the initial gap as well as sideward movement predicts that reconstruction should only target the non-initial gap. As visualized in Figure 3, coreference should be allowed in the condition ‘object, initial’ but not in ‘object, non-initial’. Although the extracted element moves through the initial gap in sideward movement, based on the observation that principle C is only evaluated in base positions but not intermediate ones, the prediction is asymmetric (cf. Nissenbaum 2000; Sportiche 2017). Again, a significant interaction between PHRASE and POSITION is expected.

It is further to be noted that proximity effects may play a role. There are two conceivable ways in which they could impact coreference under reconstruction. First, the relative surface po-

<sup>2</sup> Figures 1,2 and 3 are dummy plots that do not depict previously observed or simulated data. The coreference rates are estimates based on the reports by Citko (2005); Salzmann (2012) and the experiment by Salzmann et al. (2023).



*Figure 2.* Predicted coreference rates if ATB-movement is asymmetric, targeting only the initial conjunct.



*Figure 3.* Predicted coreference rates in object conditions if ATB-movement is asymmetric, targeting only the non-initial conjunct.

sition of the referent and the pronoun could influence coreference, regardless of reconstruction. Authors diverge with respect to their hypotheses and findings. While for English, increasing linear and structural distance between the referent and the pronoun is argued to facilitate coreference equally (Adger et al. 2017; Bruening & Al Khalaf 2019), the opposite has been argued for based on recency effects (Salzmann et al. 2023). If it is recency that plays a role, decreasing the distance between the embedded referent and the pronoun should facilitate coreference. Second, it needs to be considered that in multi-gap-dependencies, the robustness of reconstruction could be affected by the distance between the filler and the gap. This could favor the initial gap due to proximity, which in turn would predict less coreference in the condition ‘object, initial’ than in the ‘object, non-initial’. If the relative surface position plays a role, there should be a significant main effect of position. The proportion of responses will help determine whether the effect of proximity is positive or negative.



Notice that subject conditions are predicted to be constant with respect to allowing coreference with the embedded referent in the vast majority of cases. This is due to the lack of a principle C violating c-command configuration both in the underlying as well as the surface structure – the pronoun never c-commands the wh-phrase and its PP modifier. The value in collecting responses for these conditions lies in their ability to identify whether the experiment is valid, i.e. whether responses are actually guided by underlying c-command relations. If so, there should be no difference between the two subject conditions, and they should both elicit high coreference rates.

### 3.6. Results

Data from  $n = 277$  participants was analysed.<sup>3</sup> Participants' attention and whether they understood the task was assessed through inspecting coreference rates with the matrix referent, i.e. one of the questions in target trials, as a sanity check. Failure to indicate coreference with the matrix referent in 25% of cases or more led to exclusion. This was taken to indicate that participants either responded based on preferences rather than possibilities, or that they did not complete the task responsibly. Figure 4 shows that in the overwhelming majority of cases and across conditions, the remaining participants correctly indicated that coreference between the pronoun and the matrix referent was widely possible, though not at ceiling.

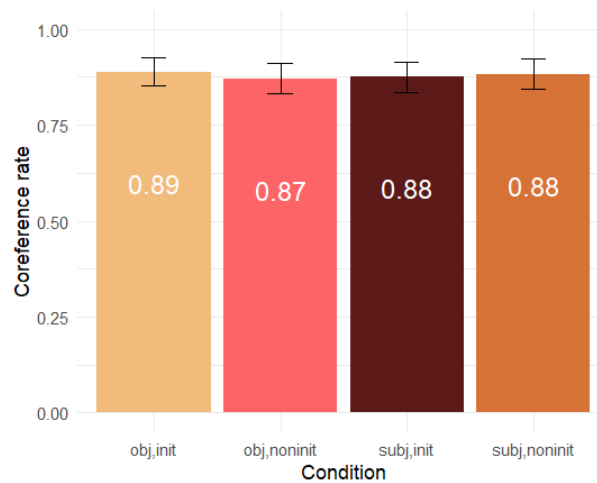


Figure 4. Observed coreference rates for the matrix referent across conditions. Error bars indicate standard error.

Concerning the research question about reconstruction in ATB-movement, coreference rates with the embedded referent are shown in Figure 5. In particular, the hypothesis that coreference should always be allowed in subject conditions is not borne out. Not only is the proportion below chance level in subject conditions, but crucially, coreference rates differ by 10% based on which conjunct the pronoun is in. Turning to object conditions, responses deviate from all possible predictions. Again, there is a clear difference between the condition testing reconstruction to the initial vs. the non-initial gap, but the contrasts are weaker than expected based on the

<sup>3</sup> The materials, analysis script and data can be viewed at <https://osf.io/hf27s/> under *Experiment 1*.

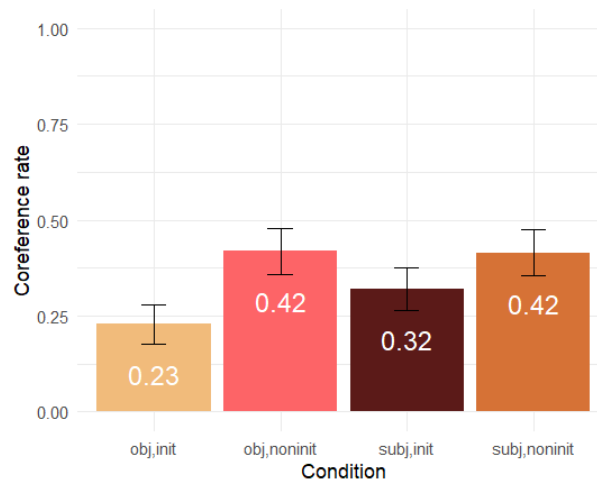


Figure 5. Observed coreference rates for the embedded referent across conditions. Error bars indicate standard error.

syntactic predictions. Participants found that coreference was possible more frequently when the pronoun was in the non-initial conjunct than in the initial one, but the proportions do not indicate a clear tendency towards coreference being ruled in or out by a syntactic constraint. The significant interaction between PHRASE and POSITION reveals that the contrast between subject and object extraction conditions only holds if the pronoun is in the initial conjunct. In the non-initial conjunct, this contrast vanishes completely.

The data was analyzed in R (R Core Team 2021) using a generalized linear mixed effects model through the function *glmer* with the family *binomial* (logit link) and the optimizer *bobyqa* (Bates et al. 2015). Modelling was carried out only for the task about the embedded referent due to the lack of theoretical value in hypothesizing about coreference with the matrix referent. A conservative  $\alpha$ -level of 0.05 was defined. The model included fixed effects for both factors, PHRASE and POSITION, the interaction of the two, and a random effects structure with varying intercepts and slopes for both participants and items.

$$(16) \quad \text{rating} \sim \text{phrase} * \text{pos} + (1 + \text{phrase} + \text{pos} \mid \text{item}) + (1 + \text{phrase} + \text{pos} \mid \text{participant})$$

The model estimates are reported in Table 1. Because the model had problems estimating random slopes and intercepts by item due to insufficient data, two more models were fitted. One of them attempted to address the issue by dropping the correlation between the random intercepts and slopes by item, the other one omitted the random effects structure by item altogether. Nevertheless, a likelihood ratio test revealed that the model reported in (16) has the lowest AIC out of the three and a significant p-value. The reported estimates are on the log-scale and factors are treatment contrast coded (levels ‘initial’ and ‘subj’ treated as the base, coded 0).

The model estimates a statistically significant main effect of PHRASE, i.e. subject vs. object extraction. It likewise estimates that the interaction between the factors PHRASE and POSITION is significant, and so is the main effect of POSITION. These significance estimates match the predictions of an asymmetric derivation of ATB-movement, however, the main effect of POSITION indicates that the surface configuration also plays a role.

GLMM	Estimate (SE)
(Intercept)	1.00*** (0.15)
phrase	0.73*** (0.19)
pos	-0.65*** (0.17)
phrase:pos	-0.77*** (0.19)
AIC	3157.94
Num. obs.	3048
Num. groups: participant	254
Num. groups: item	12
Var: participant (Intercept)	3.57
Var: participant phrase	0.06
Var: participant pos	1.05
Var: item (Intercept)	0.00
Var: item phrase	0.21
Var: item pos	0.06

\*\*\* $p < 0.001$ ; \*\* $p < 0.01$ ; \* $p < 0.05$

Table 1. Estimates of the generalized linear mixed effects model given in (16).

### 3.7. Discussion

The asymmetry in coreference rates between the initial and the non-initial conjunct across the factor levels of PHRASE likely results from relative surface order. There appears to be a proximity effect, though unclear if due to linear or structural proximity. It seems, in line with findings by Adger et al. (2017), that increasing the distance between the referent and the pronoun boosts coreference. The pattern is thus not a recency effect whereby the most recently mentioned referent relative to the pronoun is favored, since this wrongly predicts that coreference rates should increase in ‘initial’ conditions. Rather, we observe that increasing the distance has a positive effect, potentially because it allows the referent to *decay* in memory before a pronoun refers back to it. The interference of a mismatched referent in non-initial conditions may also make coreference more felicitous. Thus, the asymmetrical pattern reported for principle C reconstruction in ATB-movement could merely be a positive effect of distance rather than an indicator of the presence or absence of the displaced constituent in the underlying representation.

## 4. General discussion

The experimental findings indicate that the principle C reconstruction test in ATB-movement is inconclusive. The reason for this is, on the one hand, the weakness of the contrast between responses in the conditions ‘object, initial’ and ‘subject, initial’, and on the other hand, the presence of a contrast between the conditions ‘subject, initial’ and ‘subject, non-initial’. The data suggest that the observed effect, though showing the same tendency as reported in the literature for English, is not due to asymmetric reconstruction to the initial gap and a corresponding syntactic derivation where extraction only targets the initial conjunct. Rather, it is the distance between the pronoun and the embedded referent that appears to cause this asymmetry based

on the presence of the effect in subject conditions where the offending c-command configuration is never obtained. The current findings are in line with the conclusions by Bruening & Al Khalaf (2017) from an experiment on reconstruction in English ATB-movement. The authors compared principle C effects in ATB-movement and Right Node Raising (RNR). The design compared surface violations of principle C in RNR to underlying ones under reconstruction in ATB, assuming that RNR does not *bleed* principle C (Levine 1985). Coreference rates in the RNR conditions were found to be around 5% and thus 20-25% lower than in ATB conditions. The authors conclude that the reported asymmetry is not real. For English, the contrast between the initial and non-initial gap is reported to be lower than found for German in the current experiment, suggesting that there may be cross-linguistic variability. Note, however, that comparing surface vs. reconstructed violations of principle C can be inconclusive due to the inherent instability of reconstruction, as addressed by the authors in more recent work (Bruening & Al Khalaf 2019).

Whether the proximity effects are due to linear or structural distance cannot be answered based on the ATB data – the linear order of the conjuncts always corresponds to their hierarchical order. However, the same paradigm could be adapted to parasitic gaps in German to tease apart the difference. Parasitic gaps are sharing constructions in which the licensing gap is in the matrix clause and the parasitic gap is in an adjunct clause, among other options. While the adjunct clause is more deeply embedded, it can be linearized in two different ways in German, allowing for the free manipulation of the surface order.

- (17) a. Welches Gerücht über Arthur hat Iris \_\_\_\_\_  
 which rumour.NOM/ACC about Arthur.ACC have-3SG Iris.NOM  
 geglaubt ohne ihm *pg* zu erzählen?  
 believe.PST without he.DAT to tell.INF  
 ‘Which rumour about Arthur did Iris believe without telling him?’
- b. Welches Gerücht über Arthur hat Iris, ohne  
 which rumour.NOM/ACC about Arthur.ACC have-3SG Iris.NOM without  
 ihm *pg* zu erzählen, \_\_\_\_ geglaubt?  
 he.DAT to tell.INF believe.PST  
 ‘Which rumour about Arthur did Iris, without telling him, believe?’

Although promising, some confounds make this test difficult to carry out experimentally. Because the relevant adjunct clauses in German do not introduce new subjects, instead of the subject-object contrast, one would have to switch to indirect vs. direct objects. This gives rise to new problems, such as gapless readings where the (di-)transitive verb in the adjunct clause is interpreted as intransitive. Further, the c-command relation between indirect and direct objects in German is debated (Grewendorf 1988; Featherston & Sternefeld 2003; Twiner & Lee-Schoenfeld 2019). An acceptability judgment experiment on German further found high interspeaker variability for both aforementioned versions of parasitic gap constructions, finding them to be judged as marginal at best when the adjunct clause was extraposed (Szarvas to appear).

Moreover, it remains to be explored whether the presence of the matrix referent and the complexity of the experimental task have a depressing effect on coreference rates, particularly in the subject condition. To address this, the same experiment will be piloted twice with slight changes. In one pilot, the context, matrix referent and phrasing of the task will remain the same.

However, participants will only have to respond to one task in each trial. In target items, participants will always be asked about coreference possibilities with the embedded referent. Fillers will be used for counterbalancing, i.e. the respective trials will only inquire about the possibility of coreference with the matrix subject. In the other pilot, the matrix referent, embedding sentence and context will all be omitted. Participants will be given a general context applicable to all sentences and asked whether the pronoun refers to the embedded referent or ‘someone else’ (cf. Stockwell et al. 2021, 2022). Both of these pilots will include the experimental items tested by Salzmann et al. (2023) as pseudo-fillers, assessing how these factors influence not only ATB-dependencies but also regular wh-extraction. Lexical variability across conditions will also be eliminated by using psych verbs, contrasting the pattern ‘X boreed Y’ with ‘Y found X boreful’, X being the displaced constituent containing the embedded referent and Y the pronoun, instead of using distinct verbs (Salzmann et al. 2023). The prediction is that removing the matrix referent or merely the question about it from the experimental items should boost coreference at least in subject conditions. If the boost is observed across conditions again, this will further support the view that the pattern is not a result of a c-command-based principle C violation.

The anonymous reviewer points out that coreference rates are well below chance across all conditions, and they wonder whether any conclusions can be derived from interpretations that are unequivocally perceived as ungrammatical. I fully agree with this concern, though I think it remains an open issue whether the readings are indeed perceived as ungrammatical in this experiment. One step towards clarity may be to collect acceptability judgments either alongside the forced-choice task or integrating a Likert scale into the task (Stockwell et al. 2021, 2022).

Finally, given these current findings on ATB- as well as prior ones on regular wh-movement, there is a very simple preliminary explanation for why reconstruction patterns in ATB-movement seem to differ across phenomena. As noted in section 3, most types of binding show a symmetric reconstruction pattern, with principle C being one of the noteworthy exceptions seemingly only targeting the initial gap (Citko 2005; Salzmann 2012). The present data, in line with Bruening & Al Khalaf (2017), are taken to indicate that the alleged principle C effect in ATB-movement is not an effect of reconstruction. I hypothesize that this is due to the instability of principle C reconstruction in and of itself. On the one hand, it has long been noted that coreference or the lack thereof does not require c-command whereas binding does (Reinhart 1983a,b). On the other hand, even if we follow the idea that binding principles are responsible for regulating coreference as well (Chomsky 1981; Heim 2007; Bruening 2021), both prior as well as current findings support the view that PP arguments do not reconstruct alongside the head noun, as claimed by many (Bianchi 1995; Lasnik 1998; Safir 1999; Kuno 2004; Henderson 2007), rendering the principle C reconstruction test useless. The innovation of the current experiment is that the subject conditions serve as a sanity check, showing that surface order plays a crucial role in determining coreference patterns in ATB-dependencies. Given that proper binding, such as variable binding, is only possible under c-command, it should behave differently from principle C in ATB-dependencies and could supply the necessary evidence to determine whether extraction affects all conjuncts equally. The next step is thus to test the introspective judgments from the literature experimentally for other types of binding as well.

### 5. Conclusion

The presented experiment shows that the principle C reconstruction test in German is insufficient to make any claims about the underlying structure of ATB-movement. At the same time, it suggests that the asymmetry reported in English based on introspective judgments may be a more general proximity effect, in line with conclusions reached for English based on a different experimental design. The experiment provides evidence for the aforementioned claim by showing that coreference possibilities are affected by the alleged principle C violation even in cases where the offending c-command relation does not hold on the surface nor underlying level. This kind of comparison is entirely novel for ATB-movement. The data further suggest, together with previous studies on reconstruction in simple wh-dependencies, that the results of the principle C reconstruction test could be impacted by the experimental design, such as the availability of alternative referents and their prominence. To assess the relevance of these influences, I have proposed two further pilot studies. Future studies on ATB-movement should focus on types of binding that are reported to behave symmetrically to test these claims. Based on the data currently available, I hypothesize that the conflicting evidence is a result of conflicting requirements of different binding phenomena rather than the derivation of ATB-movement itself.

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### Abbreviations

1SG	first person singular	INF	infinitive
3SG	third person singular	NOM	nominative
ACC	accusative	PST	past
DAT	dative		

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# Inverse marking as morphological movement

## The case of Potawatomi

Felicitas Andermann

In this paper I show that analysing Potawatomi inverse marking in Harmonic Serialism (Müller 2020), a derivational version of Optimality Theory, as a reflex of morphological movement obliterates the need for assuming two Voice heads in the syntax, nominative-accusative and absolutive-ergative alignment at the same time, or one exponent encoding both arguments. In addition to inverse marking, morphological movement and movement-related repair operations can derive exponent drop, i.e. the unexpected absence of certain exponents whenever they realise the less salient argument.

### 1. Introduction

In Potawatomi transitive animate (TA) verbs (see Hockett 1948b or Stump 2001), a direct (DIR) marker /a/ occurs when the subject is a speech act participant (SAP, i.e. 1st or 2nd person) and the object has 3rd person features, as in (1a)<sup>1</sup> or when both subject and object are 3rd person but the object is marked as obviative (less salient), as in (1c). In the reverse cases, where a 3rd person subject acts on a SAP object, as in (1b), or an obviative 3rd person subject acts on a proximate 3rd person object, as in (1d), instead of /a/, an inverse (INV) marker /UkO/ occurs in the inflected forms that are otherwise identical to the direct forms in (1a) and (1c).

- |     |    |   |     |    |  |
|-----|----|---|-----|----|--|
| (1) | a. | g-wabm- <b>a</b> -wa- <b>g</b><br>k-wapm- <b>a</b> -wa- <b>k</b><br>2-see-DIR-2/3PL-3PL<br>'You (pl.) see them.'    | (2) | a. | ?-wabm- <b>a</b> -wa- <b>n</b><br>w-wapm- <b>a</b> -wa- <b>n</b><br>3-see-DIR-2/3PL-3OBV<br>'They see him (obv.).'     |
|     | b. | g-wabm- <b>əgo</b> -wa- <b>g</b><br>k-wapm- <b>UkO</b> -wa- <b>k</b><br>2-see-INV-2/3PL-3PL<br>'They see you(pl.).' |     | b. | ?-wabm- <b>əgo</b> -wa- <b>n</b><br>w-wapm- <b>UkO</b> -wa- <b>n</b><br>3-see-INV-2/3PL-3OBV<br>'He (obv.) sees them.' |

<sup>1</sup> The marker /wa/, glossed as 2/3PL, encodes either a 2PL argument or a 3PL argument.

In other words, the direct marker /a/ occurs whenever the subject outranks the object and the inverse marker /UkO/ occurs when the object outranks the subject on the salience hierarchy in (3) that has been proposed for Algonquian by Trommer (2001), Kushnir (2015), Bruening (2017), and Despić et al. (2019), among others.

(3) 2/1 > 3 > OBV

Direct/inverse marking has been analysed in numerous ways in different morphological theories, among which there is no real consensus as to which grammatical category direct and inverse markers encode. Direct and inverse markers have been analysed as portmanteau markers encoding case and transitivity (Halle & Marantz 1993), case and person (Branigan & MacKenzie 2002; Henze & Zimmermann 2011; Bruening 2017), case, person and animacy/salience (Wunderlich 1997; Stiebels 2002; Trommer 2001, 2006), as person markers that in reality must be assumed to also bear case diacritics (Steele 1995; Despić et al. 2019), or as instances of differential case marking, where either ergative or accusative is assigned (Déchaine 1999; Kushnir 2015). In Oxford (2018, 2022), the direct marker as a 3rd person object marker and the inverse marker is analysed as an elsewhere marker, in Stump (2001), direct and inverse markers realise a major reference feature that is assigned to either the subject (in the direct forms) or the object (in the inverse forms) or no argument (in the local forms where both arguments are speech act participants), and in Anderson's (1992) analysis the inverse marker is analysed as a reflex of modification of the morphosyntactic node into which exponents are inserted. The trade-offs of these approaches are that either the DIR and INV markers have to realise  $\phi$  features of both arguments (in the analyses of DIR and INV as portmanteaux)<sup>2</sup>, two Voice heads or case alignment systems have to be assumed for one and the same paradigm (as in Déchaine 1999; Kushnir 2015; Oxford 2018, 2022), or the analysis relies on specific features or a morphosyntactic operation that cannot be independently argued for (Stump 2001; Anderson 1992).

In this paper I present an analysis previously developed in Andermann (2022, 2023) that can make do without assuming two Voice heads, two case alignment patterns or exponents encoding two arguments by deriving the distribution of the direct and inverse marker via morphological movement: An exponent realising the **less salient**<sup>3</sup> argument on the salience hierarchy in (3) morphologically moves to the right edge of the word and leaves a copy in the base position which is overtly realised by the direct or inverse marker, where the direct marker /a/ is a copy of object exponent movement and the inverse marker /UkO/ is a copy of subject exponent movement.

(4) a. stem-**obj**-subj ⇒ c. stem-**subj**-obj ⇒  
 b. stem-**DIR**-**subj**-obj d. stem-**INV**-**obj**-subj

Morphological theories differ as to whether they allow for morphological exponent movement or even predict it. Most morphological theories such as Paradigm Function Morphology (Stump 2001), Network Morphology (Brown & Hippisley 2012), Minimalist Morphology (Wunderlich 1997) and Information-Based Morphology (Crysmann & Bonami 2016) have no possibility of

<sup>2</sup> For arguments against Multiple Probing approaches to portmanteaux see e.g. Fenger (2018).

<sup>3</sup> Throughout the paper, **red** refers to the **less salient** argument and **blue** refers to the **more salient** argument.

deriving morphological movement. In Distributed Morphology (Halle & Marantz 1993), exponent movement is possible but has to be derived via additional operations (lowering, local dislocation, metathesis).

In derivational optimality-theoretic approach to morphology like Inflectional Morphology in Harmonic Serialism (Müller 2020), on the other hand, morphological movement follows without further ado from the interaction of Merge and alignment constraints: In each step of the derivation, only one operation (merge, movement, or deletion) may be applied, as shown in a toy example in (5)-(7). Given a ranking  $L \Leftarrow \text{Root} \gg \text{MERGE}(X) \gg \text{MERGE}(Y) \gg X \Rightarrow R$ :  $\text{MERGE}(X)$  is ranked highest of all Merge Conditions, and  $X$  must be merged as a suffix due to a high-ranked constraint requiring the root to be left-aligned, (5).

(5) Toy example, step 1: Merge X

$I_0$ : stem,[• X •] [• Y •]; {X, Y}	$L \Leftarrow \text{Root}$	$\text{MERGE}(X)$	$\text{MERGE}(Y)$	$X \Rightarrow R$
$O_1$ stem,[• X •] [• Y •]				
$O_2$ stem-Y [• X •]		*!		
$O_3$ X-stem [• Y •]	*!		*	
$O_4$ stem-X [• Y •]			*	

Subsequently,  $Y$  must be merged, also as a suffix, in violation of the constraint  $X \Rightarrow R$  that requires  $X$  to be right-aligned, (6). Merging  $Y$  as a prefix, as in  $O_{42}$ , would violate  $L \Leftarrow \text{Root}$ , and not merging  $Y$ , as in  $O_{41}$ , would violate  $\text{MERGE}(Y)$ , which is ranked higher than  $X \Rightarrow R$ .

(6) Toy example, step 2: Merge Y

$I_4$ : stem-X [• Y •]; {Y}	$L \Leftarrow \text{Root}$	$\text{MERGE}(X)$	$\text{MERGE}(Y)$	$X \Rightarrow R$
$O_{41}$ stem-X [• Y •]			*!	
$O_{42}$ Y-stem-X	*!			
$O_{43}$ stem-X-Y				*

In the next step of the derivation, however,  $X \Rightarrow R$  can be satisfied by movement, i.e. late alignment, of  $X$  to the right edge of the word.

(7) Toy example, step 3: Move X right

$I_0$ : stem-X-Y	$L \Leftarrow \text{Root}$	$\text{MERGE}(X)$	$\text{MERGE}(Y)$	$X \Rightarrow R$
$O_{431}$ stem-X-Y				*!
$O_{432}$ stem-Y-X				

Note that this kind of movement is only possible because the constraints are satisfied one after another. In Standard Parallel Optimality Theory (SPOT),  $X$  and  $Y$  would be realised simultaneously, with  $X$  at the right edge. The derivational nature of Harmonic Serialism is therefore crucial for the analysis presented here. Derivational optimality theory has been considered as an alternative to SPOT since the very beginnings (see Prince 2004). Under the name of Harmonic Serialism, it has been independently motivated for both phonology (McCarthy 2010, 2016) and

syntax (e.g. Heck & Müller 2007, 2016; Anke Assmann et al. 2015; Murphy 2017) and has recently also been proposed for morphology by Müller (2020) as an endeavour to establish a unified macro-architecture for all modules of grammar, replacing the classic divide between *SPOT* in phonology and non-optimality-theoretic Minimalism and *DM* in syntax and morphology. This paper is structured as follows: Section 2 is an overview of the person/number inflection paradigms of transitive animate verbs with which this paper is concerned. In section 3 I briefly discuss evidence for morphological movement and overt reflexes thereof. In section 4 I illustrate my analysis of inverse marking as a minimal trace of exponent movement with the sample derivation of the inverse form *k-wapm-UkO-wa-k* ‘They see you.PL’ in (1b). Section 5 concludes.

## 2. The pattern

Potawatomi, like other Algonquian languages, has four types of verbs that differ by valency and animacy of their single or internal argument: Inanimate Intransitive (*II*), where the sole argument of the verb is inanimate, Animate Intransitive (*AI*), where the sole argument of the verb is animate, Transitive Inanimate (*TI*), where the object is inanimate, and Transitive Animate (*TA*), where the object is animate. All these verb types have both an *independent order* paradigm, which is used in main clauses, and a *conjunct order* paradigm, which is used in subordinate clauses. Transitive Animate verbs additionally have a direct paradigm, where the subject outranks the object in the person hierarchy in (3), an inverse paradigm, where the object outranks the subject, and a local paradigm, where both arguments are speech act participants (*SAP*) and therefore ranked equally in the hierarchy. This paper is concerned with the direct and inverse paradigm of *TA* verbs in the independent order.

Person/number inflection of Potawatomi *TA* verbs follows the template generally observed for Algonquian languages in the literature (see Bloomfield 1946:98-102; Goddard 1969:38), represented in (8). Inflectional forms consist of a prefix that realises person features of the **more salient** argument, the direct or inverse marker, also referred to as *theme sign*, a *central ending* encoding person and number of the **more salient** argument, and a *peripheral ending*, which realises either person and number or person and obviation of the **less salient** argument.

### (8) Verb inflection template for *TA* Independent Order

<i>Prefix</i>	<i>Stem</i>	<i>Theme sign</i>	<i>Central ending</i>	<i>Peripheral ending</i>
PERS		DIR/INV	PERS/NUM	PERS/NUM//OBV

The direct and inverse paradigms of Potawatomi *TA* verbs (adapted from Hockett 1948b) are shown in (9)-(10). Since the prefix and the central ending always realise  $\phi$  features of the **more salient** argument, no matter whether this argument is the subject or the object, and the peripheral ending always realises person/number of the **less salient** argument regardless of its grammatical function/case, most of the inverse forms in (10) are almost identical to the corresponding direct forms in (9) and differ only by the theme sign (/a/ in the direct forms, /UkO/ in the inverse forms).

## (9) TA Independent Order Direct

OBJ →			
SUBJ ↓	3SG	3PL	3OBV
1SG	n-wapm-a-∅	n-wapm-a-k	n-wapm-a-n
2SG	k-wapm-a-∅	k-wapm-a-k	k-wapm-a-n
3SG			w-wapm-a-n
1PL.INCL	k-wapm-a-mUn	k-wapm-a-mUn	k-wapm-a-mUn
1PL.EXCL	n-wapm-a-mUn	n-wapm-a-mUn	n-wapm-a-mUn
2PL	k-wapm-a-wa	k-wapm-a-wa-k	k-wapm-a-wa-n
3PL			w-wapm-a-wa-n

The person prefixes, /k-/ for 2nd person, /n-/ for 1st person and /w-/ for 3rd person, appear in the direct as well as in the inverse paradigm, and so does central ending /wa/ that marks 2PL and 3PL arguments as well as the peripheral endings /-k/ encoding less salient 3PL arguments and /-n/ realising obviative arguments. The only exception is constituted by the 1PL ↔ 3 forms, where the marker /mUn/ appears when a 1PL subject acts on a 3rd person object and *nan* occurs instead when a 3rd person object acts on a 1PL subject. This, however, is only the case in the present tense forms, while in the preterite, /mUn/ encodes both 1PL subjects and 1PL objects. This suggests that /mUn/ is generic 1PL marker and /nan/ is a 1PL object marker whose occurrence is restricted to the present tense by some mechanism I will disregard here. Apart from /nan/, no other marker is specified for case.

## (10) TA Independent Order Inverse

SUBJ →			
OBJ ↓	3SG	3PL	3OBV
1SG	n-wapm-UkO-∅	n-wapm-UkO-k	
2SG	k-wapm-UkO-∅	k-wapm-UkO-k	
3SG			w-wapm-UkO-n
1PL.INCL	k-wapm-UkO-nan	k-wapm-UkO-nan-k	
1PL.EXCL	n-wapm-UkO-nan	n-wapm-UkO-nan-k	
2PL	k-wapm-UkO-wa	k-wapm-UkO-wa-k	
3PL			w-wapm-UkO-wa-n

I therefore assume the feature specifications in (11) for the exponents, where person is decomposed in [ $\pm 1 \pm 2 \pm 3$ ], number in [ $\pm pl$ ] and obviation in [ $\pm obv$ ], and the 1PL object marker /nan/ is additionally specified for a feature [+obj(ect)].

## (11) Feature specifications

/n/	↔	[+1 ],	/mUn/	↔	[+1 +pl ],
/k <sub>1</sub> /	↔	[+2],	/nan/	↔	[+1 +pl +ob],
/w/	↔	[+3],	/wa/	↔	[-1 +pl ],
∅	↔	[+3 -pl],	/k <sub>2</sub> /	↔	[+3 +pl],
			/n <sub>2</sub> /	↔	[ +3 +obv ]

Given these feature specifications, some exponents are expected to appear in configurations where they never surface: The person prefix /w-/ encoding 3rd person is expected to appear twice in  $3 \leftrightarrow 3\text{OBV}$  but appears there only once. Likewise, /w-/ is expected in  $n\text{ SAP} \leftrightarrow 3\text{rd person}$  configurations but never surfaces in these forms. Moreover, in 1st person plural contexts, only the 2nd person prefix /k-/ appears but not the 1st person prefix /n-/. Finally, the central ending /wa/ encoding 2PL or 3PL does not occur in  $1 \leftrightarrow 3\text{PL}$  constellations and occurs only once in  $2\text{PL} \leftrightarrow 3\text{PL}$  and  $3\text{PL} \leftrightarrow 3\text{PL}$  contexts. This phenomenon, known as *exponent drop*, can be derived straightforwardly via the interaction of alignment constraints and MAX constraints in an optimality-theoretic framework. The absence of /w/ in the  $2 \leftarrow 3\text{PL}$  forms in (1), for instance, follows from a ranking  $L \leftarrow +2 \gg L \leftarrow +3 \gg \text{MAX} (+2) \gg \text{MAX} (+3)$ : Both affixes /k<sub>1</sub>/  $\leftrightarrow$  +2 and /w/  $\leftrightarrow$  +3 compete for the position at the left edge of the word. Deleting /w/  $\leftrightarrow$  +3 yields the best constraint profile, as it satisfies the highest-ranked constraint (/k<sub>1</sub>/  $\leftrightarrow$  +2 is now at the left edge) and does not violate the next-highest ranked constraints  $L \leftarrow +3$  and  $\text{MAX} (+2)$  but only the lowest-ranked constraint  $\text{MAX} (+3)$ .

The main concern of this paper, however, is deriving inverse marking by morphological movement. So far, we have seen that the direct (DIR) marker /a/ occurs in forms where SAP (1st or 2nd person) subject acts on a 3rd person object or where a 3rd person proximate (non-obviative) subject acts on a 3rd person obviative object, while the inverse marker /UkO/ occurs configurations with a 3rd person subject acting on a SAP object, or a 3rd person obviative subject acting on a proximate 3rd person object. The distribution of the direct and inverse marker depends on whether the subject is *more salient* than the object or vice versa, but not on the concrete person features of the arguments themselves, which is why there is no consensus in existing theories on which grammatical category the direct and inverse marker encode and how their distribution is derived. I argue that the direct marker is a generic object marker and the inverse marker is a generic subject marker, and both are reflexes of alignment-driven morphological movement of an exponent that encodes the *less salient* argument.

### 3. Suggestive evidence for morphological movement

Suggestive evidence for repair-driven exponence triggered by morphological movement comes from Bantu. Hyman & Mchombo (1992) and Hyman (2003) discuss a case of exponent doubling in Chichewa, represented in (12)-(13).

- |      |    |  |      |    |  |
|------|----|--|------|----|--|
| (12) | a. | mang-il-an<br>tie-APPL-REC<br>i. ‘tie for each other’<br>[[Appl] Rec]<br>ii. ‘tie each other for/at’<br>[[Rec]Appl]] | (13) | a. | mang-an-il-an<br>tie-REC-APPL-REC<br>i. *‘tie for each other’<br>[[Appl] Rec]<br>ii. ‘tie each other for/at’<br>[[Rec]Appl]] |
|      | b. | *mang-an-il<br>tie-REC-APPL  |      | b. | *mang-il-an-il<br>tie-APPL-REC-APPL  |

In Chichewa, like in all Bantu languages, affix order usually follows the Causative-Applicative-

Reciprocal-Passive (CARP) template. However, when the applicative scopes over the reciprocal, the reciprocal suffix can be copied such that it both precedes and follows the applicative suffix, satisfying both CARP and the Mirror Principle, which requires morphological structure to reflect syntactic structure/semantic compositionality.

For applicative and reciprocal, there are two possible orders of semantic composition: (i) reciprocalised applicative ([[[Root]Appl]Rec]) and (ii) applicativised reciprocal ([[[Root]Rec]Appl]). If one assumes that syntactic structure reflects the order of semantic composition, or vice versa, then the Mirror Principle, which requires morphological structure to reflect syntactic structure, predicts the reciprocalised applicative (i) to be realised by the affix order in (13a)-(14a), i.e. ROOT-APPL-REC, and the applicativised reciprocal (ii) to be realised by the order in (13b)-(14b), ROOT-REC-APPL. Now Bantu languages are known for exhibiting a restriction on affix order referred to as the CARP template (Causative-Applicative-Reciprocal-Passive) that requires exponents encoding causative to precede exponents realising applicative, exponents realising applicative to precede exponents realising reciprocal, and so on. In (13a)-(14a), the CARP-template-conform order, where the applicative suffix precedes the reciprocal suffix, is grammatical under both interpretations (i) and (ii), whereas the reverse order in (14b), which violates CARP, is ungrammatical under both interpretations.

- (14) Permitted orderings of applicative /ir/ + reciprocal /an/ in Chichewa (Hyman 2003:253ff; Hyman & Mchombo 1992:1992:351ff)

			[[[Root]Appl]Rec]	[[[Root]Rec]Appl]
a.	APPL-REC (CARP)	mang-il-an	✓ (MP)	✓
b.	REC-APPL	mang-an-il	✗	✗ (MP)
c.	APPL-REC- APPL	mang-il-an-il	✗	✗
d.	REC-APPL-REC	mang- <b>an</b> -il- <b>an</b>	✗	✓

(MP = Mirror Principle, CARP = Causative-Applicative-Reciprocal-Passive)

However, the order ROOT-REC-APPL becomes grammatical under the interpretation in (ii) when it is doubled such that one copy of the reciprocal marker precedes the applicative marker and the other one follows it, yielding a construction that satisfies both Mirror Principle and (partly) CARP, as in (13c)-(14d). In contrast, the reverse order in (13d)-(14c), where the applicative marker is doubled, is ungrammatical under both interpretations. This means that exponent copying in Chichewa only occurs in configurations where the Mirror Principle would otherwise be violated by a CARP-conform affix order. Hyman (2003:256-257) therefore argues that copying of the reciprocal suffix in (13)-(14) is an instance of repair, and Gleim et al. (2023:122) remark that the occurrence of such copies could be considered evidence for both morphological movement and movement-related copying.

A crucial difference between the Chichewa data in (13)-(14) and the Potawatomi data in (9) - (10) is that in Chichewa, the moved item and the copy are identical in shape whereas in Potawatomi, they are not. It is therefore not entirely clear whether in Chichewa it is the copy closer to the stem or that further away from the stem which is inserted by repair. In Potawatomi, on the other hand, the distribution of the direct and inverse marker suggests that these are copies of moved exponents that are realised minimally as traces, see (15)-(16).

- (15) a. **k**-wapm-**a**-wa-**k** 'You see them.'  
 b. **k**-wapm-**UkO**-wa-**k** 'They see you.'
- (16) a. **w**-wapm-**a**-wa-**n** 'They see him.OBV.'  
 b. **w**-wapm-**UkO**-wa-**n** 'He.OBV see them.'

The exponents **k** and **n**, which realise the **less salient** 3PL / 3OBV argument, are always at the right edge, no matter whether they realise the subject or the object. The direct marker **a** occurs whenever **k** or **n** realises the *object*. The inverse marker **UkO**, on the other hand, appears whenever **k** or **n** realises the *subject*. I take this to mean that the direct marker is a reflex of object exponent movement (i.e. morphological movement of an exponent that realises the object) and encodes a feature [-su(bject)], while the inverse marker is a reflex of subject exponent movement and encodes [+su(bject)].

If this is the case, then one expects **a** and **UkO** to occur elsewhere in Potawatomi grammar realising a generic object and a generic subject, respectively. Now there is indeed potential evidence for the direct marker /a/ being a generic object marker and the inverse marker /UkO/ being a generic subject marker, although the evidence is not as clear as one would have hoped. For instance, Hockett (1948a) describes cases where the direct marker /a/ seems to occur in derivational morphology denoting an *indefinite object* (Hockett 1948a:§4.3).

'[AI] verbs of action on indefinite objects have final /ke/, with various modifications of a preceding final. The [TI] final *to* is replaced by *ta*. The [TA] final/w/ is replaced by /a/.'

Abstracting away from /ke/, the final /a/ that replaces /w/ in such constructions can be analysed as encoding the underspecified object. In the contexts where the intransitive final /to/ is replaced by /ta/ one may assume that /a/ is added to /to/ and the o in /to/ is subsequently deleted to avoid a hiatus. Examples from Hockett (1948a:§4.3) and potential reanalyses are given in (17)-(18).

- (17) From TA to AI
- |    |                 |                   |    |
|----|-----------------|-------------------|----|
| a. | mUčUnUw         | 'compete with'    | TA |
| b. | mUčUn-a-ke      | 'compete with sb' | AI |
| c. | nUnatUtUw       | 'ask for'         | TA |
| d. | nUnatUt-a-ke    | 'ask for sb'      | AI |
| e. | mikučewit'Uw    | 'work for'        | TA |
| f. | mikučewit'-a-ke | 'work for sb'     | AI |
- (18) From TI to AI
- |    |                 |                     |    |
|----|-----------------|---------------------|----|
| a. | mači-to         | 'take'              | TI |
| b. | mači-t-a-ke     | 'take something'    | AI |
| b. | nUšOnačU-to     | 'destroy'           | TI |
| d. | nUšOnačU-t-a-ke | 'destroy something' | AI |

As for the inverse marker as a generic subject marker, (Valentine 2001:270-274) lists an unspecified actor theme sign in Ojibwe, which is closely related to Potawatomi. This unspecified actor theme sign is strikingly similar to the inverse marker in Ojibwe, see (19d-e) and (20).



- (19) Theme signs in Ojibwe  
 a. /iN/ 2 goal    d. /igw/ 3 inverse  
 b. /i/ 1 goal    e. /igoo/ X actor  
 c. /aa/ 3 direct  
 (Valentine 2001:274)
- (20) a. n-waabm-igw  
 1-see-INV  
 'AN.SG sees me'  
 b. n-wabm-igo-naan  
 1-see-INV-1PL  
 'AN.SG sees us'  
 c. w-waabm-igoo-n  
 1-see-INV-OBV  
 'AN.SG SEES AN.OBV'  
 d. n-waabm-igoo  
 1-see-X.ACTOR  
 'I am seen'

In Potawatomi, unspecified actor/subject forms are not as systematically described as in Ojibwe. However, Hockett (1939:239, see below), Neely (2010), and Lockwood (2017:79) list some forms with an unspecified subject (not necessarily actor) that can be reanalysed as containing the inverse marker /UkO/ (or, in a more modern spelling, /egw/).

'There is a class of intransitive verbs for an inanimate subject, distinguished syntactic they can take no explicit subject. An example is *mnokišket* 'it is a nice day'; the others have comparable 'impersonal' meanings. Because of their formal structure these are probably internal subjects, rather than as constituting subjectless predications but the implicit-explicit contrast obviously has no meaning.'

The form *mnokišket* mentioned in Hockett (1939) can be reanalysed as in (21), where the *k* in the stem final is an instance of the inverse marker /UkO/.

- (21) mno-kiš-UkO-(U)t  
 good-day-SUBJ-?  
 'it is a nice day'

Further stem finals that might be analysed as containing the inverse marker /UkO/ or, in modern orthography, /egw/, and allomorphs of which can occur with both II and AI verbs, are listed in (Lockwood 2017:79).

- (22) -éndagwed (II), éndagwze (AI) 'seem, be thought of'  
 a. kchenéndagwet  
 'it (in.) is thought of highly' (II)  
 b. mikwéndagwze  
 's/he is thought of, remembered'
- (23) -magwet (II), -magwze (AI), -myad (TI), -myam (TA) 'smell'  
 a. mnomagwet  
 'it (in.) smells good' (II)  
 b. mnomagwze  
 'it (an.) smells good' (AI)

Again, these forms can be reanalysed as in (24)<sup>4</sup>.

- (24) Possible reanalysis of (22)-(23)
- |    |               |                  |                  |
|----|---------------|------------------|------------------|
| a. | kchenendagwet | kchenenda-egw-et | kchenenda-UkO-Ut |
| b. | mikwéndagwze  | mikwenda-egw-ze  | mikwenda-UkO-ze  |
| c. | mnomagwet     | mno-ma-egw-et    | mno-ma-Uko-Ut    |
| d. | mnomagwze     | mno-ma-egw-ze    | mno-ma-UkO-ze    |

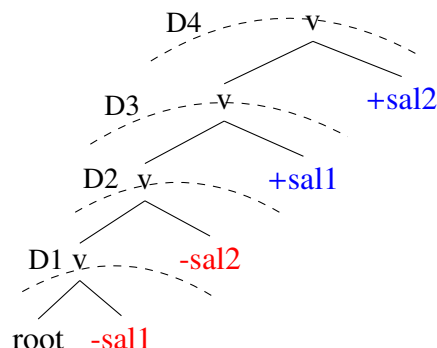
These considerations lead to two conclusions: Firstly, the distribution of the direct and inverse markers suggests that the direct marker /a/ is a reflex of object movement and the inverse marker /UkO/ is a reflex of subject movement. Secondly, the fact that the distribution of the direct and inverse marker does not depend on the concrete person features of the less salient argument but only on whether the less salient argument is a subject or an object, as well as the potential – although not entirely clear – evidence for the direct marker /a/ as a generic object marker and the inverse marker /UkO/ as a generic subject marker suggests that, unlike Chichewa exponent movement, which leaves a full copy, Potawatomi exponent movement leaves a minimal trace realised by the direct or inverse marker.

In syntax, full and minimal realisations of overt movement reflexes have been analysed by Pesetsky (1998), Hornstein (2000), and Boškovič & Nunes (1997) within the copy theory of movement, and their occurrence is attributed to constraints on pronunciation rather than to movement types. All these analyses rely on the assumption that movement always leaves copies, and that in the unmarked case all but one of these copies are deleted to satisfy a constraint *SILENT-t* that requires all lower copies to be deleted in Pesetsky (1998:25) or as a consequence of Kayne's (1991) Linear Correspondence Axiom (LCA) in Hornstein (2000) and Boškovič & Nunes (1997). It is furthermore argued in these approaches that there is a general preference for pronouncing only the highest copy and deleting all lower copies (see Boškovič & Nunes 1997:29). To account for multiple overt realisations of full copies, Nunes (2004) and Boškovič & Nunes (1997) assume that the lower of the overtly realised copies is invisible to the LCA because it has undergone a morphosyntactic fusion operation (as proposed by Halle & Marantz 1993) with an adjacent constituent before linearisation applies. Minimal realisations of copies, on the other hand, have been taken to be repair items introduced by the grammar to minimise violation of *SILENT-t*, Pesetsky (1998) or to repair a PF violation incurred by LCA-triggered chain reduction, Hornstein (2000). Crucially, Hornstein (2000:171) points out that pronominals only ever occur in repair contexts, for which he accounts by excluding them from the numeration and positing that they are introduced by grammar. Following Hornstein (2000:171), I assume that the direct and inverse marker also do not have the same status as regular exponents but are introduced later than all other exponents, for the sole purpose of repairing a constraint violation.

<sup>4</sup> Note that in these forms, the subject always has a theme  $\theta$ -role. If one assumes that they contain the underspecified subject marker, one must analyse these constructions as passive-like, where the theme argument is promoted to the subject position and realised by /UkO/. The fact that /egw/ does not occur in the TI and TA endings /myad/ and /myam/ in (23) can be explained by the fact that in TI and TA configurations, the subject is always animate and therefore not underspecified.



## (27) Cyclic domains



Given these assumptions about the architecture of morphological cycles, it turns out that the Potawatomi paradigm is completely regular and well-behaved as far as (first-cycle) Merge operations are concerned: All exponents are merged neatly in a row, first the exponents encoding the **less salient** argument, then the exponents encoding the **more salient** argument. Both unexpected exponence (of direct and inverse markers) and unexpected non-exponence (exponent drop) arise only in the 2nd cycle, following from the interaction of alignment and MAX constraints.

In the framework of *IMHS*, a stem in the lexicon is assumed to bear a fully specified language-specific well-formed set of inherent features. Non-inherent features, that are also fully specified, are added in the numeration. The resulting set of features, henceforth referred to as feature structure, provides the context for underspecified inflection markers that are taken from the lexicon and form part of *morphological arrays*, i.e. sets of exponents to be used in the derivation<sup>6</sup> that encode a given grammatical category such as person, number, or, as in this case, a fusion of person, number, and obviation, labelled *AGR(EEMENT)*. For each morphological array encoding a grammatical category (or fusion of categories) *X* there is a structure-building feature [**• X •**] and a corresponding Merge Condition *MC(X)*, as defined in (28), which triggers morphological exponence.

## (28) MERGE CONDITION

A structure-building feature [**• X •**] that is accessible in the input participates in (and is deleted by) a Merge operation in the output. (Müller 2020:14)

Merge, as well as all other operations, obeys the STRICT CYCLE CONDITION (SCC).

## (29) STRICT CYCLE CONDITION (SCC)

Within the current domain  $\delta$ , an operation may not exclusively target a position included within another domain  $\epsilon$  that is dominated by  $\delta$ .

Transitive animate verbs in Potawatomi agree with both subject and object and therefore have two feature structures as well as two structure-building features [**• Agr •**]. The inherent features of feature structures and exponents in Potawatomi are [ $\pm 1$ ], [ $\pm 2$ ], [ $\pm 3$ ] for person, [ $\pm$  pl(ural)] for number and [ $\pm$  obv] for obviation.<sup>7</sup>

<sup>6</sup> In analogy to *lexical arrays* in (Chomsky 2000:100), which assemble lexical material underlying a syntactic derivation.

<sup>7</sup> And possibly [ $\pm$ obj(ect)] for case to account for the distribution of the suffix /nan/. Apart from /nan/ there

- (30) Inherent feature structures:  
 $2_{PL} > 3_{PL}$   
 $[_V \text{ wapm}] : [\bullet \text{Agr}\bullet] [\bullet \text{Agr}\bullet]$   
 $[-1-2+3+pl-obj] [-1+2-3+pl-obj]$
- (31) Inherent feature structures:  
 $3_{PL} > 2_{PL}$   
 $[_V \text{ wapm}] : [\bullet \text{Agr}\bullet] [\bullet \text{Agr}\bullet]$   
 $[-1-2+3+pl-obj] [-1+2-3+pl-obj]$

Before Merge takes place, an operation comparable to the Major Reference assignment function in Stump (2001) determines which of the feature structures is **less salient** and which one is **more salient**, based on the salience hierarchy in (3). By this operation, the binary feature  $[\pm \text{sal}(\text{ient})]$  is added to the feature structures, i.e. the less salient feature structure is assigned the feature  $[-\text{sal}]$  while the more salient feature structure is assigned  $[\text{sal}]$ , as exemplified in (32a) for a direct configuration involving a 2<sub>PL</sub> subject and a 3<sub>PL</sub> object ( $2_{PL} > 3_{PL}$ ), and in (33a) for the corresponding inverse configuration involving a 3<sub>PL</sub> subject and a 2<sub>PL</sub> object ( $3_{PL} > 2_{PL}$ ). The feature  $[\pm \text{sal}]$  is then percolated onto the morphological array associated with the feature structure, e.g. if a feature structure is assigned  $[-\text{sal}]$ , then every exponent in the morphological array associated with it is assigned  $[-\text{sal}]$ . The same holds for  $[\text{sal}]$ .

By an operation analogous to that of assigning the binary salience feature, a binary grammatical function feature  $[\pm \text{subj}(\text{ect})]$  is assigned to the respective feature structures, as shown in (31), and also percolated to the corresponding morphological arrays, as shown in (32b) for the direct configuration  $2_{PL} > 3_{PL}$  and in (33b) for the inverse configuration  $3_{PL} > 2_{PL}$ .

- (32)  $2_{PL} > 3_{PL}$ :
- a. Assign  **$[-\text{sal}]$**  and  **$[\text{sal}]$**   
 $[_V \text{ wapm}] : [\bullet \text{Agr}\bullet] [\bullet \text{Agr}\bullet]$   
 $[-1-2+3+pl-obj-\text{sal}]$   
 $[-1+2-3+pl-obj+\text{sal}]$
- b. Assign  **$[-\text{su}]$**  and  **$[\text{su}]$**   
 $[_V \text{ wapm}] : [\bullet \text{Agr}\bullet] [\bullet \text{Agr}\bullet]$   
 $[-1-2+3+pl-obj-\text{sal}-\text{su}]$   
 $[-1+2-3+pl-obj+\text{sal}+\text{su}]$
- (33)  $3_{PL} > 2_{PL}$ :
- a. Assign  **$[-\text{sal}]$**  and  **$[\text{sal}]$**   
 $[_V \text{ wapm}] : [\bullet \text{Agr}\bullet] [\bullet \text{Agr}\bullet]$   
 $[-1-2+3+pl-obj-\text{sal}]$   
 $[-1+2-3+pl-obj+\text{sal}]$
- b. Assign  **$[-\text{su}]$**  and  **$[\text{su}]$**   
 $[_V \text{ wapm}] : [\bullet \text{Agr}\bullet] [\bullet \text{Agr}\bullet]$   
 $[-1-2+3+pl-obj-\text{sal}+\text{su}]$   
 $[-1+2-3+pl-obj+\text{sal}-\text{su}]$

Merge is assumed to follow the functional sequence of grammatical categories (F-SEQ, see Starke 2001) that is assumed to hold independently for both morphology and syntax. By F-SEQ, one would expect exponents realising the object to be merged before exponents realising the subject, since in syntax, the verb first combines with the object and then with the subject. However, if one argument is specified for  $[-\text{salient}]$  and the other one is specified for  $[\text{salient}]$ , as is the case in Potawatomi, exponents realising the argument specified as  $[-\text{salient}]$  have to be merged first, as sketched in (34) for the configurations involving a 2<sub>PL</sub> and a 3<sub>PL</sub> argument. In the first steps of the derivation in (34a-c), all exponents realising the **less salient** argument are merged. In this case, the exponents compatible with the feature structure of the **less salient** argument are  $/w/ \leftrightarrow [+3 -\text{sal}]$ ,  $k_2 \leftrightarrow [+3 +pl -\text{sal}]$  and  $/wa/ \leftrightarrow [-1 +pl -\text{sal}]$ . A constraint EXHAUST MORPHOLOGICAL ARRAY (EXMORAR) requires that once a morphological array has been accessed by Merge, all exponents in the morphological array that are compatible with the associated feature structure must be merged before any other operation can apply (see Müller 2020:141). Hence, all three

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are no markers in the morphological array whose distribution is sensitive to case / grammatical function.

exponents must be merged. Another constraint MINIMIZE SATISFACTION (MINSAT) requires that of all compatible exponents, the one that realises the least number of features that have not been realised before is merged first and ensures that the exponents are merged in the order in (34a-c). All exponents, both the ones realising the less salient argument and the ones realising the more salient one, are merged as suffixes in order not to violate an alignment constraint  $L \Leftarrow \text{Root}$ , which requires the root to be aligned with the left edge of the word.

- (34) 1st cycle: Merge operations
- |    |      |    |                 |     |                 |  |  |
|----|------|----|-----------------|-----|-----------------|--|--|
| a. | wapm | -w |                 |     |                 | (Merge w $\leftrightarrow$ [+3 -sal])              |  |
| b. | wapm | -w | -k <sub>2</sub> |     |                 | (Merge k $\leftrightarrow$ [+3 +pl -sal])          |  |
| c. | wapm | -w | -k <sub>2</sub> | -wa |                 | (Merge wa $\leftrightarrow$ [-1 +pl -sal])         |  |
| d. | wapm | -w | -k <sub>2</sub> | -wa | -k <sub>1</sub> | (Merge k <sub>1</sub> $\leftrightarrow$ [+2 +sal]) |  |
| e. | wapm | -w | -k <sub>2</sub> | -wa | -k <sub>1</sub> | -wa  | (Merge wa $\leftrightarrow$ [-1 +pl +sal]) |

When all exponents realising the *less salient* argument are merged, the feature structure of the *more salient* argument can be accessed. The exponents compatible with this feature structure are /k<sub>1</sub>/  $\leftrightarrow$  [+2 +sal] and /wa/  $\leftrightarrow$  [-1 +pl +sal]. Again, ExMORAR requires all three exponents to be merged, and by MINSAT, first the most generic marker /k<sub>1</sub>/ and then the more specific marker /wa/ is merged, (34d-e), yielding the intermediate output in (35) that serves as input for the second morphological cycle, where movement applies.

Note that the intermediate output consists of nothing but person and number exponents merged neatly in a row, first the exponents realising the *less salient* exponents, then those encoding the *more salient* one. All complications in the form of unexpected exponence (direct/inverse marker) and unexpected non-exponence (exponent drop) arise only in the second cycle, where movement and movement-related operations take place.

- (35) Input from 1st cycle: wapm-w-k<sub>2</sub>-wa-k<sub>1</sub>-wa


In the second cycle, crucially, all exponents specified for [-sal] undergo rightward movement to satisfy a high-ranked constraint  $-\text{SAL} \Rightarrow \text{R}$  which requires all exponents specified for [-sal] to be aligned with the right edge of the word. As shown in (35), all exponents realising the *more salient* argument (specified for [+sal]) are merged after, and to the right of, all exponents realising the *less salient* argument (specified for [-sal]). Therefore, the only way to satisfy  $-\text{SAL} \Rightarrow \text{R}$  is for the exponents specified for [-sal] to move to the right edge, across the exponents specified for [+sal]. Now in Harmonic Serialism, only one operation can be carried out at once, which means that only one exponent can move to the right edge at once, and by the CYCLIC PRINCIPLE as assumed in (26) – (27), which requires that all exponents must move in the same order in which they are merged, the first exponent to move right is /w/  $\leftrightarrow$  [+3 +sal].

(36) Move /w/ ↔ [+3 +sal] right and discharge [-sal]

I <sub>0</sub> wapm-w-k <sub>2</sub> -wa-k <sub>1</sub> -wa	-SAL ⇒ R	NUM ⇒ R	L ⇐ PERS	MAX (SU)
O <sub>1</sub> wapm-w-k <sub>2</sub> -wa-k <sub>1</sub> -wa	***!	***	*****	
O <sub>2</sub> w-wapm-k <sub>2</sub> -wa-k <sub>1</sub> -wa	***!	***	*****	
 O <sub>3</sub> wapm-k <sub>2</sub> -wa-k <sub>1</sub> -wa-w	***!	***	*****	

The feature [ $\pm$ sal] is discharged after movement triggered by an alignment constraint referring to [ $\pm$ sal], i.e. after the exponent has moved, the feature is no longer part of the exponent's feature specification or at least no longer available for further operations. As /w/ is now not specified for [-sal] but only for [+3], it moves to the left edge to satisfy  $L \Leftarrow PERS$ <sup>8</sup>, as represented in (37), and remains there until it is later deleted by the second person exponent /k<sub>1</sub>/. This must apply before any other exponent can move, because the order of movement operations is determined by the CYCLIC PRINCIPLE, according to which no other exponent can be moved until the exponent currently targeted has reached its final landing site. If the order of movement operations were driven by the ranking of alignment constraints alone, the marker /w/ would be predicted to remain in its suffix position while /k<sub>2</sub>/ and /wa/ would move across it. It could not even be deleted by entering into competition with /k<sub>2</sub>/ and /wa/ for the rightmost position, as this competition is triggered by  $NUM \Rightarrow R$ , and /w/ only encodes person but not number. Deleting /w/ after all other movement steps have been carried out to repair the violation of  $L \Leftarrow +2$  would violate the STRICT CYCLE CONDITION, which requires that any operation must target a position at the left or right edge. The predicted final output would therefore be \*k<sub>1</sub>-wapm-a-wa-w-k<sub>2</sub>.

(37) Move /w/ ↔ [+3] left

I <sub>3</sub> wapm-w-k <sub>2</sub> -wa-k <sub>1</sub> -wa	-SAL ⇒ R	NUM ⇒ R	L ⇐ PERS	MAX (SU)
O <sub>31</sub> wapm-k <sub>2</sub> -wa-k <sub>1</sub> -wa-w	***	***	*****!	
 O <sub>32</sub> w-wapm-k <sub>2</sub> -wa-k <sub>1</sub> -wa	***	***	*****	

Now that /w/ has reached its final landing site, the second-merged exponent, /k<sub>2</sub>/ moves to the right (38). Recall from above that every exponent realising the subject has been assigned the feature [+su]. By moving right, /k<sub>2</sub>/ splits the feature [+su] off and strands it in the base position, incurring a violation of  $MAX(\pm su)$ .

<sup>8</sup> Or more specifically,  $L \Leftarrow +3$ . In some tableaux, the alignment constraints  $L \Leftarrow +2$  and  $L \Leftarrow +3$  are subsumed under  $L \Leftarrow PERS$  for simplification.

(38) Move / $k_2$ /  $\leftrightarrow$  [+3 +pl -sal] right, discharge [-sal], and strand [+su] in the base position

	$\text{-SAL} \Rightarrow \text{R}$	$\text{NUM} \Rightarrow \text{R}$	$\text{L} \Leftarrow \text{PERS}$	$\text{MAX (SU)}$
I <sub>32</sub> w-wapm- $k_2$ -wa- $k_1$ -wa				
O <sub>321</sub> w-wapm- $k_2$ -wa- $k_1$ -wa	**!	**	*****	
O <sub>322</sub> $k_2$ -w-wapm-[+su]-wa- $k_1$ -wa	**!	**	*****	*
☞ O <sub>323</sub> w-wapm-[+su]-wa- $k_1$ -wa- $k_2$	*	**	*****	*

To repair this violation, a generic subject marker, namely /UkO/  $\leftrightarrow$  [+su], is inserted (39). In analogy to Pesetsky's 1998 analysis of resumptive elements and Hornstein's 2000 analysis of reflexives, I assume that /UkO/  $\leftrightarrow$  [+su] is not part of the lexicon but introduced by grammar.

(39) Insert generic subject marker /UkO/ to satisfy MAX (SU)

	$\text{-SAL} \Rightarrow \text{R}$	$\text{NUM} \Rightarrow \text{R}$	$\text{L} \Leftarrow \text{PERS}$	$\text{MAX (SU)}$
I <sub>323</sub> w-wapm-[+su]-wa- $k_1$ -wa- $k_2$				
O <sub>3231</sub> w-wapm-[+su]-wa- $k_1$ -wa- $k_2$	*	**	*****	*
☞ O <sub>3232</sub> w-wapm-UkO-wa- $k_1$ -wa- $k_2$	*	**	*****	

Unlike /w/, / $k_2$ / does not subsequently move left, because in addition to [+3] it encodes [+pl], and a constraint  $\text{NUM} \Rightarrow \text{R}$  requiring number exponents to be right-aligned (see Trommer (2001)) is ranked higher than  $\text{L} \Leftarrow$  [+3]. After moving right, / $k_2$ / has therefore reached its final landing site, and the third-merged exponent, /wa/  $\leftrightarrow$  [-1 +pl -sal], moves to the right edge and discharges the feature [-sal] (40).

(40) Move /wa/  $\leftrightarrow$  [-1 +pl] right and discharge [-sal]

	$\text{-SAL} \Rightarrow \text{R}$	$\text{NUM} \Rightarrow \text{R}$	$\text{L} \Leftarrow \text{PERS}$	$\text{MAX (SU)}$
I <sub>13</sub> w-wapm-UkO-wa- $k_1$ -wa- $k_2$				
O <sub>32321</sub> w-wapm-UkO-wa- $k_1$ -wa- $k_2$	*!	**	*****	
☞ O <sub>32322</sub> w-wapm-UkO- $k_1$ -wa- $k_2$ -wa		**	*****	

Now both / $k_2$ /  $\leftrightarrow$  [+3 +pl] and /wa/  $\leftrightarrow$  [-1 +pl] compete for the rightmost position, as they both encode number and number exponents have to be right-aligned by  $\text{NUM} \Rightarrow \text{R}$ . Given a ranking  $\text{NUM} \Rightarrow \text{R} \gg \text{MAX (+3)} \gg \text{MAX (-1)}$ : deleting /wa/ violates the lowest-ranked constraint and therefore improves the constraint profile the most (41).



- (41) Resolve competition of /k<sub>2</sub>/ ↔ [+3 +pl] and /wa/ ↔ [-1 +pl] by deleting /wa/

I <sub>3232322</sub>	w-wapm-UkO-wa-k <sub>1</sub> -wa-k <sub>2</sub>	-SAL ⇒ R	NUM ⇒ R	L ⇐ PERS	MAX (+3)	MAX (-1)
O <sub>3232221</sub>	w-wapm-UkO-k <sub>1</sub> -wa-k <sub>2</sub> -wa		*!*	*****		
O <sub>3232222</sub>	w-wapm-UkO-k <sub>1</sub> -wa-wa-k <sub>2</sub>		*!*	*****		
O <sub>3232223</sub>	w-wapm-UkO-k <sub>1</sub> -wa-□-wa		*	*****	*!	
☞ O <sub>3232224</sub>	w-wapm-UkO-k <sub>1</sub> -wa-k <sub>2</sub> -□		*	*****		*

Finally, in (42), /k<sub>1</sub>/ moves to the prefix position to satisfy [L ⇐ +2] and competes with /w/ for the leftmost position.

- (42) Move /k<sub>1</sub>/ ↔ [+2] left

I <sub>32323224</sub>	w-wapm-UkO-wa-k <sub>1</sub> -wa-k <sub>2</sub>	-SAL ⇒ R	NUM ⇒ R	L ⇐ +2	L ⇐ +3	MAX (+2)	MAX (+3)
O <sub>3232241</sub>	w-wapm-UkO-k <sub>1</sub> -wa-k <sub>2</sub>		*	*!			
O <sub>3232242</sub>	w-wapm-UkO-wa-k <sub>2</sub> -k <sub>1</sub>		*!*	*			
☞ O <sub>3232243</sub>	k <sub>1</sub> -w-wapm-UkO-wa-k <sub>2</sub>		*		*		

Again, under the ranking L ⇐ +2 ≫ L ⇐ +3 ≫ MAX (+2) ≫ MAX (+3): deleting /w/ violates the lowest-ranked constraint and is the optimal candidate, see (43).

- (43) Resolve competition between /k<sub>1</sub>/ ↔ [+2] and /w/ ↔ [+3] by deleting /w/

I <sub>32323224</sub>	w-wapm-UkO-wa-k <sub>1</sub> -wa-k <sub>2</sub>	-SAL ⇒ R	NUM ⇒ R	L ⇐ +2	L ⇐ +3	MAX (+2)	MAX (+3)
O <sub>32322431</sub>	k <sub>1</sub> -w-wapm-UkO-wa-k <sub>2</sub>		*		*!		
O <sub>32322432</sub>	w-k <sub>1</sub> -wapm-UkO-wa-k <sub>2</sub>		*	*!			
O <sub>32322433</sub>	□-w-wapm-UkO-wa-k <sub>2</sub>		*			*!	
☞ O <sub>32322434</sub>	k <sub>1</sub> -□-wapm-UkO-wa-k <sub>2</sub>		*				*

The derivation converges on the output *k<sub>1</sub>-wapm-UkO-wa-k<sub>2</sub>* (44).

- (44) Final output: *k<sub>1</sub>-wapm-UkO-wa-k<sub>2</sub>*

The second morphological cycle can be informally summarised in (45), where (45a) corresponds to (36), (45b) to (37) and so on.

(45)	2nd cycle: Movement operations							
	Input:	wapm	-w	-k <sub>2</sub>	-wa	-k <sub>1</sub>	-wa	
	a. (36)	wapm	-k <sub>2</sub>	-wa	-k <sub>1</sub>	-wa	-w	(-SAL ⇒ R)
	b. (37)	w-	wapm	-k <sub>2</sub>	-wa	-k <sub>1</sub>	-wa	(L ⇐ +3)
	c. (38)	w-	wapm	[+su]	-wa	-k <sub>1</sub>	-wa	-k <sub>2</sub> (-SAL ⇒ R)
	d. (39)	w-	wapm	UkO	-wa	-k <sub>1</sub>	-wa	-k <sub>2</sub> (MAX(±SU))
	e. (40)	w-	wapm	UkO	-k <sub>1</sub>	-wa	-k <sub>2</sub>	wa (-SAL ⇒ R)
	f. (41)	w-	wapm	UkO	-k <sub>1</sub>	-wa	-k <sub>2</sub>	□ ([NUM ⇒ R]≫ Mx+3≫Mx-1)
	g. (42)	k <sub>1</sub> -	w-	wapm	UkO	-wa	-k <sub>2</sub>	(L ⇐ +2)
	h. (43)	k <sub>1</sub> -	□	wapm	UkO	-wa	-k <sub>2</sub>	([L ⇐ PERS]≫ Mx+2≫Mx+3)

### 5. Conclusion

I have shown that an analysis of Potawatomi direct and inverse marking as minimally realised overt reflexes of morphological movement, for which I have argued in section 3, can make do without assuming two Voice heads in the syntax, nominative-accusative and absolutive-ergative alignment at the same time, or one exponent encoding both arguments. In a derivational optimality-theoretic approach, such as Harmonic Serialism, morphological movement does not have to be derived via an additional operation type such as local dislocation or metathesis, but follows without further ado from the interaction of MERGE CONDITION, MAX, and alignment constraints. I have also shown that exponent drop, i.e. the fact that some exponents realising the **less salient** argument unexpectedly fail to surface, follows without further ado from the interaction of alignment and MAX constraints. My analysis relies on a cyclic architecture as in Gleim et al. (2023), with two morphological cycles, one for Merge and one for movement operations. Such an architecture offers a new insight into the Potawatomi transitive animate paradigm, namely that it is underlyingly regular and well-behaved: all exponents are merged neatly in a row, first the markers encoding the **less salient** argument, then the markers realising the **more salient** one. All unexpected exponence (direct/inverse marking) or unexpected non-exponence (exponent drop) is a consequence of movement and movement-related repair operations that take place in the second morphological cycle.

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## Abbreviations

2PL	second person plural	IMHS	Inflectional Morphology in Harmonic Serialism
2/3PL	second or third person plural	LCA	Linear Correspondency Axiom
3PL	third person plural	MC	Merge Condition
AI	Animate Intransitive	NUM	number
APPL	applicative	OBV	obviative
CARP	Causative-Applicative-Reciprocal-Passive	OT	Optimality Theory
DIR	direct	PERS	Person
DM	Distributed Morphology	SAP	Speech Act Participant
II	Inanimate Intransitive	SPOT	Standard Parallel Optimality Theory
F-SEQ	Functional sequence of grammatical categories	TA	Transitive Animate
INV	inverse	TI	Transitive Inanimate

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## Linear asymmetries and the syntax of serialization

Against an antisymmetric approach

Gautam Ottur

Carstens (2002) argues that Muysken’s Anomaly, the observation that verb order in a serial verb construction (SVC) is independent of head directionality, can be explained if the functional projection  $\nu$ P of the second verb merges as the complement of the lexical V of the first verb. This structure ensures that objects in an SVC always c-command those they linearly precede, accounting for quantificational binding between objects of different verbs. However, a case study on Malayalam suggests that languages replicating these facts may be incompatible with her proposal. An alternative structure and reanalysis of the binding data are provided.

### 1. *Serialization and Muysken’s Anomaly*

Serial verb constructions are traditionally defined along the following lines: they are monoclausal constructions involving multiple verbs, which share subjects, have the ability to share objects, and share semantic values for tense, aspect, mood, evidentiality, polarity, and so on (Haspelmath 2016). They may express single events or sets of events.

Many typologically different languages have been shown to exhibit constructions roughly matching this profile. Notably, both head-initial and head-final languages that allow serialization may display strikingly similar patterns. Consider the examples from Gungbe (1a) and Malayalam (1b) below.

- (1) a. *Sésínú ná kùn mótò cè só àdó.*  
Sesinou FUT drive car 1SG.POSS hit wall  
‘Sesinou will drive my car (and) hit the wall.’ (Gungbe, Kwa; Aboh 2009:5)
- b. *Rāmaṅ ente vaṅṅi oṭiccū matil iṭikk-um.*  
R. 1SG;GEN vehicle drive.STEM wall hit-FUT  
‘Raman will drive my car (and) hit the wall.’ (Malayalam, Dravidian)

These data provide obvious indications of the head-directionality tendencies of both these

languages. In Gungbe, a strongly head-initial language, the tense marker precedes the verbs that it takes scope over, whereas in Malayalam, a uniformly head-final language, the tense(/aspect) marker follows the verbs that it takes scope over. The morphological characteristics of these two languages also differ; verbs and tense markers in Gungbe remain prosodically separate, whereas Malayalam uses a bare stem for the non-final verb, and inflects the final verb; thus, the morphophonological profile of the final verb in some sense differs from that of the preceding verb.

The order of each verb in relation to its respective object also reflects head directionality, that is, Gungbe has the order  $V_1 - O_1 - V_2 - O_2$ , whereas Malayalam has the order  $O_1 - V_1 - O_2 - V_2$ . Pre-theoretically, there appears to be an organizational principle in these languages that applies equally to (a) the structural relationship between verbs and their objects, and (b) the structural relationship between tense/aspect markers and the verbs that they take scope over.

However, this principle does not extend to the structural relationships between verbs in a series, nor those between their respective objects. In both languages, the verb 'drive' and its object precede the verb 'hit' and its object. The interpretation rendered is also roughly the same: there is some kind of driving (sub)event which leads to a crashing (sub)event. Such consistencies in linear order have been documented at length across many typologically disparate languages.<sup>1</sup>

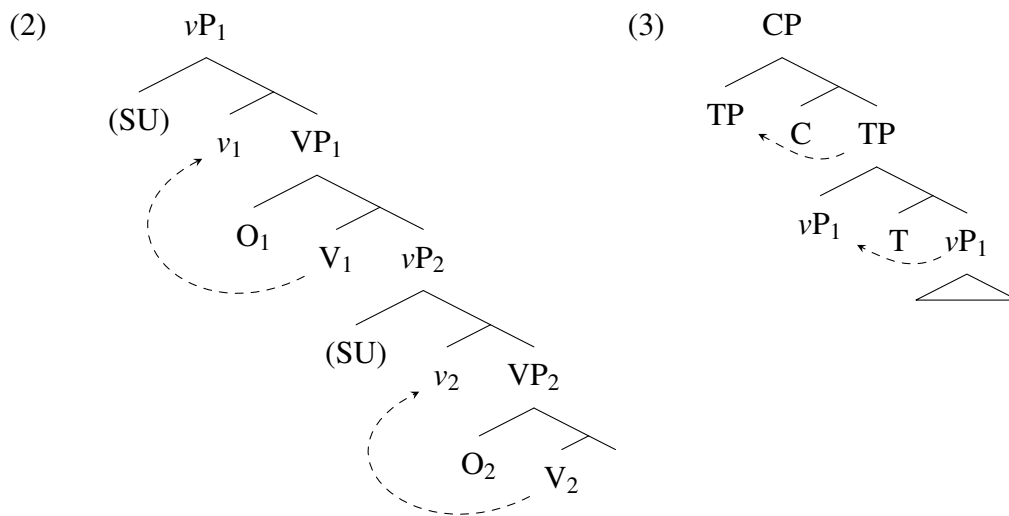
Put differently, the order of verbs and objects in a series seems to be insensitive to head directionality. This observation is stated explicitly in Muysken (1988), and has since been called Muysken's Anomaly (Carstens 2002:5).

### *1.1. Kaynian analysis*

Carstens (2002) takes Muysken's Anomaly as strong evidence for Kayne's (1994) proposal that all languages underlyingly have a left-headed syntax. The primary motivations for Kayne's proposal have to do with linear asymmetries that are found across head-initial and head-final languages, e.g. in topic placement, agreement, coordinate structures, etc. Muysken's Anomaly fits into this catalogue neatly. Carstens proposes a unified analysis of SVCs for head-initial and head-final languages along these lines. She shows that SVCs in Ijò, a head-final language, and Yoruba, a head-initial language, can be generated using the same base structure. For a prototypical series of two transitive verbs, she proposes the structure in (2), where both verbs merge on the clausal spine.

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<sup>1</sup> The interested reader is referred to Aikhenvald & Dixon (2006) for more discussion on this.



A crucial assumption upon which her analysis rests is that objects are base-generated as specifiers rather than complements, meaning serializing languages (or maybe languages generally) actually have an underlying OV word order.<sup>2</sup> Given a construction containing two verbs, the surface orders in head-initial and head-final languages are generated as follows. In head-initial languages, V-to-*v* movement occurs, and deriving the  $V_1 - O_1 - V_2 - O_2$ , as in (2a). In head-final languages, this movement never occurs, leaving  $O_1 - V_1 - O_2 - V_2$ , as in (2b). By assuming deep left-headedness, Carstens is able to elegantly capture Muysken's Anomaly using a single structural relationship: regardless of head-directionality,  $V_1$  takes  $vP_2$  as its complement. Similar interpretations arise because underlyingly, the structural relationship between the verbs is the same. Asymmetries between the verbs could be assumed to arise from the fact that one is lower on the clausal spine than the other.

Apart from this, following Kayne, she assumes that higher heads like T and C appear in the inverse order in head final languages due to Comp-to-Spec movement, as shown in (3) (Carstens 2002:31). In other words, for Carstens, the mechanism for deriving the difference between OV and VO orders is different from that which derives the head directionality of higher heads. Under Carstens' assumptions, the morphological asymmetry in Malayalam would be a consequence of Comp-to-Spec movement, rather than the consequence of a difference between a serial verb construction and a single verb construction.

### 1.2. The binding facts

A major motivation for this analysis is that it can easily capture explain certain binding facts. It is widely believed that quantificational elements must c-command any pronominal element that they bind (Reinhart 1983). For example, subjects can quantificationally bind objects in English but the inverse is not possible:

- (4) a. Each student<sub>*i*</sub> received her<sub>*i*</sub> grade.  
 b. \*Her<sub>*i*</sub> grade pleased each student<sub>*j*</sub>.

<sup>2</sup> Carstens does not elaborate greatly on what would fill the complement position of  $V_2$ . Whatever the assumption is about this will not have much of a bearing on this discussion.



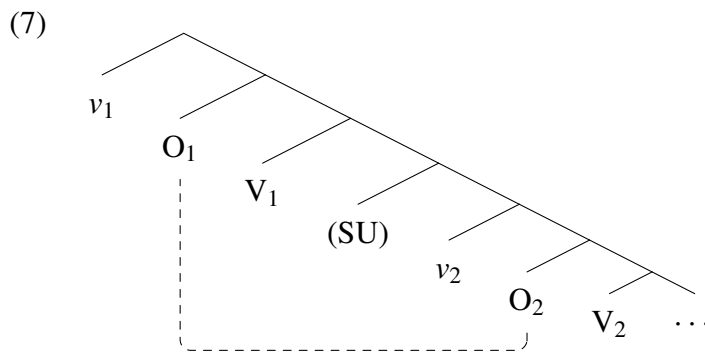
Carstens claims that in Ijò, a head-final serializing language, q(uantificational)-binding between objects of verbs in an SVC is allowed:  $O_1$  binds  $O_2$  (note that  $O_2$  is an indirect object).

- (5) *arí kẹ̀nì tóboṣu kẹ̀nì tóboṣu akì-nì wo yengi píri-mí.*  
 1SG one child one child take-PRT 3SG.POSS mother give-PST  
 ‘I gave each child<sub>i</sub> to his<sub>i</sub> mother.’ (Ijò; Carstens 2002:16)

No quantifier is actually used in (5); the strategy used instead to express the distributive universal quantification is apparently reduplication, so one may wonder if this is in fact a *bona fide* case of quantification. If not, it may be that *kẹ̀nì tóboṣu kẹ̀nì tóboṣu* does not c-command *wo yengi*, and that coreference is therefore allowed under Condition B. However, similar patterns are found in other languages with comparable typological profiles. Carstens lists bisyndetic coordination, *wh*-in-situ, and internally headed relative clauses as among the common properties of strict head-final languages. Malayalam shares these properties with Ijò, and also allows exactly the kind of q-binding that Carstens implicates for Ijò, but uses a dedicated quantifier *ōrō* ‘each.’

- (6) *ñāñ ōrō kuṭṭi-ye-yum eṭuttū atinte amma-ykkū koṭuttu.*  
 1SG each child-ACC-CONJ take.STEM 3SG.N;GEN mother-DAT give.PST  
 ‘I took each child<sub>i</sub> and gave (it<sub>i</sub>) to its<sub>i</sub> mother.’ (Malayalam)

This shows that this kind of data can be independently attested in other typologically similar languages, suggesting that her understanding of the Ijò data is correct. For Carstens, this is an important piece of evidence, since these assumptions would require that  $O_2$  be dominated by the sister of  $O_1$ , which in turn entails a structure like the one she proposes, wherein both arguments merge with the clausal spine, as shown in (7).



### 1.3. Predictions and complications

Whereas the binding data are certainly compelling, in this paper, I will argue that they are too weak to support a cross-linguistic Kaynian analysis for SVCs. The reason for this is that the Kaynian analysis makes strong predictions about the structure of SVCs, independent of the binding facts, which are not borne out in all serializing languages.

In Section 2, I focus specifically on two predictions about constituency within SVCs. The first major prediction would be that the linearly final verb and its arguments form a constituent, and that every linearly final preceding verb and its arguments do not form a constituent. This must be the case if verbs in a series are concatenated using a structure whereby each verb (apart from the structurally lowest verb in the series) takes another verb’s functional structure as its complement. A second (related) prediction is that, all else being equal, arguments of any verb in

the construction may move out of their base position. In other words, a serial verb construction should behave similarly to a single verb construction with respect to the extractability of the arguments it contains.

Given that the Malayalam data appears to comply with Muysken's Anomaly, and also exhibits the kind of binding data that Carstens uses to support her proposal, it provides a good case study to assess the extensibility of her analysis. I test both of the aforementioned predictions empirically, and show that the structure that Carstens proposes is incompatible with the facts in Malayalam. The evidence instead appears to indicate that different underlying structures can generate surface data compliant with Muysken's Anomaly.

In Section 3, I provide further comments on potential issues concerning the structural diagnostics used both in Carstens (2002) and in this paper. I will suggest that both constituency tests and binding tests should be interpreted with caution, given that the actual empirical picture often deviates significantly from what is predicted by standard assumptions. I close with a summary and some discussion of what this means for possible structures of SVCs in Section 4.

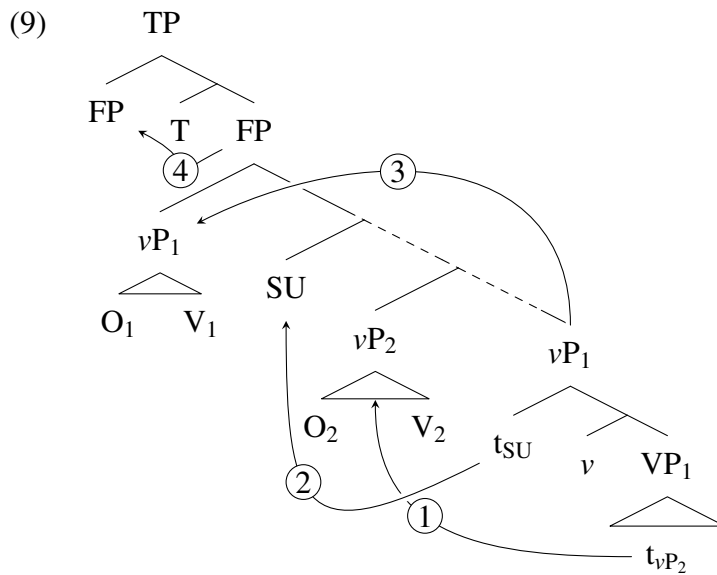
## 2. Testing the predictions

### 2.1. Fronting

A number of tests may help to better elucidate whether Carstens' model is on the right track. Since verbs and their arguments are supposed to hang off the clausal spine in her structure, one means of testing this is to evaluate what kinds of elements can be moved. Malayalam allows the fronting of various kinds of elements in a clause. For example, non-final verbs in Malayalam may be fronted along with their objects.

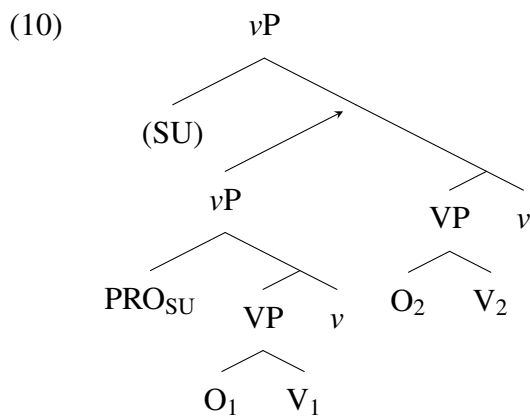
- (8) a. *Rāman* [vaṅṅi oṅiccu] [matil iṅccu].  
 R. vehicle drive.STEM wall hit.PST  
 'Raman hit a wall driving the vehicle.'
- b. [vaṅṅi oṅiccu] *Rāman* [matil iṅccu].  
 vehicle drive.STEM R. wall hit.PST  
 'Driving the vehicle, Raman hit a wall.'

This may be somewhat surprising given the analysis in Carstens (2002), because the first verb and its argument do not form a constituent in (2). However, on its own, this test represents insufficient evidence for any structure. To illustrate why, I will review two competing analyses that may produce the surface data in (8). In the first analysis, we start with the structure in (2) proposed by Carstens;  $vP_2$  first scrambles to a higher position, followed by a similar scrambling of the subject, and ending with the further scrambling of  $vP_1$  (now a remnant) to the highest position. This would already render the correct order of verbs and arguments, from where the constituent that contains both verbs and their arguments could undergo Comp-to-Spec movement within TP, thus obtaining the surface order where the inflectional head follows the second verb. This should not significantly conflict with Carstens' original assumptions, and it successfully renders the surface order  $O_1 - V_1 - SU - O_2 - V_2$ , as shown in (9).



The second possible analysis is one where *vanṅi ṅiṅcu* is simply contained within an adjunct that adjoins to the structure of *matil iṅcu*. This differs from Carstens’ approach, in that the first verb and its object together would merge into the clause as a constituent. This means that they can freely move without requiring any subconstituents to move out first.

We can modify the structure in (2), such that  $vP_1^3$  adjoins to  $vP_2^4$ , as in (10). Under this derivation, the subject is actually base-generated in Spec, $vP$  of the second verb, meaning that coreference between the Agents of ‘drive’ and ‘hit’ must be rendered by another mechanism. The most suitable candidate for this seems to be obligatory control via an empty category PRO, as proposed by Jayaseelan (2004). In such a structure, only  $vP_1$  needs to move;  $vP_2$  may otherwise remain as is.



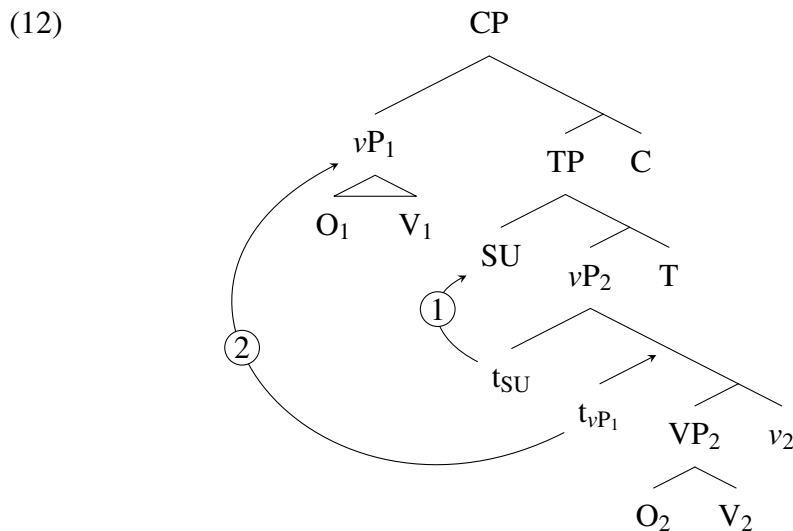
As an aside, unlike the Kaynian analysis, subject movement of some kind would be necessary for Malayalam, because the base position of  $vP_1$  always seems to be higher than the internal argument of  $vP_2$ , and obligatory subject control applies even where  $vP_2$  is unaccusative, shown in (11). Here, PRO can only be bound if the internal argument moved to a higher position.

<sup>3</sup> I will assume for the purposes of this paper that the adjoining category would be a  $vP$  rather than something larger like AspP or TP, pace Jayaseelan (2004). See also Swenson (2016) for some arguments for this.

<sup>4</sup> Where  $vP_1$  adjoins is not strictly important for the purposes of this discussion.

- (11) a. *avan̄ oṭi vīṇu.*  
 3SG.M run.STEM fall.PST  
 ‘He ran and fell.’

The fronting of  $vP_1$  thus proceeds naturally as in (12).



This analysis is significantly more economical, as the scrambling/remnant movement is no longer necessary, but it comes with a cost: it is now impossible for the object of the adjoined  $vP$  to c-command the object of the main  $vP$ , which conflicts with the assumption that c-command is required for q-binding. In other words, under this kind of analysis, (6) is not predicted to be possible; it is for this reason that Carstens (2002:33) rules out adjunction analyses generally. From this perspective, Carstens’ analysis has an advantage over (12).

Apart from this difference, at first blush, both of these appear to be plausible analyses for generating the surface order in SVCs in Malayalam. However, each of these analyses makes further predictions about the extractability of individual arguments. I will evaluate these predictions to better appraise the viability of each analysis.

## 2.2. Extraction

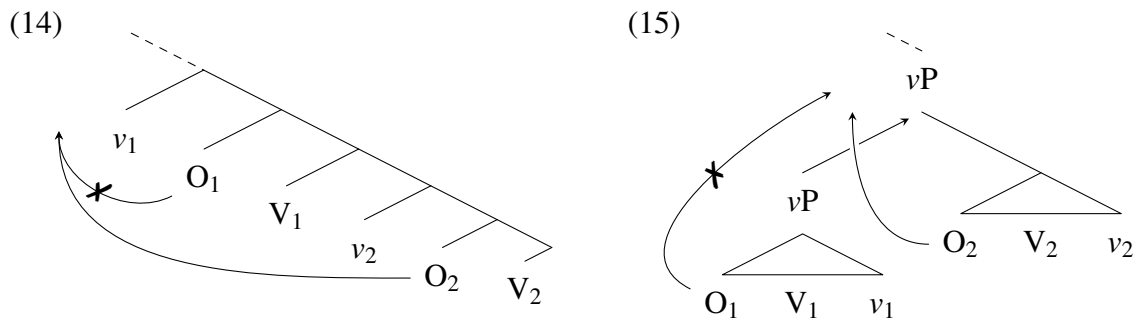
Carstens’ structure predicts that arguments can be extracted out of either verb, since all arguments merge with the clausal spine. Extraction can be tested a number of ways in Malayalam. Here, I use *wh*-clefting. Malayalam does not have standard *wh*-movement, but it does have a templatic cleft construction which allows for movement of *wh*-phrases; note that the fact that this construction involves movement from lower in the clause is evidenced by the case-marking of clefted nominals (Aravind 2018).

Attempting the extraction of the *wh*-object of each verb in a series, yields an asymmetry. The object of the final verb can be clefted, as demonstrated in (13a), whereas the objects of any preceding verbs cannot, as in (13b).<sup>5</sup>

<sup>5</sup> For brevity, I continue to use a variation of the construction with two transitive verbs. Note that this applies even for longer strings of verbs, that is, the object of any non-final verb can never be extracted in Malayalam.

- (13) a. *ent-ine<sub>i</sub>=yāṇṅ* *Rāmaṅ vaṅṅi* *ōṭiccū* *—<sub>i</sub>* *ṭṭicc-atū*.  
 what-ACC=be.PRS R. vehicle drive.STEM hit.PST-NMLZ  
 ‘What was it that Raman drove the car and hit?’  
 b. \**ent-ine<sub>i</sub>=yāṇṅ* *Rāmaṅ* *—<sub>i</sub>* *ōṭiccū* *matil ṭṭicc-atū*.  
 what-ACC=be.PRS R. drive.STEM wall hit.PST-NMLZ  
 ‘What was it that Raman drove and hit a wall?’

Returning to our two possible analyses, we see some differences in terms of how well they predict the data. For these data, without further stipulations, Carstens’ structure apparently overgenerates. Given her structure, it would be only the structurally lowest *wh*-phrase which could be extracted, as shown in (14). There is no obvious reason why this should be the case. In contrast, the adjunction structure, shown in (15), makes exactly the right prediction, if one assumes that these adjuncts in Malayalam are subject to the Condition on Extraction Domains (CED, Huang 1982), i.e. they are islands for extraction. Note that this diagnostic does not work in the other direction; extraction itself cannot be used to rule out whether an element is an adjunct or specifier, as there are exceptions to the CED, an issue which I return to in 3.2.



Once again, issues persist for a both analyses. A structure similar to the one proposed in Carstens (2002) is required to render q-binding. However, such a structure would entail that objects merge with the clausal spine, and thus should be equally susceptible to extraction, contrary to fact. Thus, the asymmetry between the verbs must be scrutinized further.

### 2.3. Coordination

Coordination is a standard constituency test; if non-final verbs (with their objects) can be coordinated, this is good evidence that the verb phrase that contains those elements is a constituent. If it is a constituent, then this suggests that the adjunction analysis is on the right track. If they cannot be coordinated, then this is more or less expected from the structure in (2), and we can safely assume that the inability to extract higher objects is due to some external issue.

The data in (16a), taken from the Malayalam grammar by Asher & Kumari (1997), show a case where three non-final verbs, ‘study,’ ‘teach,’ and ‘do,’ appear to belong to a coordinate structure together. Recall that Malayalam uses bisyndetic coordination, meaning each coordinand is followed by a coordinative morpheme (-um, in the case of conjunction). The coordinated verbs exhibit bare stem morphology, just like non-final verbs in canonical Malayalam verb series. Crucially, the final verb cannot be part of a coordinate structure which includes the preceding verbs, shown in (16b–c), irrespective of what morphology is used on those verbs.

- (16) a. *avarũ paṭhicc-um paṭhippicc-um jōli ceyt-um jīvikk-unnu.*  
 3PL study.STEM-CONJ teach.STEM-CONJ work do.STEM-CONJ live-IPFV  
 ‘They live studying, teaching, and working.’ (Asher & Kumari 1997:144)
- b. \**avarũ paṭhicc-um paṭhippicc-um jōli ceyt-um jīvikk-unn-um.*  
 3PL study.STEM-CONJ teach.STEM-CONJ work do.STEM-CONJ live-IPFV-CONJ  
 ‘They are studying, teaching, working, and living.’
- c. \**avarũ paṭhikk-unn-um paṭhippikk-unn-um jōli cey-unn-um jīvikk-unn-um.*  
 3PL study-IPFV-CONJ teach-IPFV-CONJ work do-IPFV-CONJ live-IPFV-CONJ  
 ‘They are studying, teaching, working, and living.’

This confirms that there is in fact some kind of structural asymmetry between non-final verbs and the final verb in a series in Malayalam. Once again, on their own, the results of this test may be interpreted in multiple ways. From the perspective of Carstens one plausible explanation for (16b–c) being ungrammatical is an incompatibility between the inflectional marker *-unnu* and the conjunctive morpheme *-um*. In other words, it could simply be that there is a morphological conflict which rules this out, even if the syntactic structure is generated normally. However, we have reason to believe that this is not the case. Asher & Kumari (1997) provide the following example, showing that inflected verbs may in fact be coordinated, at least for some speakers:

- (17) *avan cirikk-unn-um kaḷikk-unn-um unṭũ.*  
 3SG.M laugh-IPFV-CONJ play-IPFV-CONJ COP.IPFV  
 ‘He is laughing and playing.’ (Asher & Kumari 1997:137)

Moreover, as a reviewer points out, on Carstens’ analysis, where head finality is derived via Comp-to-Spec movement, if the coordinate structure is what raises to Spec,TP, the inflectional marker *-unnu* should follow the conjunctive morpheme *-um*, the opposite of what is observed in (16b). Without significantly modifying her assumptions, this presents a major problem for Carstens’ analysis.

For this reason, the more plausible explanation of the ungrammaticality of (16b–c) is that non-final verb phrases are constituents, and thus eligible for coordination. Once again, this is exactly what is predicted by the adjunct analysis. The final verb phrase, to which the other verb phrases adjoin, is not a constituent of the same type, and naturally cannot be part of a coordinate structure that contains itself and its adjuncts.

#### 2.4. Summary

Let us take stock of the situation. While the binding data that are cited as the motivation for the complementation analysis by Carstens (2002) are replicated in Malayalam, simple structural tests such as fronting, extraction, and coordination seem to paint a more complicated picture. Specifically, what we find is that non-final verb phrases can be fronted and coordinated, but are islands for extraction. Taken together, this minimally seems to indicate that they are constituents.

Evidence hence seems to converge on the complementation structure being unsuitable for straightforwardly capturing the facts in Malayalam. The most obvious alternative explanation is that non-final verb phrases are constituents that are adjoined to the main verb. As mentioned before, such a structure does not conform to what is expected, if one takes Reinhart’s (1983) claims about q-binding at face value. Thus, the question remains why (6) is possible at all.

## 3. Trouble with diagnostics

## 3.1. Binding as a diagnostic for structure

I propose that the reason that (6) is grammatical in the adjunction structure is simply because c-command is not necessary for quantificational binding. This is not a new idea — it is known that the c-command requirement for q-binding is relaxed in certain structures. Consider cases in English where c-command apparently does not apply, but q-binding may survive:

- (18) a. [<sub>DP</sub> The name [<sub>PP</sub> of every student<sub>i</sub>]] is written on her<sub>i</sub> name tag.  
 b. The professor [<sub>CoordP</sub> [<sub>VP</sub> read each paper<sub>i</sub>] and [<sub>VP</sub> gave it<sub>i</sub> a grade]].

These data have been taken to be cases of *weak crossover* (WCO), where there is no c-command relation between a binder and its antecedent, in contrast to *strong crossover* (SCO), where an antecedent c-commands its binder (Wasow 1972). WCO structures are understood to be perceived as less degraded than SCO structures.<sup>6</sup> Such data have been reported both in English and other languages (see also Barker 2012; Bruening 2014, and references therein). Note also that linear order additionally plays a role in WCO: it only works when the binder linearly precedes its antecedent, as demonstrated in (19).

- (19) \*The professor [<sub>CoordP</sub> [<sub>VP</sub> read it<sub>i</sub>] and [<sub>VP</sub> gave each paper<sub>i</sub> a grade]].

Intuitively, the reason for this is that in the majority of cases, c-command between arguments happens to coincide with linear precedence, so from the standpoint of parsing, the lack of c-command roughly simulates the expected linear distribution of binder and antecedent. In any case, the idea that I present here is that these apparent violations of the c-command requirement are good evidence that the binding data upon which Carstens' argument is constructed may be interpreted in more than one way, i.e. not necessarily as a diagnostic for c-command. This is corroborated when a broader swath of data is considered. For example, Malayalam actually allows quantificational binding out of subordinate clauses, as shown in (20), provided that linear precedence is respected.

- (20) *ñāñ ōrō kuṭṭi-ye-yum eṭukk-um=bōḷ atinte amma ōṭi var-um.*  
 1SG each child-ACC-CONJ take-FUT=when 3SG.N;GEN mother run.STEM come-FUT  
 'When I pick up each child<sub>i</sub>, its<sub>i</sub> mother will come running.'

In other words, the binding data that Carstens (2002) finds seem to be independent of serial verb constructions per se, which in turn indicates that compatibility with an adjunction analysis cannot be evaluated on the basis of such binding facts, pace Carstens. Note that binding out of subordinate clauses is not unique to Malayalam; similar data have been reported in Mandarin:

- (21) *jianchaguan zai xunwen mei-wei waiji xianyifan de shihou, yiding*  
 prosecutor PROG interrogate every-CL foreign suspect DE time definitely  
*dou hui anpai yi-wei fanyiyuan zai ta pangbian zuo fanyi*  
 all will arrange one-CL translator at he beside do translation  
 '(At the time) when a prosecutor interrogates [every] foreign suspect<sub>i</sub>, the court will definitely arrange a translator to do the translation beside him<sub>i</sub>.' (Huang & Lin 2021:(34))

<sup>6</sup> See also Ross et al. (2023) for experimental evidence.

Such examples confirm that q-binding out of adjuncts is widely empirically attested. This is somewhat unsurprising, since in my judgement, and in the judgement of all other native speakers of English I was able to survey, the paraphrase provided in (20) is grammatical even in English. But crucially, these kinds of structures are not judged to be grammatical across all languages. Q-binding out of subordinate clauses is truly disallowed in other Western European languages; for example, in French and German they appear to be degraded (in a way typical of WCO):

- (22) a. \**Quand chaque étudiant aura rendu son devoir,*  
 When each student have;FUT.3SG turn\_in;PFV.PTCP 3SG.POSS.M homework  
*je lui donn-er-ai sa note.*  
 1SG.NOM 3SG.DAT give-FUT-1SG 3SG.POSS-F grade  
 Intended: ‘when each student<sub>i</sub> has turned in his<sub>i</sub> homework, I will give him<sub>i</sub> his<sub>i</sub> grade.’  
 (Prudence de Pontbriand, p.c.)
- b. \**Wenn ich jed-es Eis ess-e, schmeck-e ich sein-e*  
 when 1SG.NOM each-N ice\_cream eat-1SG taste-1SG 1SG.NOM 3SG.POSS-F.ACC  
*Sorte.*  
 variety  
 Intended: ‘when I eat each ice cream<sub>i</sub>, I taste its<sub>i</sub> flavour.’  
 (Katja Friedewald, p.c.)

As such, there is quite a bit of crosslinguistic variation with regard to q-binding out of adjuncts. We are left to assume that in at least some cases in some languages, linear order can rescue q-binding even where c-command is not found. What is problematic is whether these are simply cases of WCO, which should mean that they are judged as degraded (in my investigations, the examples marked as grammatical were not) or something else accounts for their acceptability altogether. This warrants further investigation, but the upshot is that the empirical landscape of q-binding casts some doubt on the utility of q-binding as a diagnostic for c-command. At a minimum, it should be confirmed that c-command is truly required for q-binding in a language (as in French and German) before it is used as evidence for any particular structure in that language. Likewise, if q-binding is not a proxy for c-command in a given language, as seems to be the case in many languages, then there is little basis for a Carstens (2002)-style analysis.

### 3.2. A note on extraction domains

I suggested in 2.2 that the inability to extract arguments from a position provides good evidence that it is an island. For this reason, I argued that the analysis of Malayalam verb series as adjunction structures is correct, because adjuncts are probably islands. However, it is well known that there are a number of cases where apparent adjuncts are not islands, and do tolerate extraction. Such examples as (23) are certainly found in English.

- (23) *What did John drive Mary crazy [trying to fix \_\_\_\_]?* (Truswell 2007:2)

The implication is that while islands are commonly specifiers (including moved XPs) or adjuncts, specifiers and adjuncts do not themselves always need to be islands.<sup>7</sup> I clarify here that SVCs in

<sup>7</sup> A reviewer correctly points out that quite some intra-language variation on this point, such that even very similar structures in a given language may diverge in extraction behaviour. The implication certainly seems to be



some languages do allow the extraction of all arguments in a series. An example is given below from Gungbe:

- (24) a. *ménù<sub>i</sub> wè \_\_\_\_\_<sub>i</sub> ná kùn mótò cè sò àdó.*  
 who FOC FUT drive car 1SG.POSS hit wall  
 ‘Who will drive my car and hit the wall?’
- b. *été<sub>i</sub> wè Sésínú ná kùn \_\_\_\_\_<sub>i</sub> sò àdó.*  
 what FOC S. FUT drive hit wall  
 ‘What will Sesinou drive and hit the wall?’
- c. *été<sub>i</sub> wè Sésínú ná kùn mótò cè sò \_\_\_\_\_<sub>i</sub>.*  
 what FOC S. FUT drive car 1SG.POSS hit \_\_\_\_\_<sub>i</sub>  
 ‘What will Sesinou drive my car and hit?’ (Aboh 2009:6)

Given that the adjunction analysis seems to work for Malayalam, one may wonder if all serializing languages underlyingly use adjunction, and it simply happens to be the case that adjoined verb phrases are not islands in a subset of those languages, including Gungbe.

However, there are some reasons to assume that a version of the complementation structure is actually consistent with some languages. One major reason for this is that in series that contain two verbs, languages like Gungbe seem to impose fairly strict thematic constraints on how many arguments each verb may have, and which arguments are  $\theta$ -marked by which verbs. For example, Aboh (2009:26) argues that  $V_1$  in such a structure is never triadic<sup>8</sup>:

- (25) \**Kòfí ná kwé<sub>i</sub> xò xwé pro<sub>i</sub>.*  
 K. give money buy house  
 ‘Kofi gave money (to) buy a house’ (Aboh 2009:26)

Such a thematic restriction is not expected under an adjunction analysis, where each verb should be relatively free in terms of how many arguments it takes, as is the case with Malayalam (Jayaseelan 2004:87). A complementation structure could be modified to accommodate this, without any additional explanation for the extraction facts in (24). For this reason, the most likely scenario is one where multiple structures are at play across different serializing languages, pace Carstens (2002).

#### 4. Outcomes and further research

This paper has argued that complementation analyses of serial verb constructions do not extend easily across languages. While they have the benefit of straightforwardly accounting for Muysken’s Anomaly and q-binding between objects of separate verbs in a series, they make two predictions which are not borne out in every serializing language which shares those binding facts. The first of these is that only the final verb in a series forms a constituent with its object. Data from Malayalam show that the opposite is true; all non-final verbs in a Malayalam SVC form a constituent with their respective arguments. The second is that extraction of objects from either verb should be licit, all else being equal. Once again, the Malayalam data demonstrate an asymmetry between the final verb in the series, whose objects may be extracted, and those that

that some island constraints are best formulated in language-specific terms.

<sup>8</sup> In fact, for Aboh,  $V_1$  never takes an internal argument at all; the apparent internal argument in the examples in (24) are in fact applied arguments introduced by a  $v_{\text{appl}}$  above  $VP_2$ .

precede it, which seem to disallow extraction.

These two diagnostics, taken together with the coordination facts, strongly suggest that non-final verbs in Malayalam are CED-compliant adjuncts that merge with the final verb. The proposed structure, where non-final verbs are contained within phrasal adjuncts, is incompatible with objects in different verbs standing in a c-command relation. On the basis of many apparent violations of the c-command requirement for q-binding across languages, I concluded that it cannot be straightforwardly used as a diagnostic for structure in SVCs, unless it is independently verified that q-binding entails c-command in a given language. As such, I conclude that data that conform to the properties which inform the analysis in Carstens (2002) may be incompatible with the kind of structure she proposes, when scrutinized more closely.

However, both Carstens' structure and the one endorsed here for Malayalam SVCs do have some common elements. The amount of structure suggested by both analyses point to SVCs being underlyingly structurally small, as opposed to, e.g. multi-clausal constructions (see also Swenson 2016 for similar ideas on Malayalam). Both also share another characteristic, which is that each verb appears to select a structure in the syntax that linearly follows it (assuming that adjuncts in some way select their hosts). If this is a valid generalization, it may be the case that Carstens' idea about  $V_1$  selecting  $vP_2$  may be reformulated in more general terms to render similar outcomes with somewhat different structures across languages. I will leave this question open for future research.

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**More misery is coming:**  
Negative Concord not as a form of AGREE in West Slavic

Nikola Moore

This paper explores the phenomenon of Negative Concord (NC) in West Slavic (WS) languages and challenges the comparison to the traditional Minimalist AGREE. Through empirical analysis, it demonstrates that NC operates beyond typical locality constraints such as the Phase Impenetrability Condition (PIC) and Condition on Extraction Domains (CED) and instead conforms to the finite CP boundary. This constraint applies uniformly to both licensing and movement, implying that no NC items can cross finite CP boundaries. By adopting a downward AGREE framework, this study provides a clearer understanding of NC, highlighting its distinct syntactic behaviour and reinforcing the significance of the CP boundary in WS languages.

*1. Introduction and definitions*

Negative Concord, one of the signature characteristics of the West Slavic<sup>1</sup> grammatical structure, has been enjoying a lot of attention from generative syntacticians. This is mainly due to its positioning on the interface of syntax and semantics and the fine art of multiple negative items uniting to express a single semantic negation. This paper sheds light on how NC also raises fundamental questions about the mechanisms underlying otherwise well-studied syntactic operations and their applications.

A natural starting point is to introduce Negative Concord (NC). As an experienced reader might be already aware, NC is a phenomenon of multiple negative items contributing to the same semantic negation. This in practice means that indefinites (e.g. *something*, *somebody*, *somewhere*) show in an obligatorily negative form (i.e. *nothing*, *nobody*, *nowhere*), typically marked with the prefix *ni-*,<sup>2</sup> when neighbouring a negative layer, typically overtly marked as

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<sup>1</sup> Under the term ‘West Slavic’, this paper understands mainly Czech, Polish, Slovak, and their dialects, although similarities with less widely spoken members of this language family such as Sorbian or Silesian are also likely.

<sup>2</sup> Note that negative indefinites in West Slavic (WS) are typically marked with the negative prefix *ni-* (e.g.



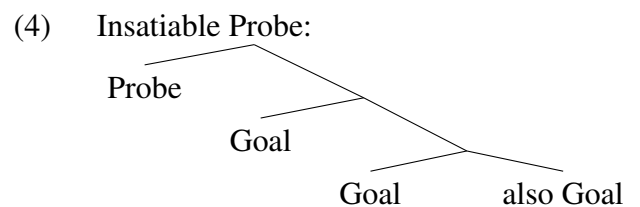
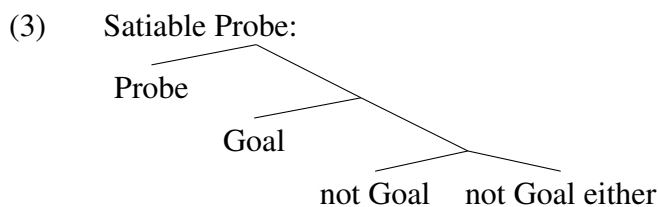
The author concludes that following the definitions in Chomsky (2001), where Probes are defined by their interpretable features and Goals by their uninterpretable features, the Probe of NC constructions must be the indefinite and the Goal must be the verbal negation. In most known cases, Zeijlstra's Probe will be situated lower in the construction than the Goal, meaning that the operation applies from the lower end upwards, resulting in the notion of an Upward AGREE.

However, Deal (2022), a piece critical of Zeijlstra (2004), responds that it is not SEMANTICS but rather MORPHOLOGY that needs licensing from syntactic operations. More importantly, this work presents an alternative attitude of downward-facing AGREE operation, which leads to consistently correct predictions on the possibility of double-negation reading of some NC constructions or an elaborate explanation of what initially appeared as optionality for NC amongst multiple Indo-European languages.

The present study adopts a downward analysis of Negative Concord (NC) following Deal (2022), where the verbal negation (the prefix *ne-* or prepositional clitic *nie*) acts as a Probe, and indefinites serve as Goals that receive the prefix *ni-* after matching with the Probe. This contrasts with the upward analysis proposed by Zeijlstra (2004), where negative indefinites are Probes targeting a singular Goal, the verbal negation.

This paper adopts the downward analysis for the following reasons: First, this analysis follows the traditional syntactic hierarchy where higher elements (Probes) govern and interact with lower elements (Goals) rather than vice versa. Second, it eliminates the need to explain the complexities behind how multiple Probes (i.e. negative indefinites) target a singular Goal (i.e. the verbal negation) without impacting the negative marking on either. Third, it minimises the number of steps needed for the correct final form: only one operation (i.e. only one active verbal Probe targeting every indefinite Goal in its domain) is necessary to yield accurate NC construction, while multiple operations initiated by multiple Probes (i.e. multiple negative indefinites) are necessary to yield accurate NC constructions according to the alternative thesis.

Note that for the downward analysis to hold, the verbal negation must be an *insatiable Probe* (Deal 2022). This means that the Probe does not deactivate upon matching its features with the first available Goal but proceeds to match with every other available Goal until the end of its domain. Trees (4) and (3) provide a visualisation of the difference between a satiable and an insatiable Probe. Example (5) shows that NC in WS requires the marking of every available indefinite and therefore more closely resembles the insatiable thesis shown in (3).



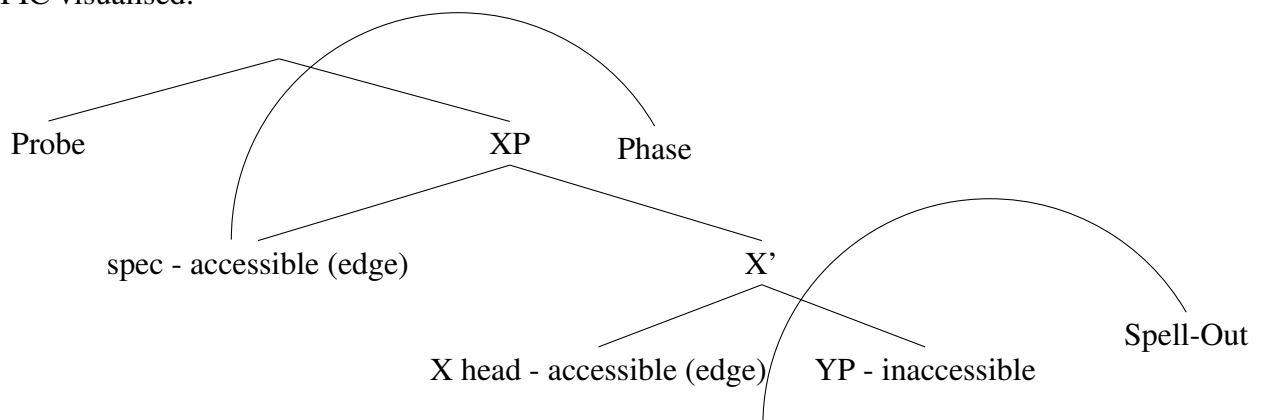
- (5) Marek **ne-vie**                    **ni-č/\*niečo**                    o  
 Marek NEG-know.3SG NEG.NDEF-thing.ACC/\*something.ACC about  
**ni-kom/\*niekom**.  
 NEG.NDEF-.LOC/\*someone.LOC  
 'Marek doesn't know anything/\*something about anybody/\*somebody.'            (Slovak)

That said, the traditional Minimalist AGREE (regardless of its direction) is also an operation restricted to a certain, finite domain. This domain has been widely studied and several so-called locality constraints, containing the operation to a local domain, have been proposed. One of the most cited constraints on AGREE have been the *Phase Impenetrability Condition* (Chomsky 2001) and the *Condition on Extraction Domains* (Huang 1982). As a form of the Minimalist AGREE, NC should play by the same rules and give in to the same constraints.

PIC (6) is a constraint on the interaction between the Probe and the Goals based on phases. The condition states that only the edge of a phase (i.e. the spec and the head) are accessible to Probes from above this phase. At this point, the complement has been sent to the spell-out and is no longer available (see visual in (7)). Note that this constraint depends on the definition of the phasal head. In this context, popularly discussed heads have been especially C, *v*, D, and P.

(6) *Phase Impenetrability Condition (original definition)*: The domain of a head X of a phase XP is not accessible to operations outside XP; only X and its edge are accessible to such operations (Chomsky 2001).

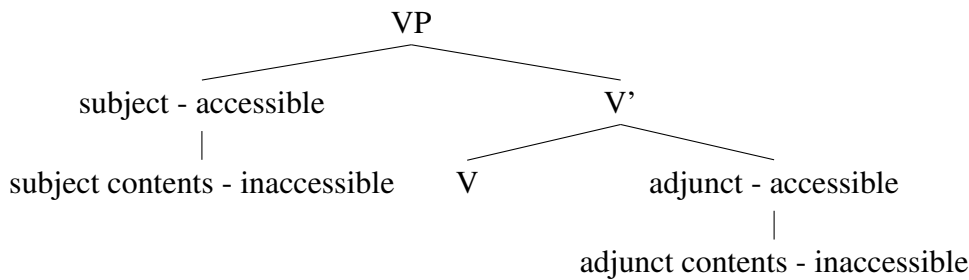
(7) PIC visualised:



CED (8), on the other hand, restricts the interaction of an external Probe with items contained within more complex subjects and adjuncts. In other words, due to the lack of ‘proper governance’, items inside subjects and adjuncts (though not subjects and adjuncts as a whole) are not available for extraction and (and other external operations). The head of a phrase is not discussed as it is typically not targeted or extracted to the same extent as subjects and adjuncts (see (9) for a visual outline of the constraint).

(8) *Condition on Extraction Domains (original definition)*: A phrase A may be extracted out of a domain B only if B is properly governed (Huang 1982).

(9) CED visualised:



As outlined above, the domain of the traditional Minimalist AGREE has been at the centre of the generative debate. However, its application to other matching operations labelled as forms of AGREE has so far gone rather unnoticed.

This paper makes the following claims: (i) that NC does not subscribe to the same locality constraints as the traditional Minimalist AGREE, (ii) that the true constraint NC responds to is the CP boundary, (iii) that, in order for this constraint to hold, CP has to be finite, and (iv) that this constraint applies for licensing as well as movement.

### 3. Negative Concord and Locality

In order to determine whether or not NC displays similar behaviours as the Minimalist AGREE, it is also necessary to look at how AGREE applies in the standard contexts (as proposed by the discussions on locality). That said, this section first tests the behaviours of typical AGREE Probes, C and T, and tests similar situations with the negative Probe (previously assumed to be the verbal negative marker) second. Two previously mentioned conditions, the PIC and CED, are tested.

In this section, this paper discusses PIC. Recall that PIC is responsible for a Probe from outside a phase failing to access Goals inside the next phase's complements. More specifically, a commonly attested Probe such as T (responsible for the subject-verb agreement) should not be able to agree with items inside the complements of phasal heads such as C, *v*, D and P. This paper focuses on D and P, as C is later argued to be the true boundary and *v* is directly chained with the negative layer in ways that go beyond the scope of this paper.

The best way to show the application of PIC in the language is to try to force T into agreeing with Goals inside DPs and PPs of predicates with no subjects to agree with. In other words, if T has no subject to agree with, will it reach into a DP or a PP for the next best available option or is there a boundary it cannot cross due to the PIC? The way to tackle this question is through subject-free predicates such as weather predicates.

Consider (10) and (11). In these weather predicates, T has no subject to agree with, but it does have Goals available behind the PP and DP boundary respectively. Note that the target Goals are in both cases plural. This means that if T could successfully reach these Goals, the verbs would have displayed a plural agreement—but they do not. This is because Goals inside PPs and DPs are not available, showing that the PIC in WS applies.

- (10) V Európe prš-**í**/\*prš-ia [<sub>PP</sub> počas všetk-**ých** obdob-**í**].  
 In Europe.LOC rain-**3SG**/\*rain-3PL [<sub>PP</sub> during all-**PL.GEN** season-**PL.GEN**]  
 'In Europe it rains during all the seasons.' (Slovak)



- (11) Padał-**o**/\*padał-y [DP cał-**e** dn-**ie**].  
 rain.3SG.PAST/\*rain.3PL.PAST [DP all.PL.ACC day.PL.ACC]  
 ‘It rained all days.’ (Polish)

This study next tests PIC in the same context (that is, of DP and PP) for the negative Probe. For the lack of suitable examples, (10) and (11) only showed the presence of PIC in adjunct contexts, which can be more easily complemented by DP and PP arguments in the context of the negative Probe, as any eligible argument can be modified to contain an appropriate indefinite that either is or is not accessible. Note that all tested DPs and PPs must be embedded to ensure that they are placed in the complement.

Although argument PPs in case-rich languages such as WS are less frequent than in less case-rich languages (e.g. English or Italian), there exist suitable verbs that mandatorily select a PP for arguments (12). However, both in argument (12) and in adjunct (13) PPs, positive indefinites are ungrammatical. Likewise, Goals inside both argument (14) and adjunct (15) DP are mandatorily licensed. This means that the negative Probe successfully reaches Goals inside these phrases, even though PIC predicted it would not.

- (12) Zoja [PP S **ni**-kým/\*někým] **ne**-vychází.  
 Zoja [PP with NDEF-person.INS/\*somebody.INS] NEG-get.along.3SG  
 ‘Zoja doesn’t get along with anyone/\*someone.’ (Czech)

- (13) Zoja **ne**-spa-la [PP počas **ni**-ktor-ej/\*niektor-ej  
 Zoja.NOM NEG-sleep-PAST.FEM [PP during NDEF-some-GEN/\*some-GEN  
 prezentáci-e].  
 presentation-GEN]  
 ‘Zoja didn’t sleep during any/\*some of the presentations.’ (Slovak)

- (14) Marek **ne**-opáči-l [DP kúsok [DP **ni**-jak-ého/\*nejak-ého  
 Marek.NOM NEG-taste-PAST.MASC [DP bit.ACC [DP **n**-some-GEN/\*some-GEN  
 syr-a]].  
 cheese-GEN]]  
 ‘Marek didn’t try a piece of any/\*some cheese.’ (Slovak)

- (15) Zoja **nie** widzia-ła [DP prezent-u [PP dla  
 Zoja.NOM NEG see-PAST.FEM [DP present-ACC [PP for  
**ni**-kogo/\*kogoś]].  
**n**-person.ACC/\*somebody.ACC]]  
 ‘Zoja didn’t see a present for anybody/\*somebody.’ (Polish)

This paper now moves on to discussing CED. Recall that CED restricts the access of a Probe to Goals INSIDE the subjects and adjuncts of phrases (though subjects and adjuncts as a whole remain accessible). In other words, parts of complex subjects and adjuncts are not accessible to an external Probe. This condition must be very familiar to the reader due to its close association with the restrictions on fronting in *wh*-questions, licensed by the C Probe.

CED splits into two main parts: (i) the subject condition and (ii) the adjunct condition. By the subject condition, the C Probe attempts to reach inside complex subjects or adjuncts and tries to agree with only parts of them. If this agreement were successful, C would have successfully fronted parts of the shown subjects (16) and adjuncts (17) but it fails, showing that CED is indeed a valid constraint for AGREE in WS.

- (16) a. [sub<sub>j</sub> Komentár o Marekovi] nahneval Zoju.  
 [sub<sub>j</sub> comment.NOM about Marek.LOC] upset.MASC.PAST Zoja.ACC  
 ‘A comment about Marek upset Zoja.’
- b. \*O kom [sub<sub>j</sub> komentár \_\_\_\_] nahneval Zoju?  
 about who.LOC [sub<sub>j</sub> comment.NOM \_\_\_\_] upset.MASC.PAST Zoja.ACC  
 Intended: ‘A comment about whom upset Zoja?’ (Slovak)
- (17) a. Zoja žiarli, [adj lebo Marek sa ne-rozpráva s ňou].  
 Zoja.NOM be.jealous.3SG [adj because Marek SE NEG-talk.3SG with 3SG.INS]  
 ‘Zoja is jealous because it is not her that Marek is talking to.’
- b. \*S kým Zoja žiarli, [adj lebo Marek sa ne-rozpráva  
 with who.INS Zoja.NOM be.jealous.3SG [adj because Marek SE NEG-talk.3SG  
 \_\_\_\_]?  
 \_\_\_\_]  
 Intended: ‘Who is it that Zoja is jealous of Marek not talking to?’ (Slovak)

In order to assess the ability of the negative Probe to access elements inaccessible by the CED, it is important to consider examples with complex subjects and adjuncts involving indefinites. Such constructions may involve, for example, embedded genitives (18) or clausal subjects (19). According to the CED, no elements inside these subjects should be accessible to the negative Probe, but their licensing is either mandatory (18) or at least acceptable to a part of the speakers (19).<sup>4</sup>

- (18) [sub<sub>j</sub> Ni-čí/-koho/ \*nie-čí/\*-koho otec] ne-pil  
 [sub<sub>j</sub> n-POSS/-person.GEN/ \*somebody-POSS/\*-GEN father] NEG-drink.3SG.PAST  
 víno.  
 wine.ACC  
 ‘Nobody’s father drank wine.’ (Slovak)
- (19) ?[sub<sub>j</sub> Vystopovať ni-koho/niekoho] dnes nie je jednoduché.  
 [sub<sub>j</sub> track.down.INF n-person.ACC/somebody.ACC] today NEG be.3SG easy.3SG  
 ‘Tracking anyone/\*someone down is not easy these days.’ (Slovak)

As an attentive reader may have noticed, both of these examples also show an interesting phenomenon: the licensed indefinites may occur well before the negative Probe in the surface repre-

<sup>4</sup> Note that WS is a group of frequently scrambling languages. This means that the partial acceptability of (19) may well be a result of a more lenient application of long-distance rather than argument movement. However, (19) is just an additional example of a CED violation confirmed in (18) with a firm judgement.

sentation. This suggests that rather than surface-level *c*-command (e.g. Moritz & Valois 1994), NC requires that the negative Probe *c*-commands its Goal, the negative indefinite, at least at some point of the derivation.

The constant failure of the CED to hold for the negative Probe also extends to the adjunct condition. In addition to the access to Goals inside complex PPs (13) and DPs (15), this section adds an example of a non-finite CP. As discussed in the later section, it comes as no surprise that indefinites inside non-finite CPs are available to agree with external Probes. However, CED predicts that any adjunct inside these complements should not be accessible. Much to the contrary of this prediction, the negative Probe (20).

- (20) a. Zoja **ne-chce** [CP **ni-komu** pomôcť]  
 Zoja.NOM NEG-want.3SG [CP NEG.NDEF-person.ACC help.INF]  
 ‘Zoja doesn’t want to help anybody.’
- b. Zoja **ne-chce** [CP **prísť** [CP **ni-komu** pomôcť]]  
 Zoja.NOM NEG-want.3SG [CP come.INF [CP NEG.NDEF-person.DAT help.INF]]  
 ‘Zoja doesn’t want to come to help anyone.’
- c. \*Zoja **ne-chce** [CP **prísť** [CP **niekomu** pomôcť]]  
 Zoja.NOM NEG-want.3SG [CP come.INF [CP NEG.NDEF-person.DAT help.INF]  
 int.: ‘Zoja doesn’t want to come to help anyone.’ (Slovak)

#### 4. CP as a boundary

Recall that this paper proposed that the domain of NC is, rather than the typical domain of AGREE as shown above, the finite CP. That CP is a reliable boundary is evident from various contexts such as CPs embedded using various complementisers such as *že* (21) and *aby* (22) (roughly equivalent to English ‘that’), interrogative CPs (23), and relative clauses (24). In all these contexts, attempting to extend NC inside these CPs yields a double-negation reading.

- (21) Zoja **ne-povedala** [CP *že* **ni-č** **ne-kúpi**].  
 Zoja NEG-say.PAST.FEM [CP C NEG.NDEF-thing.ACC NEG-buy.FUT.3SG]  
 ‘Zoja didn’t say that she wouldn’t buy anything.’ (Slovak)
- (22) Marek **ne-chce** [CP *aby* **ni-kdo** **ne-přišel**].  
 Marek NEG-want.3SG [CP C NEG.NDEF-person.NOM NEG-come.PAST.3SG]  
 ‘Marek doesn’t want that nobody comes.’ (Czech)
- (23) Marek **ne-vidí** [CP *jak se* **ni-komu** **ni-c**  
 Marek NEG-see.3SG [CP how SE NEG.NDEF-person.DAT NEG.NDEF-thing.NOM  
**ne-daří**].  
 NEG-do.well.3SG]  
 ‘Marek doesn’t see how nobody is doing well.’ (Czech)

- (24) **Ni**-kto, [CP kto **ne**-prišiel,] **ne**-oľutoval.  
 NEG.NDEF-person [CP who NEG-come.MASC.PAST] NEG-regret.MASC.PAST  
 ‘Nobody who didn’t come regretted (not coming).’ (Slovak)

Crucially, for CP to successfully keep two semantic negations apart, this CP needs to be finite. This boundary makes sense: it is only inflected verbs that can merge with a negative layer and trigger thus NC, and so every time an inflected verb merges in, the boundary gets established, just to prevent domain clashes in case the verb later also merges with a negative layer.<sup>5</sup> Neat contrasting examples of this difference are control-verb constructions (25) as well as relative clauses (26).

- (25) a. Zoja **ne**-chce [CP **ni**-komu/\*někomu  
 Zoja.NOM NEG-want.3SG [CP NEG.NDEF-person.DAT/\*somebody.DAT  
 pomoct].  
 help.INF]  
 ‘Zoja doesn’t want to come to help anyone/\*someone.’
- b. Zoja **ne**-chce [CP aby **ni**-komu **ne**-pomohla].  
 Zoja.NOM NEG-want.3SG [CP C NEG.NDEF-person.DAT NEG-help.SG.PAST]  
 ‘Zoja doesn’t want that she help no one.’ (Czech)
- (26) a. Marek **ne**-videl **ni**-jakú knihu [RC ležiacu  
 Marek NEG-see.3SG.PAST NEG.NDEF-which book.ACC [RC lie.INF.FEM.ACC  
 na **ni**-ktorom/\*nie-ktorom zo stolov]  
 on NEG.NDEF-which.LOC/\*some.LOC from table.PL]  
 ‘Marek saw no book lying on any of the tables.’
- b. Marek **ne**-videl **ni**-jakú knihu [RC ktorá  
 Marek NEG-see.3SG.PAST NEG.NDEF-which book.ACC [RC REL  
 ležala na niektorom/\***ni**-ktorom zo stolov]  
 lie.FEM.3SG.PAST on some.LOC/\*NEG.NDEF-which.LOC from table.PL]  
 ‘Marek saw no book that lied on any of the tables.’ (Slovak)

### 5. Negative Concord in motion

Perhaps most interesting of all is the observation that this boundary is not only applicable to licensing but further extends to restricting movement. In the case of NC, one can consider two types of movements: (i) the movement of the Probe (i.e. the verbal prefix *ne-* or prefix *nie*) as well as (ii) the movement of the Goal. The aim of this section is to demonstrate that the

<sup>5</sup> Note that infinitive verbs in WS can occasionally also merge with a negative layer (i), necessarily implying that the low-focus reading for this complement. Read Belletti (2004) for a more detailed analysis of low focus.

- (i) Marek dnes chce **ni**-c **ne**-pít  
 Marek today want.3SG NEG.NDEF-thinking NEG-drink  
 ‘It is not drinking anything that Marek wants to do today.’ (Czech)

otherwise reasonable movement across the finite CP is not possible for NC items.

In this section, this paper discusses moving the Probe first. Moving verbal negation across the CP boundary is not an unheard-of phenomenon in generative syntax. Consider Collins & Postal (2017). According to this analysis, the negative layer can freely raise from the embedded clause to the matrix clause without any changes to the overall meaning conveyed by the construction.

As one of the main arguments for such a movement, the study offers examples of clauses with embedded Negative Polarity Items (NPIs) which need a clausal negative layer to yield a grammatical single-negation reading. This reading is also available if the singular present negative layer occurs in the matrix clause, demonstrating that it must have been the same negation raising rather than a different negation freshly merged (27).

- (27) a. [CP I do think [CP that Marek doesn't know [NPI *jackshit*] about archery]].  
 b. [CP I don't think [CP that Marek \_\_\_\_\_ knows [NPI *jackshit*] about archery]].

Although it appears that the same kind of raising is possible in WS because it also offers the option to change the placement of the verbal negation from its embedded position to the matrix position with no impact on the meaning (28), this view is rather deceptive. This is because as soon as negative indefinites (which, by the way, serve exactly as strict NPIs due to requiring a local licenser) get involved, this raising movement is no longer licensed and the verbal negation must stay within its original CP (29).

- (28) a. [CP Marek si myslí [CP že Zoja **ne-príde**]]  
 [CP Marek.NOM SE think.3SG [CP C Zoja.NOM NEG-come.3SG.FUT]]  
 'Marek thinks that Zoja will not come.'
- b. [CP Marek si myslí [CP že Zoja **ne-príde**]]  
 [CP Marek.NOM SE think.3SG [CP C Zoja.NOM NEG-come.3SG.FUT]]  
 'Marek thinks that Zoja will not come.' (Slovak)
- (29) a. [CP Myslím, [CP že Marek \*(**ne-**)vie [NPI *a-ni*  
 [CP think.1SG [CP C Marek.NOM \*(NEG-)know.3SG [NPI *either-NEG.NDEF*  
*hovno*]]].  
*shit*.ACC]]]  
 'I think Marek doesn't know *jackshit*.'
- b. \*[CP **Ne-**myslím, [CP že Marek vie [NPI *a-ni*  
 [CP NEG-think.1SG [CP C Marek.NOM know.3SG [NPI *either-NEG.NDEF*  
*hovno*]]].  
*shit*.ACC]]]  
 'I don't think Marek knows *jackshit*.'
- c. [CP **Ne-**myslím, [CP že Marek **ne-**vie [NPI *a-ni*  
 [CP NEG-think.1SG [CP C Marek.NOM NEG-know.3SG [NPI *either-NEG.NDEF*  
*hovno*]]].  
*shit*.ACC]]]  
 'I don't think Marek doesn't know *jackshit*' (Slovak)

With that in mind, this paper moves on to discussing moving the Goal. Perhaps the simplest way to show the possible — or rather impossible — movement of the Goals of NC is through fronting. This is because through this movement, parallels with other types of elements such as *wh*-words and even definite arguments can be drawn. While both of these types of arguments can be easily fronted from the embedded CP, the negative indefinite cannot assume the frontal position in a clause and must stay in the clause of initial merge (30).

- (30) a. Koho Marek hovoril, [CP že zajtra (ne-)stretne \_\_\_\_\_]?  
 who.ACC Marek say.SG.PAST [CP C tomorrow (NEG-)meet.3SG.FUT \_\_\_\_\_]  
 ‘Who did Marek say that Marek he’d meet tomorrow?’
- b. Zoju Marek hovoril, [CP že zajtra (ne-)stretne \_\_\_\_\_]?  
 Zoja.ACC Marek say.SG.PAST [CP C tomorrow (NEG-)meet.3SG.FUT \_\_\_\_\_]  
 ‘Was it Zoja that Marek said he’d meet tomorrow?’
- c. \*Ni-koho Marek hovoril, [CP že zajtra  
 NEG.NDEF-person.ACC Marek say.SG.PAST [CP C tomorrow  
 ne-stretne \_\_\_\_\_]?  
 NEG-meet.3SG.FUT \_\_\_\_\_]  
 ‘Was it nobody that Marek said he’d meet tomorrow?’ (Slovak)

Note that one might argue that example (30) is ungrammatical not because the negative indefinite is attempting to cross the C boundary but rather because negative indefinites simply may not be selected for fronting (cf. *As for the teacher, John saw them yesterday* and *As for nobody, John saw them yesterday*). However, this movement is not allowed into alternative positions, either (31).

- (31) a. \*Marek ni-koho hovoril, [CP že zajtra  
 Marek NEG.NDEF-person.ACC say.SG.PAST [CP C tomorrow  
 ne-stretne \_\_\_\_\_]?  
 NEG-meet.3SG.FUT \_\_\_\_\_]  
 ‘Was it nobody that Marek said he’d meet tomorrow?’
- b. \*Marek hovoril ni-koho, [CP že zajtra  
 Marek say.SG.PAST NEG.NDEF-person.ACC [CP C tomorrow  
 ne-stretne \_\_\_\_\_]?  
 NEG-meet.3SG.FUT \_\_\_\_\_]  
 ‘Was it nobody that Marek said he’d meet tomorrow?’ (Slovak)

## 6. Conclusion

This paper substantiates that Negative Concord in West Slavic languages operates beyond the traditional Minimalist AGREE constraints like PIC and CED, indicating its own distinct syntactic behaviour. The primary constraint governing NC is the finite CP boundary, which ensures that only clauses with inflected verbs can participate in NC, thereby preventing domain clashes and maintaining the integrity of negation structures. This constraint applies to both the licensing

of Goals as well as the movement of all participating items. These findings enhance our understanding of NC's unique syntactic properties in WS languages and contribute to the broader theoretical framework of generative grammar.

This study of course does not come without limitations and space for future research. This paper consulted native speakers of the three most widely spoken West Slavic languages: Czech, Polish, and Slovak. This selection was intentional in order to represent as much of the speaker base of WS as possible. However, although many similarities are expected to occur, this does not mean that all of the above-mentioned patterns will necessarily immediately generalise to equivalent constructions in all remaining WS languages (e.g. Sorbian or Silesian). More fieldwork and data on this phenomenon could be an interesting avenue of investigation for researchers in typology, language variation, and comparative syntax.

Experimental data could likewise alter the course of this debate. For example, Lyutikova & Gerasimova (2023) argues for (rather than against) the analysis of NC as a form of AGREE in Russian based on locality patterns discovered by manipulating the position of NPIs on larger samples of speakers. While patterns from East Slavic languages are not necessarily automatically applicable to West Slavic settings (and in fact vary significantly in the context of NC), they demonstrate the potential of experimental data to reveal comparable patterns in West Slavic. The data collected for this paper, by contrast, relies on judgements from individual speakers rather than spontaneous or corpus-based usage and lacks the capacity to form such generalisations.

Finally, this paper only focused on simple syntactic constructions: simple transitive and ditransitive constructions, embedded clauses, genitive phrases, and the like. Future research in the field of theoretical syntax on the topic of NC in WS could find some interesting extensions from more complex constructions such control verb constructions, other locality constraints such as coordinate structure constraints (Ross 1967), and constructions that appear to be sensitive to language contact and adopt patterns from neighbouring, often non-NC languages such as resultatives (e.g. Drinka, 2017).

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*Abbreviations*

3	3rd gram. person	NEG	negation
ACC	accusative	NDEF	indefinite
C	complementiser	NOM	nominative
DAT	dative	MASC	masculine gender
FEM	feminine gender	PAST	past tense
FUT	future tense	PL	plural
GEN	genitive	POSS	possessive
INF	infinitive	REL	relativiser
INS	instrumental	SE	SE particle
SG	singular	LOC	locative

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# Processing of pseudo-affixes in words and non-words

A study on Bangla prefixes

Basita Biswas & Moumita Mukherjee

This study investigates the performance of speakers on a primed lexical decision task with prefixed and pseudo-prefixed Bangla words and non-words. Analysis of the reaction times (RTs) shows that target words that share prefixes with their primes are identified the quickest, while pseudo-prefixed target words with prefixed prime words take the longest to identify. The intent of this paper is to examine whether roots and affixes are stored separately in the mental lexicon and accessed separately during word recognition. The results observed in this experiment support the hypothesis of morphological decomposition prior to lexical access.

## *1. Introduction*

In this paper, we have examined prefixed bimorphemic Bangla words to discover if Bangla employs the same mechanisms as in languages like English for access and representation when it comes to complex words.

Prior studies in English have shown that affixes and roots are stored separately in the mental lexicon. The FOBS (frequency ordered bin search) account Taft & Forster (1975) postulated a root-centric model, where words are accessed only after a successful retrieval of the root's lexical representation. Various linguistic theories have supported this claim of roots being recognised first, followed by the access of the affix, thereby recognising the meaning of the input word.

Prefixes, specifically, are known to be responsible for delays in the word recognition process owing to their structural complexity. Since prefixes occur before the roots in a word, they need to be shelved before the root is accessed. Only once the root is accessed, are the prefixes added to the accessed root meaning and the complete complex word is recognised. When pseudo-prefixes are presented to the speaker following a prefixed prime, recognition of the word is further delayed. The speaker tends to access the target word as two separate parts due to the presence of the pseudo-affix. When they fail to find the (pseudo-)root in the lexicon, they reaccess the entries for the whole word together till recognition happens. This causes a delay in the response

times. This has been exhibited in Marslen-Wilson's lexical decision task 1994.

In the current paper, our aim is to investigate how roots and affixes are represented in Bangla. We use derivational morphology in prefixed words, pseudo-prefixed words, as well as appropriate non-words in our experiment design to seek answers to the following questions:

- (1) How do affixes in primes affect the recognition time of affixed or pseudo-affixed targets?
- (2) How does a pseudo-affixed prime affect the recognition of affixed or pseudo-affixed targets?
- (3) Do the priming effects differ for every condition and why?

According to the FOBS model (Forster 1989; Forster & Bednall 1976; Taft & Forster 1975), lexical access takes place when the speaker uses input cues (visual or auditory) to search their long-term memories for the coordinating stimulus. The word representations are activated in a bottom-up mechanism through the input. Morphemes are an important level of representation in lexical access according to this model. They claim that words are organised in terms of shared roots into bins. Items like *cat*, *cats*, *catty*, *catnip*, and *catwalk* are all represented together in the same bin. High-frequency words are stored at the 'front' and low-frequency words are stored towards the 'back' of the bin. When an entry is searched, the direction is from the front to the back—from the more frequent words to the less frequent ones. Once access is successful, the process self-terminates. The FOBS model theorises that upon encountering a polymorphemic word, the first process is that of morphological decomposition to ascertain the root. The root is then used to access the correct bin where the polymorphemic word is stored.

## *2. Evidence of morphological decomposition*

Further evidence of morphological decomposition is found in studies involving pseudo-affixes in English. Derivational affixes, when added to a root, create polymorphemic words. A verb *teach*, when suffixed with *-er*, becomes a noun *teacher*. It is a polymorphemic word. There are also words that look like *teacher* but are not polymorphemic in nature. An example is *father*. It is a monomorphemic word and not *fath* + *-er*, although it might look like it. In this instance, *-er* is a pseudo-suffix. According to the FOBS model, the affix gets stripped before the root is searched in the bin. So, *father* will be treated as two items – a root and a suffix, and the pseudo-root *fath* will be searched for in the mental lexicon. When the search comes back unsuccessful as there is no root *fath* in the English lexicon, the system will try to reassess the word *father* as a whole. (Traxler 2011)

In their 1975 paper, Taft & Forster examined non-word real stems like *juvenate* of prefixed words like *rejuvenate* (*re+juvenate*) and non-word pseudo-stems like *pertoire* (from *repertoire*) using lexical decision tasks. *Juvenate* is stored in the mental lexicon as a non-word since it is a part of the real-derived word *rejuvenate*. It takes longer to be recognised as a non-word. In the case of *repertoire*, since it is not a derived word and *pertoire* is not stored in the lexicon as a non-word, the access system quickly categorises it as a non-word. For *juvenate*, however, the access system has to go through the initial search before it comes back unsuccessful. It then re-accesses the mental lexicon for a match for *rejuvenate* which is stored in the mental lexicon as a real word. That is when *juvenate* is recognised as a non-word, making it a longer process.

It was observed that real stems (e.g. *juvenate*) took significantly longer to be identified as a non-word than pseudo-stems (e.g. *pertoire*). To check for the morphological decomposition before access, in another experiment, they added inappropriate prefixes to the stimuli from the previous experiment. For instance, a real stem non-word would be *dejuvenate* (*de+juvenate*) while a pseudo-stems non-word would be *depertoire* (*de+pertoire*). If the delay in the previous experiment was due to a participant's uncertainty about the use of the currently obsolete free word *juvenate*, this experiment should take care of that problem. A lexical decision task with these stimuli showed that real stem non-words (e.g. *dejuvenate*) took significantly longer to be identified as a non-word than pseudo-stem non-words (e.g. *depertoire*) as shown in Table 1. The margin of error was also much lower in the pseudo-stem condition owing to its obviousness, while the real-stem condition caused the access system to take longer to categorise it.

	RT (msec)	Error (%)
<i>Real stem non-words</i>	836	18.7
<i>Pseudo stem non-words</i>	748	3.3

Table 1. Mean lexical decision times and percentage error rates for real stem non-words and pseudo stem non-words (Taft & Forster 1975)

Rubin et al. (1979) did a study involving a lexical decision task (word vs non-word), where they examined prefixed and nonprefixed words. This study claimed that morphological decomposition happens only in specific instances as a strategy for access. They observed pseudo-prefixed words (e.g. *relish*) resulting in longer response times than prefixed words (e.g. *repay*) in the context of prefixed non-words (e.g. *retext*), but not in the unprefixed non-word (e.g. *ratisfy*) contexts. This context dependency was cited to claim that morphological decomposition of prefixed words is a marked strategy used when there is a predominant prefixed stimulus.

Taft (1981) suggested that the discrepancy in the above study was perhaps due to participants responding positively to apparent prefixes<sup>1</sup> in conditions of unprefixed non-words (e.g. *ratisfy*) following the prefixed (e.g. *repay*) and pseudo-prefixed words (e.g. *relish*). The fast and equal response times (henceforth referred to as RTs) in these two conditions were because of this and not because morphemic decomposition is a special strategy. To support his claim, Taft conducted an experiment where no non-words were used. He still reported pseudo-prefixed words (e.g. *precipice*) taking significantly longer to name than prefixed words (e.g. *replica*).

	RT (msec)	Error (%)
<i>Prefixed (replica)</i>	297	2.4
<i>Pseudoperfixes (precipice)</i>	364	8.8

Table 2. Mean naming time minus naming control time and percentage error rates for prefixed and pseudo-prefixed words (Taft 1981)

<sup>1</sup> apparent prefixes refer to both true prefixes and pseudo-prefixes, both of which resemble a prefix

In an eye movement tracking study done by Lima in 1987, similar conclusions were drawn. Eye movements of adults were tracked while reading sentences that contained prefixed (e.g. *revive*) or pseudo-prefixed words (e.g. *rescue*). Adhering to the results from the abovementioned studies, significantly longer eye fixations were observed while participants read a pseudo-prefixed word compared to when they read prefixed words.

Another study by Melinger (2001) involving a segment-shifting task observed that both prefixed and pseudo-prefixed words, as well as suffixed and pseudo-suffixed words, showed the same patterns as the previous studies. The response times for affixed stimuli were significantly shorter than those of pseudo-affixed stimuli, hence establishing the prefix-stripping hypothesis.

For our experiment, we use a visual primed lexical decision task to ascertain if affix-stripping as a phenomenon is also present in Bangla. Lexical decision tasks are pivotal in investigating the processes of word recognition (Berbery et al. 2021). In these tasks, a participant is asked to look at a screen where a word or a string of letters (or appropriate alternatives) are displayed. The participant is instructed to press ‘YES’ or ‘NO’ as fast as they can based on whether what they see on the screen is a word or a non-word respectively. The response times of these tasks are analysed to make relevant judgements for the study. In our case, it will help us understand how prefixation influences word recognition.

### 3. A brief on Bangla derivational morphology

Bangla derivational morphemes consist of predominantly prefixes and suffixes. Derivational morphemes help make new words in the language. They often change the grammatical category of the stem as well (Yule 2010).

There are both class-changing and class-maintaining derivational morphemes in Bangla, (Ray 1966) examples of which are listed here.

#### a. Class-maintaining derivational morphemes <sup>2</sup>:

Morphemes	Examples	Meaning
বি- /bi/	বিদেশ /biðesh/ “foreign country”	class of the noun দেশ /ðesh/ “country” is maintained after the prefixation
বে- /be/	বেরঙ /berɔŋ/ “colourless”	added to stem রঙ /rɔŋ/ “colour”, adds a negative sense to the base
অ- /ɔ/	অপরিচিত /ɔporitʃitɔ/ “unfamiliar”	added to stem পরিচিত /poritʃitɔ/ “familiar” to bring an opposing sense
আ- /a/	আবাহা /abatʃʰa/ “unsorted”	added to stem বাহা /batʃʰa/ “sorting to bring a sense of ‘un-’

Table 3. Examples of class-maintaining derivational morphemes in Bangla

<sup>2</sup> Class-maintaining derivational morphemes do not change the syntactic class of words. For instance, the affix *-hood* when added to the noun *boy*, produces the noun *boyhood*.

- b. Class-changing derivational morphemes<sup>3</sup> consist of both prefixes and suffixes. These affixes are used with Sanskrit origin words.

Morphemes	Examples	Meaning
নি- /ni/	নিপাট /nipat/ “without a fold”	without; changes noun to adjective
নী- /ni/	নীরোগ /nirog/ “without disease”	without; changes noun to adjective
স্ব- /ʃɔ/	স্বজাত /ʃɔdʒat/ “of the same caste”	self, with; changes noun to adjective
অ- /ɔ/	অজাত /ɔdʒat/ “of an unknown caste”	‘un-’; changes noun to adjective
অন- /ɔn/	অনিচ্ছা /ɔnitʃtʰa/ “disinclination”	‘un-’; changes noun to adjective
সু- /ʃu/	সুবেশ /ʃubeʃ/ “well-dressed”	‘well-’; changes noun to adjective

Table 4. Examples of class-changing derivational prefixes in Bangla

Morphemes	Examples	Meaning
-অন /on/	চলন /tʃɔlon/ “mode of movement”	adds to চলা /tʃɔla/ “movement” to produce a meaning of modality; changes verb into noun
-আন //an/	জানান /dʒanan/ “notice”	adds জানা /dʒana/ “knowing” to produce a meaning of communication; changes verb into noun
-অন্ত /onto/	চলন্ত /tʃɔlonto/ “in the state of”	adds to চলা /tʃɔla/ “movement” to produce a sense of state of being; changes verb into adjective

Table 5. Examples of class-changing derivational suffixes in Bangla

There is a seemingly unending list of affixes that are less restricted in terms of usage compared to the ones listed above. To maintain uniformity in our data for unskewed results, we have only used prefixes listed explicitly here – both class-retaining and class-changing ones.

<sup>3</sup> Class-changing derivational morphemes change the syntactic class of a word. For instance, in English, the affix *-er* when added to the verb *play* produces a noun *player*.

#### 4. The study

As discussed previously, our study wishes to investigate the processes of morphological decomposition and lexical access in Bangla. It primarily aims to determine whether affixes and roots are stored separately in the mental lexicon and accessed independently during the word recognition process. We have tried to achieve this by using a primed lexical decision task paradigm, where we check the impact of the use of derivational affixes in the primes on the recognition time of Bangla words and non-words.

##### 4.1. Participants

38 (21 male; 17 female) native literate speakers of Bangla participated in the study. Their mean age was 24; 9 (SD = 7.06). All participants could read and write the script and mandatorily had it as a school subject till the 12th standard. This was controlled to ensure a homogeneous linguistic background for the study. Further, all participants were right-handed and possessed normal or corrected-to-normal vision to eliminate potential biases in response times due to visual impairments. None of them reported motor disabilities or a history of neurological disorders.

##### 4.2. Task stimuli

The experimental stimuli consisted of bisyllabic words. Their word length and frequencies were controlled. The stimuli were divided into two versions to prevent repetition within each set and maintain participant engagement. The experiment targets consisted of 30 affixed words and 28 non-words, paired with either prefixed or pseudo-prefixed word primes.

Additionally, 44 filler pairs, consisting of non-word targets that were either phonologically similar or dissimilar to the primes, were included to avoid predictability and sustain task variability.

There were four primary conditions for word targets and two conditions for non-word targets. For the target words, we had the following conditions:

- (i) Condition A: Primes and targets shared the same prefix. For example, the prime সুদিন (/ʃudin/, good+day) and the target সুনাম (/ʃunam/, good+name; fame) share the prefix সু- (/ʃu/) which means ‘good’.
- (ii) Condition B: Primes had a prefix, and targets had a pseudo-prefix. For instance, the prime সুদিন (/ʃudin/, good+day) and the target সুজি (/ʃudʒi/, semolina) where the target has a pseudo-prefix.
- (iii) Condition C: Primes and targets shared the same pseudo-prefix. For instance, the prime সুতো (/ʃuto/, thread) and the target সুধা (/ʃudʰa/, nectar) share the pseudo-prefix সু- (/ʃu/).
- (iv) Condition D: Primes had a pseudo-prefix, and targets had a prefix. An example is the prime সুতো (/ʃuto/, thread) and the target সুপথ (/ʃupɔtʰ/, good+path), where the target had a real prefix.

<b>PRIME (affixed)</b>	<b>TARGET (affixed)</b>	<b>PRIME (affixed)</b>	<b>TARGET (pseudo- affixed)</b>
সুদিন /ʃudin/ “good+day”	সুনাম /ʃunam/ “good+name, fame”	সুদিন /ʃudin/ “good+day”	সুজি /ʃudʒi/ “semolina”
(a) Condition A		(b) Condition B	
<b>PRIME (pseudo- affixed)</b>	<b>TARGET (pseudo- affixed)</b>	<b>PRIME (pseudo- affixed)</b>	<b>TARGET (affixed)</b>
সুতো /ʃuto/ “thread”	সুধা /ʃud <sup>h</sup> a/ “nectar”	সুতো /ʃuto/ “thread”	সুপথ /ʃupɔt <sup>h</sup> / “good+path”
(c) Condition C		(d) Condition D	

Table 6. Summary of experimental conditions for target words

We had the following experimental conditions for the non-word target items:

- (v) Condition 1: Primes were affixed words, and targets were non-words. For example, we used a prime like কুপথ (/kupɔt<sup>h</sup>/, bad+path), followed by the non-word target কুজাস (/kudʒaʃ/).
- (vi) Condition 2: Primes were pseudo-affixed words, and targets were non-words. This condition included primes like নিলাম (/nilam/, auction) followed by non-word targets like নিহাজ /nihadʒ/.

<b>PRIME (affixed)</b>	<b>TARGET (non-word)</b>	<b>PRIME (pseudo-affixed)</b>	<b>TARGET (non-word)</b>
কুপথ /kupɔt <sup>h</sup> / “bad+path”	কুজাস /kudʒaʃ/	নিলাম /nilam/ “auction”	নিহাজ /nihadʒ/
(a) Condition 1		(b) Condition 2	

Table 7. Summary of experimental conditions for filler non-words

#### 4.3. Experimental Design

The study was conducted using PsychoPy software on a 14-inch screen, where participants engaged in a visual primed lexical decision task. They were instructed to focus on the screen, where prime-target pairs were presented visually. They were required to press the button labelled as ‘YES’ on the keyboard if the target was a word and ‘NO’ if the target was a non-word. The

Stimulus Onset Asynchrony (SOA)<sup>4</sup> of 1500 ms and an inter-trial interval of 2000 ms. These intervals were chosen to allow sufficient time for cognitive processing while maintaining the pace of the experiment. The response times (RTs) were recorded for each trial to measure the speed and accuracy of word recognition. Including the filler pairs was a standard practice to prevent participants from anticipating the nature of subsequent stimuli, thereby reducing potential biases in their responses. The frequency of the target words was also intuitively controlled across all conditions to eliminate frequency effects on RTs. This would ensure that the observed differences in RTs were attributable to the morphological properties of the stimuli only, rather than their familiarity or as a result of practice effects.

The collected data on accuracy rates and mean RTs were subjected to rigorous statistical analysis. An Analysis of Variance (ANOVA) was conducted to compare RTs across different conditions and the Chi-Square Test was employed to analyse the accuracies. These statistical methods were chosen for their ability to detect significant differences between multiple groups.

#### 4.4. Results

We present the results for each type and across every condition in terms of accuracy and response time.

In the case of the word targets, accuracy rates for the different conditions were relatively high but showed some variability. In Condition A, the accuracy rate was 94.4%, indicating that participants were highly accurate when the prime and target shared the same prefix. Condition B had a slightly lower accuracy rate of 93.5%, reflecting the increased difficulty in recognising targets with pseudo-prefixes. Condition C showed an accuracy rate of 91.4%, the lowest among the word target conditions, suggesting that pseudo-affixed primes might lead to more errors. Condition D had an accuracy rate of 93.8%, similar to Condition B, indicating that the presence of a pseudo-prefix in the prime did not significantly affect accuracy when the target had a real prefix. The differences in the accuracy rates across the various conditions, however, was not statistically significant.

Accuracy rates for non-word targets were lower than their word counterparts. Further, there were differences in accuracy between the two experimental conditions. In Condition 1, the accuracy rate was 89.6%, indicating some difficulty in accurately identifying non-words following affixed primes. In Condition 2, the accuracy rate was higher at 95.6%, suggesting that participants were more accurate in recognising non-words when primed with pseudo-affixed words. This higher accuracy rate could be attributed to the ease of dismissing pseudo-affixed primes, leading to quicker and more accurate responses for non-word targets. However, the difference in the accuracy rates was not statistically significant.

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<sup>4</sup> Here, we refer to SOA as the interval between the appearance of the prime ( $S^1$ ) and the target ( $S^2$ ).



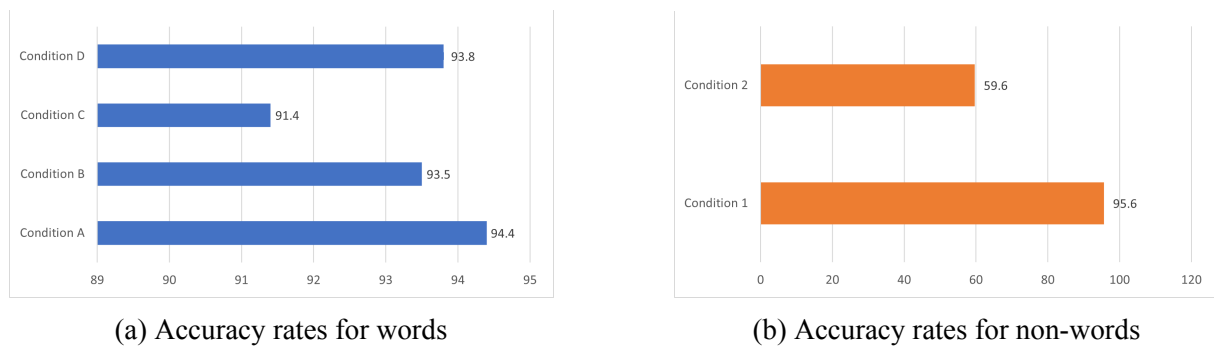


Figure 2. Summary of response accuracy for words and non-words across different conditions

In terms of the response times (RTs), the results for word targets indicate significant differences across the different conditions.

In Condition A, where primes and targets shared the same prefix, the average RT was the fastest at 860.59 ms. This suggests that participants could more efficiently recognise words when the prime and target shared a common morphological structure. In Condition B, where primes had a prefix and targets had a pseudo-prefix, the RT was the longest, averaging 999.6 ms.

This implies that the presence of pseudo-prefixes significantly hindered the word recognition process, likely due to the additional cognitive load required to reconcile the pseudo-prefix with the target word. The difference between the RTs of these two conditions was 139.01ms and it was statistically significant ( $[F(1,151) = 5.43, p < 0.05]$ ).

In the case of Condition C, where primes and targets were both pseudo-affixed, the mean RT was 925.6 ms. For Condition D, where pseudo-affixed primes were followed by affixed targets, the mean RT was 962 ms.

Although the difference of 36.4 ms between conditions C and D was not statistically significant, the trends indicate that pseudo-affixed primes cause delays in word recognition.

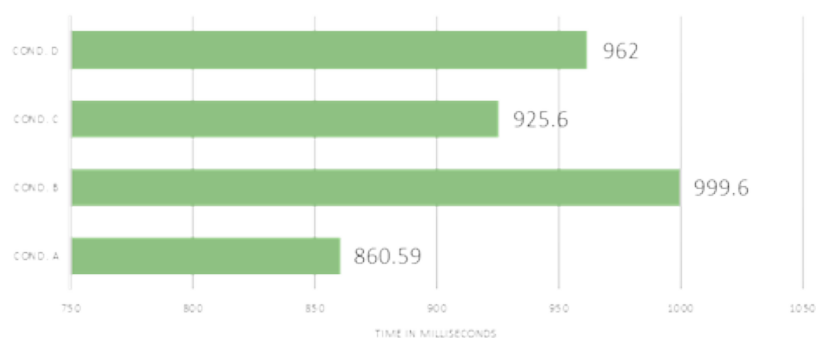


Figure 3. Summary of the mean RTs across different conditions for word targets

For non-word targets, in Condition 2, where the targets were preceded by pseudo-affixed words, the mean Rt was 988.12 ms. In contrast, in Condition 1, where the targets were preceded by affixed words, took longer to process, with an average RT of 1145.1 ms. The difference of 156.98 ms between these two conditions was statistically significant  $[F(1, 529) = 12.5, p < 0.05]$ .

The significant difference in processing times between these conditions hints at the cognitive challenges associated with pseudo-affixes in non-word recognition. The faster RTs in Condition 2 suggest that participants could identify non-words quicker when primed with pseudo-affixed words, possibly because pseudo-affixes are more readily dismissed as non-lexical elements, speeding up the decision process.

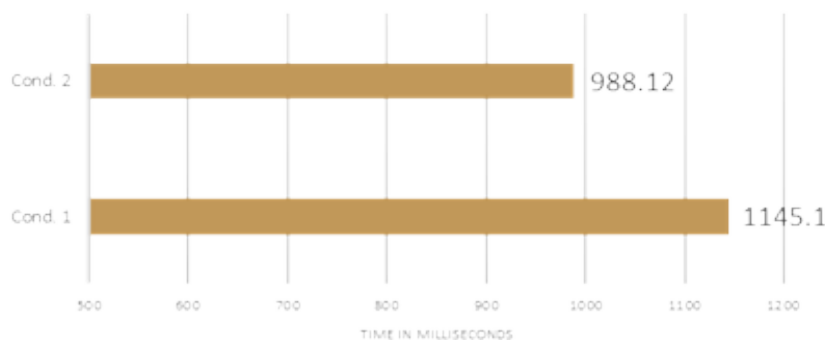


Figure 4. Summary of the mean RTs across different conditions for non-word targets

In the case of fillers, phonologically related pairs were processed faster (1094.11 ms) than unrelated ones (1153.93 ms). The difference between the two conditions was not statistically significant.

### 5. Discussion

The findings of this experiment provide significant insights into the morphological processing and lexical access mechanisms of Bangla. The data reveal that shared prefixes between primes and targets facilitate more efficient word recognition, as evidenced by the faster response times (RTs) and higher accuracy rates in Condition A. This supports the hypothesis that affixes and roots are stored separately in the mental lexicon and accessed independently during the word recognition process (Taft & Forster 1975). The longer RTs and lower accuracy rates in Condition B, where targets had pseudo-prefixes, underscore the cognitive complexity introduced by pseudo-affixes, which require additional processing time and effort for accurate recognition. This finding aligns with the affix-stripping hypothesis, suggesting that pseudo-affixes complicate the morphological decomposition process, thereby extending the time needed for lexical access as evidenced in studies in English discussed towards the beginning of this paper.

For non-word targets, the results indicate that primes with pseudo-affixes (Condition 2) lead to quicker and more accurate identification of non-words compared to affixed primes (Condition 1). This suggests that participants may more readily dismiss pseudo-affixes as non-lexical elements, thus speeding up the decision-making process. These observations contribute to our understanding of how morphological structures influence cognitive processing during lexical access.

The study's significance lies in its contribution to the broader understanding of morphological decomposition and lexical access in languages with complex morphological systems. By

demonstrating that Bangla speakers process affixed and pseudo-affixed words differently, the research underscores the importance of morphological structure in lexical access and supports existing cognitive models that posit separate storage and access pathways for affixes and roots.

However, the study has several limitations that need to be mentioned. Firstly, the number of participants was relatively small and homogeneous, limited to native Bangla speakers with specific demographic characteristics. Future research could benefit from a larger and more diverse sample to enhance the generalizability of the findings. Secondly, the experiment focused solely on disyllabic words and non-words, which may not fully capture the complexity of morphological processing in Bangla. Including a broader range of word lengths and structures in future studies could provide a more comprehensive understanding of morphological processing.

Additionally, the experiment involved a lexical decision task when assessing recognition through the visual modality. It still does not answer the question of how pseudo-affixes are processed while reading them in sentences.

Future research could also benefit from incorporating auditory lexical decision tasks to examine whether the observed effects generalise across different modalities of language processing. Moreover, exploring the impact of other morphological processes, such as suffixation and compounding, on lexical access could further reveal the complexities of morphological decomposition in Bangla.

Despite its limitations, the research opens avenues for further investigation into the cognitive and linguistic processes underlying morphological processing, offering potential implications for both theoretical models and practical applications in language learning and processing.

### *6. Concluding remarks*

As seen in the result and discussion of this study, we can claim that morphological decomposition before lexical access of Bangla complex words is established. The results of the current study is in tune with those of previous studies involving pseudo-affixes, where it is clear that roots and affixes are stored separately and accessed individually.

In this study, we observed significant differences in the response times when identifying prefixed words versus pseudo-prefixed words, which suggests that there is significant hindering in the access process when a pseudo-prefix is encountered. Pseudo-affix in a word increases the cognitive load. It is stored in the mental lexicon as an individual item, but the access system processes it as a complex word by dividing it up and searching for the pseudo-root first. Upon failure to access such an item in the mental lexicon, the access process has to restart its search of the lexical item as a whole this time around. This entire process inevitably increases the duration required to process pseudo-affixed words, compared to affixed words.

This study in the visual modality in Bangla opens up avenues for investigating the process of morpheme decomposition through other linguistic modalities. It would be worthwhile to investigate the ways in which different aspects of complex words are processed in Bangla.

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# **Redefining basic orthographic syllable structures (BOSS) in an akshara-based orthography**

Evidence from two experiments in Bangla

Khairul Mondal & Moumita Mukherjee

Are literate speakers of a language with a non-linear writing system affected by orthographic syllabification in the same way as those of a language with a linear alphabet? This paper presents observations from two separate studies in Bangla – (1) a visual lexical decision task (LDT) and (2) an auditory syllabification task – and attempts to redefine the Basic Orthographic Syllable Structures (BOSS) of a word proposed by Taft (1979). While in exp. 1 participants were shown to favour phonological division over BOSS division, in exp. 2 their syllabification patterns were influenced by akshara blocks.

## *1. Introduction*

As reported by Sinclair (1994), a widely accepted view within reading comprehension research is “the single comprehension process hypothesis” by Horowitz and Samuels, which postulates that: “Listening and reading comprehension show similar cognitive processing. The fluent reader is characterized as decoding print to the phonological representation and then processing the phonological representation as though it were coming through an auditory channel.” (1987:84). Thus, reading comprehension lies at the intersection of listening comprehension and visual recognition of orthographic information. Therefore, the recognition and comprehension of a written word would require the orthographic representation of the word to be encoded in some way and mapped with a lexical representation in our mental lexicon. However, the exact nature of the encoding has been the subject of considerable debate, with several types being suggested:

- (a) Phonological encoding: It has been claimed by Rubenstein et al. (1971) that phonological representations play a key role in visual word recognition, which is accessed during reading by converting the orthographic representation of the word by grapheme-phoneme correspondence rules.
- (b) Morphological encoding: The proposal has been made by Murrell & Morton (1974) that recognizing a word involves assigning it to a morpheme and polymorphemic words are recognized by independently recognizing their root and affix morphemes.

- (c) Syllabic encoding: It has been suggested by Spoehr & Smith (1973) that words are parsed into syllables during recognition and polysyllabic words have their syllable structure represented in the lexicon. Subsequently, Taft & Forster (1976) proposed that only the first syllable mediates the process of lexical access of both monomorphemic and polymorphemic words.

Taft (1979) took note of a major incompatibility between the method of syllabic analysis proposed by Spoehr & Smith (1973) and the experimental results of Taft & Forster (1976). If words are stored in the mental lexicon in terms of their first syllables, then, according to Spoehr & Smith (1973), the lexical entry for a word like ACTOR would not be identical to that of its base word ACT. This is because the first syllable of ACTOR is AC, not ACT. Similarly, TABULAR and its base TABLE would be accessed through completely different entries, namely TA and TAB respectively. Keeping in mind these phonological and morphological considerations, Taft (1979) proposed a solution that the parsing of syllables in visual word recognition is orthographic, rather than phonological. He termed it the "Basic Orthographic Syllabic Structure" or "BOSS", and defined it as including "as many consonants following the first vowel of the word as ortho-tactic factors will allow without disrupting the morphological structure of that word" (Taft 1979:24). The BOSS of both ACT and ACTOR being ACT, this proposal resolves the incompatibility.

Taft (1979) subjected 30 students at MIT to a lexical decision task (a variation of Rubenstein et al. 1970) where items in uppercase were divided into two parts by introducing a gap either after its first articulated syllable as the phonological condition (e.g. LAN TERN) or after its BOSS (e.g. LANT ERN). Participants took on average 39 milliseconds longer to recognize words divided according to phonological syllables than ones divided according to BOSS, as shown in Table 1 below. This proves that the division of visually presented words according to their orthographically defined syllables is less disruptive, or maybe even somewhat facilitative, to recognition than the division of a visually presented word according to phonologically defined syllables.

Division	Examples	RT (Response Time)	%E
<i>Phonological</i>	LAN TERN	618 ms	3
<i>BOSS</i>	LANT ERN	579 ms	3

Table 1. Results of the first experiment of Taft's (1979) study

Similar results were obtained by presenting the division with Upper Case-Lower Case alteration instead of using a gap to split them up into parts, (e.g. MUStard in phonological condition vs MUSTard in BOSS condition). The 30 students from Monash University who served as subjects, were on average 18 milliseconds faster in recognizing the words in the BOSS divided condition, as shown below.

<b>Division</b>	<b>Examples</b>	<b>RT (Response Time)</b>	<b>%E</b>
<i>Phonological</i>	MUStard	594 ms	6
<i>BOSS</i>	MUSTard	576 ms	7

Table 2. Results of the second experiment of Taft's (1979) study

However, subsequently, Taft and other researchers identified factors that call for a more nuanced BOSS theorization:

- (1) General reading proficiency: While “good readers” (based on the Cooperative Reading Comprehension Test developed by the Australian Council of Educational Research) showed a preference for BOSS division over phonological division, “poor readers” did the exact opposite (Taft 2001):

<b>Reading Proficiency</b>	<b>BOSS Division (e.g. <i>ROUTINE</i>)</b>	<b>Phonological Division (e.g. <i>ROU TINE</i>)</b>	<b>Difference</b>
<i>Good</i>	726 ms	759 ms	+33
<i>Poor</i>	931 ms	894 ms	-37

Table 3. Effect of reading proficiency on BOSS preference (Taft 2001)

- (2) Word frequency: BOSS preference was more prominent in low-frequency words (e.g. ELDER) compared to high-frequency words (e.g. UNDER) (Chen & Vaid 2007). However, they found no correlation between participant's reading ability and segmentation type because of a methodological difference. Their criterion to determine reading ability (SAT verbal scores) was a less direct measure than that used by Taft (2001).

<b>Word Frequency</b>	<b>BOSS Division</b>	<b>Phonological Division</b>	<b>Difference</b>
High	636 ms	639 ms	+3
Low	708 ms	742 ms	+34

Table 4. Effect of word frequency on BOSS preference (Taft 2001)

- (3) Orthographic depth of alphabets: The need for an orthographic processing unit like BOSS might be more apparent in languages with a deep orthography like English, but not so much in those with a shallow orthography (Spanish: Taft et al. 2007; Serbo-Croatian: Feldman et al. 1983; Dutch: Knuijt & Assink 1997). One probable explanation is in shallow orthographies the more direct one-to-one mapping between the phoneme-grapheme constituents offsets the morphological advantage of BOSS divisions. For example, phoneme-grapheme mapping is more consistent in Spanish than

in English, and Taft et al. (2007) found that literate Spanish speakers showed a marked preference for phonological division over BOSS division, irrespective of their reading proficiencies, as illustrated in Table 5 below.

Reading Proficiency	BOSS Division	Phonological Division	Difference
Good	738 ms	718 ms	-20
Poor	771 ms	722 ms	-49

Table 5. Effect of orthographic depth on BOSS preference (Taft 2001)

However, one key script-related orthographic element, namely the non-linearity of a script, and its impact on BOSS theorization, has not been explored so far. Akshara-based scripts derived from Brahmi, being nonlinear and having a special visuo-spatial configuration, are unlike English and the other languages studied so far. Therefore, we need to reevaluate how BOSS is structured in these scripts.

## 2. The study

While our first experiment, a visual lexical decision task (LDT) examining the role of BOSS in Bangla word recognition, is part of a larger study of the influence of Sub-lexical structures in word reading comprehension in Bangla Print and Bangla Braille orthographies; the second experiment, an auditory syllabification task is one of a series of experiments looking at the effect of orthography in auditory tasks in Bangla. Before we delve into the minute details of each task, it is perhaps necessary to provide a brief sketch of the Bangla orthographic system.

The symbol set of Bangla orthography evolved from the Kutila Lipi, a descendant of Brahmi. All Brahmi-derived scripts, including Bangla, are labelled as alpha-syllabaries because they have properties of both alphabetic scripts and syllabaries. The script runs from left to right and the symbols hang from a top line in a non-linear fashion, using both upstrokes and downstrokes. The aksharas or symbol blocks may contain vowel diacritics and conjunct consonants. The permissible akshara types are listed in the table below.

Type	Examples		
	Symbol	Transcription	IPA
V	আ	a	ɑ
CV	কা	ka	kɑ
CV <sub>0</sub>	ক্	k <sub>0</sub>	k
CCV	ক্কা	k <sub>l</sub> ɑ	kɑ
CCCV	ক্ক্ৰী	str <sub>i</sub> :	str <sub>i</sub>

Table 6. Some akshara types in print Bangla<sup>1</sup>

<sup>1</sup> In our transcription system, we have indicated the vowel *matras* or diacritics using subscripts and used 0 to mark the Bangla *hasanta* (cancellation of inherent vowel symbol)



The following three situations are of special significance to our experiments:

- (1) The inherent/implicit vowel: Bangla orthography being an abugida the consonant symbols contain an inherent vowel /ɔ/, which may phonologically be realized as /o/ in some contexts or may become suppressed in yet other contexts, e.g. all three cases are observed in the word সকল <sa.ka.la><sup>2</sup> /ʃɔ.kol/ ‘all’. Like the other vowels, /ɔ/ also has a stand-alone full form <অ> appearing in word-initial positions, as in অনেক <ɔ.ne.kɔ> /ɔ.nək/ ‘many’. The suppression of the inherent vowel is unambiguous in the word-final position, and in word-medial positions may optionally be marked with a diacritic called *hasanta* <্> as in উদ্বেগ <u.do.be.gɔ> /ud.beg/ ‘anxiety’.
- (2) Placement of explicit vowel diacritics or *matras*: All other vowels have two forms, a full/primary form and a diacritical/secondary form. “The full form appears in the word-initial position, and after a CV akshara (with an inherent vowel as in বই <bɔ.i> /boi/ ‘book’ or any other vowel as in ভাই <b<sup>h</sup>a.i> /b<sup>h</sup>ai/ ‘brother’). The diacritical form of a vowel is placed vertically above, below, or to either side of the consonant, and visual elements used in some diacritics can combine to make other unique diacritics. Taking the number of visual elements in a diacritic as a symbol parameter, Bangla vowels can be classified into (1) vowels with a single element e.g. কা /ka/, কি /ki/, কে /ke/, কী /ki:/, কু /ku/, কূ /ku:/, (2) vowels with a two-part diacritic e.g. কো /ko/, কৌ /koi/ and (3) vowels with a three-part diacritic, as in the case of the diphthong marker কৌ /kou/” (Sircar & Nag 2019:164). Although the Indo-Aryan distinction of short and long vowels (e.g. /i, i:/ and /u, u:/) is lost in Bangla phonology, the orthography continues to retain these distinctions (e.g.; <ই, ঈ> and <উ, ঊ>).
- (3) The conjunct consonants or *juktaksharas*: In Bangla, a consonant cluster symbol may contain up to three consonants, e.g. স্ত্রী <stri: > /s̪tri/ ‘woman’. It is evident from the example of স্ত্রী that one akshara block can capture as many as four phonemes and that the graphemic elements to mark those phonemes may not remain as clearly distinguishable segments in the symbol block (in this instance three consonants <স>, <ত> and <র>). Moreover, word-medial conjunct consonants may surpass phonological syllable boundaries, as in the word বল্লম <bɔ.llɔ.mɔ> /bɔl.lom/ ‘spear’. In this particular example, however, the constituent elements of the akshara block are just scaled-down versions of the full consonant symbol <ল>.

Due to such orthographical complexities, we consider Bangla an ideal candidate for an in-depth exploration of BOSS theorization.

<sup>2</sup> While there are several transliteration practices to represent the Bangla language, we opted for an IPA-inspired system, where we use a dot (.) to mark the akshara boundary, similar to how syllable boundaries are marked in IPA transcriptions.

## 2.1. Experiment 1

The experiment sought to measure the preference of native Bangla speakers between BOSS-divided and phonologically divided items in a word recognition task. The experimental paradigms used by Carreiras et al. (2005), and later adopted by Taft et al. (2007), in lexical decision tasks were employed.

### 2.1.1. Methodology

Items with a bi-colour coding scheme were given to native literate speakers of Bangla for lexical decision. The colour coding schemes were: (i) the first phonological syllable in the word and the rest of the word were coded with different colours (e.g. সকাল <so.ka.la> /ʃo.kal/ ‘morning’) (Phonological Syllable or PS condition); (ii) the first orthographic syllable in the word colour-coded differently than the rest of it (e.g. সকাল) (the Basic Orthographic Syllable Structure or BOSS condition). 55 words and 55 pseudo words (made up by combining possible syllables from Bangla phonology) with the two conditions were presented in the task. The presentation of items was counterbalanced so that participants got either the BOSS or the Phonological condition for each item. All word and nonword items were disyllabic, with 3 akshara blocks, and had no conjunct aksharas.

### 2.1.2. Participants

42 (17 female and 25 male) native Bangla speakers in the age range 18–36 years (mean age: 23.9) who were students of English and Foreign Languages University, Hyderabad, participated in the study. All participants were right-handed with normal or corrected to normal vision and had no motor disability or history of neurological disorders.

Before the experiment, their proficiency in spelling Bangla was tested on a sentence dictation task. The passage used for the screening test was selected from Sahaj Path, Book 2 by Rabindranath Tagore (1930), a popular text used as a primer in the second grade of primary schools in West Bengal, India. It provides a comprehensive coverage of Bangla orthography, including complex orthographic clusters (*juktakshara*). The extract used for the screening has been presented below:

উদ্ধব মন্ডল জাতিতে সদেগাপ। তার অত্যন্ত দরিদ্র অবস্থা। ভূসম্পত্তি যা কিছু ছিল ঋণের দায়ে বিক্রয় হয়ে গেছে। এখন মজুরী করে কায়ক্লেশে তার দিনপাত হয়। এ দিকে তার কন্যা নিষ্ঠারিনীর বিবাহ। বরের নাম বটকৃষ্ণ। তার অবস্থা মন্দ নয়। ক্ষেতের উৎপন্ন শস্য দিয়ে সহজেই সংসারনির্বাহ হয়। বাড়িতে পূজা-অর্চনা ক্রিয়াকর্মও আছে। আগামী কাল উনিশে জ্যৈষ্ঠ বিবাহের দিন।

ud.d<sup>h</sup>ɔb mon.dol ja.ti.te ʃɔd.gop tar ot.tɔn.to do.rid.ro ɔ.boʃ.t<sup>h</sup>a b<sup>h</sup>u.ʃɔm.pot.ti dʒa ki.ʃu  
ʃi.lo ri.ner da.je bik.rɔj ho.je gæ.ʃe æ.k<sup>h</sup>on mo.dʒu.ri ko.re kaj.kle.ʃe tar din.pat hɔj e.di.ke  
tar kon.na nis.ta.ri.nir bi.ba.ho bɔ.rer nam bɔ.tɔ.kriʃ.no tar ɔ.boʃ.t<sup>h</sup>a mon.do nɔj. k<sup>h</sup>e.ter  
ut.pɔn.no ʃɔʃ.ʃɔ di.je ʃɔ.ho.dʒei ʃɔŋ.ʃar nir.ba.ho hɔj ba.ti.te pu.ja ɔ.ʃɔ.na kri.ja.kɔr.mo  
a.ʃ<sup>h</sup>e a.ga.mi kal u.ni.ʃe dʒɔʃ.t<sup>h</sup>o bi.ba.her din<sup>3</sup>

<sup>3</sup> Please note that we have used a broad IPA transcription method here.

Uddhab Mandal is a Sadgapa by caste. His condition is very poor. Whatever land/property he had was sold off due to his debts. Now, he sustains his daily life through hard labour. On the other hand, it is his daughter Nistarini's wedding. The groom's name is Batakrishna. His condition is not bad. He can easily make ends meet from the earnings of the crops produced on his farm. There are religious ceremonies at home too. Tomorrow, the 19th of Jaishthya, is the wedding day.

Based on their performance in the task, participants were given a score between 0–100. All the participants scored above 50 points (Mean = 80.95; SD = 11.6).

### 2.1.3. Procedure

The letter strings were presented through PsychoPy on a 15.6-inch computer screen and participants had to press designated keys (right and left arrows for words and nonwords respectively) to indicate their choice. A practice trial was done with 6 letter strings. The order in which they received the stimuli for the main experiment was randomized. The accuracy of the key press and the time taken to press a key (in msec or milliseconds) were recorded and analyzed. For the recognition time analysis, a lower bound of 200 ms and an upper bound of 3000 ms was used. All response time scores beyond the bounds were not analyzed.

### 2.1.4. Results

The accuracy of lexical decision was above 82%, with no significant difference between the BOSS and PS conditions in either word or pseudoword tokens. Lexical decisions were higher for words (92%) than pseudowords (83-85%) irrespective of the condition. The recognition time data on the other hand showed an overall difference between the two conditions, with PS divisions being recognized faster than BOSS divisions, with the effect being more prominent for words. However, this difference was not statistically significant, proving that the question of BOSS (as defined by Taft) does not arise in Bangla.

Items	PS (e.g. सकाल)	BOSS (e.g. सकाल)	Diff.
Words	1257 ms	1271 ms	-14
Pseudo Words	1687 ms	1690 ms	-3

Table 7. RTs of words and pseudowords in PS and BOSS conditions

When each participant's writing proficiency and BOSS preference (calculated by comparing their mean RT in the two conditions; and given positive values for those preferring BOSS over PS, and negative values for those doing the opposite) were arranged in a scatter plot (see Figure. 1 below), little correlation was found between the two (as indicated by the flat line of correlation). This is perhaps another indication of the inessentiality of BOSS theorization in Bangla.

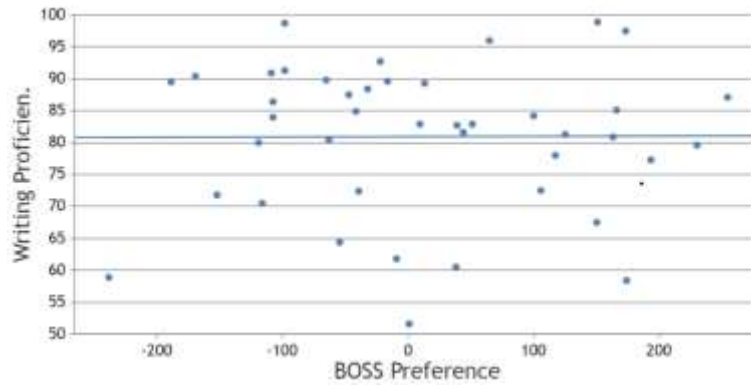


Figure 1. Scatter chart showing the relationship between BOSS preference (in ms) and writing proficiency scores

However, at this stage of the analysis, it would be unwise to outrightly cancel any possibility of orthographic syllabification for Bangla, particularly if we take into account a key phrase in Taft's definition, i.e. "as ortho-tactic factors will allow". Unlike in English, where the letter arrangements are linear, in Bangla, the non-linear nature of the alphabet makes it difficult, if not impossible, to identify the BOSS boundary visually as it would cut through CV aksharas in most words. Depending on the diacritic placement of the second vowel the bi-colour BOSS divided words can be grouped into:

- (i) Akshara division can be shown in a linear way as the consonant and the vowel diacritic can be shown in different colours (e.g. কামান <k<sub>a</sub>.m<sub>a</sub>.ṅṅ> /ka.man/ 'cannon')
- (ii) As the vowel diacritics are arranged in a non-linear way<sup>4</sup> with respect to the consonant they modify, the division becomes jumbled (e.g. আলোক <a.l<sub>o</sub>.k<sub>o</sub>> /a.lok/ 'light')
- (iii) As the second vowel is inherent in the consonant akshara, it cannot be shown graphically in the bi-colour coding (e.g. কমল <k<sub>o</sub>.m<sub>o</sub>.l<sub>o</sub>> /k<sub>o</sub>.mol/ 'lotus')

The mean response times in these three conditions are reflected distinctly in the data.

Types	Examples	Phonological	BOSS	Diff.
Linear Akshara	কামান	1241 ms	1257 ms	-16
Jumbled Akshara	আলোক	1242 ms	1260 ms	-18
Inherent Vowel	কমল	1273 ms	1309 ms	-36

Table 8. Summary of mean RTs across different experimental conditions

<sup>4</sup> The vowel diacritics either preceded the consonant symbols or attached to them on both ends.

The result can be explained when the akshara-based nature of Bangla Orthography is taken into account. “An akshara may represent a vowel (/V/), a consonant (/C/), a consonant with the inherent vowel /a/ or other marked vowels (/Ca/, /CV/), and consonant clusters with either the inherent or marked vowels (e.g. /CCa/, /CCV/, /CCCV/). The mapping of word-level phonology to specific akshara is decided by a rule of resyllabification where post-vocalic consonants form the next akshara.” (Nag 2014) Hence, in Bangla, these consonants following the first vowel of the word may not be the basis of its orthographic syllable, rather the akshara blocks might be playing a prominent role. One key observation in Experiment 2, further asserts this hypothesis.

## 2.2. Experiment 2

We investigated the syllabification of intervocalic consonants and clusters in Bangla to understand how inconsistent mapping affects word processing tasks, where literate speakers were required to syllabify Bangla words and nonwords. The type of syllabification of a CVC/CV(C) (e.g. বস্টি < b<sub>o</sub>.s<sub>t</sub>i > /bo.sti/ ‘slum’) word could be CV.CCV(C) (e.g. /bo.sti/) or CVC.CV(C) (e.g. /bos.ti/). We intended to investigate whether orthographic complexities in these medial syllables affected the syllabification patterns of the target words and drove participants to choose a particular pattern over others. The primary aim of the syllabification task was to investigate the influence of BOSS on syllable segmentation in Bangla. This study seeks to determine whether BOSS affects participants' ability to correctly syllabify words and insert pauses at appropriate junctures.

### 2.2.1. Participants

The study involved 34 participants (15 female and 19 male) all of whom are literate native speakers of Bangla. The mean age of the participants was 24;5, with a standard deviation of 4.5. The selection criteria ensured that all participants had a sufficient level of literacy in Bangla to engage effectively with the orthographic stimuli presented during the task. They were all graduate students, pursuing their degrees at the English and Foreign Languages University, Hyderabad. None of them reported any auditory impairment or neurological disorder.

### 2.2.2. Procedure

The pause insertion task was methodically designed to evaluate the influence of orthographic effects on syllable segmentation. The stimuli consisted of 25 conjunct and 31 non-conjunct target words, 16 non-words and 23 fillers. Participants were aurally presented with a series of words and non-words in Bangla. They were instructed to segment these auditory stimuli into syllables and insert pauses between the syllables. The task was conducted in a controlled environment to ensure the accuracy and consistency of the responses. The responses were recorded using the Audacity software, which facilitated precise capture and subsequent analysis of the pause insertion points.

### 2.2.3. Results

The task had an accuracy level of 81.1% for words and 83% for non-words with respect to the number of syllables counted correctly for word targets. The akshara effect observed in word items was 6.2%. Significantly, participants showed akshara effects even in non-words (12.6%), indicating that they are mentally reconstructing the non-words following akshara patterns of real words. Instances of syllabification according to Taft's definition of BOSS were negligible in both conditions. In 12% of cases for words, the syllabification patterns were neither phonological nor orthographic<sup>5</sup>. This effect was negligible for non-words.

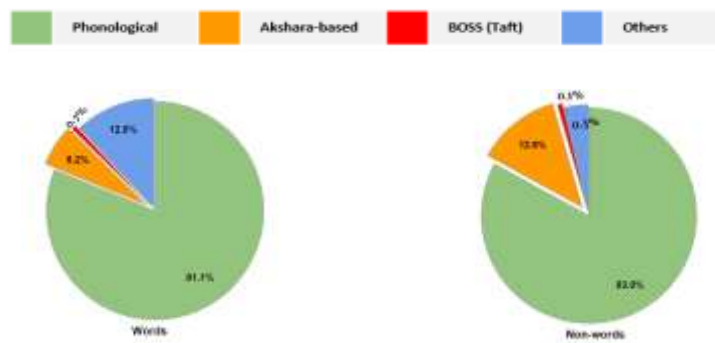


Figure 2. Syllabification patterns of different item types

While listeners were predominantly found to override the visual akshara boundaries (CV.CCV(C)) in favour of the phonological principle (CVC.CV(C)), the cases where they did not are of immense importance given it was an auditory task. This not only suggests that syllabification which is generally guided by phonology gets modulated by orthographic representation, but also points towards a structural redefinition of the orthographic syllable in Bangla as consisting of individual akshara blocks only, evidenced by akshara-based effects being much higher than BOSS effects across all item types as shown below.

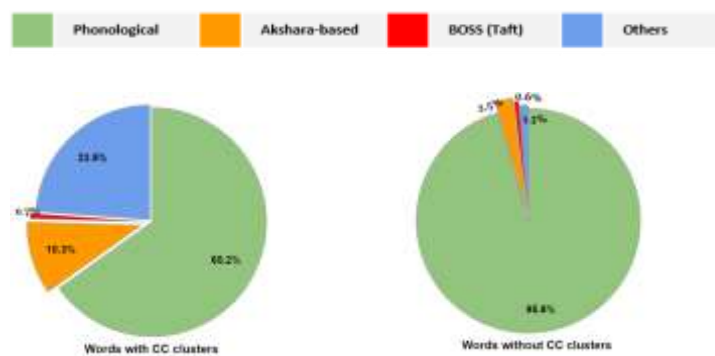


Figure 3. Syllabification patterns of different word types

<sup>5</sup> This included degemination of geminate clusters, gemination of non-geminates, deletion of segments, insertion of vowels, and so on.

Even though word-medial conjunct consonants in Bangla represent two different syllables, participants conceived them as a singular block even during the auditory task, thereby highlighting the akshara-based nature of the orthography.

### *3. Discussion*

When analyzing the results of the two experiments together, it becomes evident that the effects of orthography in word recognition are significant even in non-linear orthographies such as Bangla. However, the nature of the sub-lexical orthographic units at play in Bangla is significantly different from those found in the studies concerning linear orthographies.

In the Bangla script, the semi-syllabic akshara blocks play a crucial psychological role in word recognition. These akshara blocks do not permit the reorganization of a word outside their bounds, which is a notable departure from the trends observed in linear orthographies. This phenomenon becomes particularly prominent in two specific cases: words containing inherent vowels and those with conjunct consonants (CC clusters).

#### *3.1. Inherent vowel cases (Experiment 1)*

As discussed above, in Bangla, each consonant symbol inherently carries a vowel sound, typically /ɔ/, unless modified by an explicit vowel diacritic or a suppressive diacritic (*hasanta*). This inherent vowel remains graphically hidden within the consonant akshara symbol, leading to a unique orthographic characteristic where the vowel is not overtly represented but is understood contextually.

When trying to mark BOSS boundary in words where the second vowel is an inherent vowel, the non-visual nature of the vowel produces a disruptive effect on the reorganization of the word during tasks requiring visual processing. This disruption occurs because the hidden vowel creates ambiguity in syllable segmentation, making it challenging for participants to parse and reorganize the word mentally.

The hidden nature of the inherent vowel complicates visual reorganization, as participants must infer the presence of the vowel, which can vary depending on the context. This inference process adds an extra layer of cognitive load, disrupting the smooth processing of the word.

#### *3.2. Conjunct consonants (Experiment 2)*

The second experiment, which focused on auditory syllabification and pause insertion, highlighted the significant impact of consonant clusters in Bangla. The conjunct consonant aksharas, which are clusters of consonants that form a single visual unit, present a substantial hurdle in sub-lexical rearrangement, when the constituents are parts of two different syllables.

Even when these clusters are presented aurally, their complex structure poses difficulties for participants. The akshara blocks, which consist of multiple consonants, are perceived as indivisible units, making it challenging for participants to insert pauses within these clusters.

This psychological resistance to sub-lexical rearrangement hints at the robust nature of akshara blocks in Bangla. Unlike linear orthographies, where individual phonemes or graphemes can be easily manipulated and reorganized, the semi-syllabic nature of Bangla aksharas enforces a strict boundary that resists such manipulation.

### 3.2. General observations

The comparison between these findings and those from linear orthographies reveals a fundamental difference in how orthographic units are processed. In linear orthographies, words can often be parsed and reorganized at the level of individual letters or phonemes. However, in Bangla, the akshara blocks serve as more rigid, psychologically salient units that cause latencies in processing.

**Visual Reorganization:** The hidden inherent vowel in Bangla adds a layer of complexity to visual word recognition. Participants must rely on their knowledge of the script to infer the presence of these vowels, which disrupts the straightforward reorganization of words.

**Auditory Processing:** The presence of conjunct consonant aksharas in auditory tasks highlights the robustness of these orthographic units. Even without visual cues, the psychological integrity of akshara blocks influences how participants process and segment spoken words.

The findings from these experiments suggest that the orthographic theorization of non-linear scripts like Bangla requires a different approach compared to linear scripts. The semi-syllabic nature of akshara blocks in Bangla imposes unique constraints on both visual and auditory word recognition processes. These constraints must be accounted for in models of orthographic processing to accurately reflect the cognitive mechanisms involved in recognizing and processing words in such scripts.

Hence, we can conclude that while the effects of orthography on word recognition are undeniable across different types of writing systems, the constituent nature of sub-lexical orthographic units in akshara-based languages like Bangla differs significantly from those in linear orthographies. The psychological role of semi-syllabic akshara blocks in these languages highlights the need for a nuanced understanding of how orthographic structures influence cognitive processes in language recognition and processing.

### 4. Concluding remarks

While observations from our studies highlight the necessity to rethink the applicability of theories of orthographic influence on word recognition, particularly regarding those of sub-lexical constituents, in languages with non-linear orthographies; a few methodological shortcomings should be mentioned. Firstly, we could not check the effect of word frequency in the absence of our access to a standard database of frequency count for Bangla words. Secondly, in hindsight, the need to present a third condition in Experiment 1 where each akshara of the items would be marked in a different colour coding becomes more apparent. And lastly, in both studies, we used monomorphemic words to reduce the experimental complexities and as a result could not investigate the interaction between the roles of morphology and grapho-phonology. If one were able to overcome these deficiencies in future studies, a more robust theory of orthographic word recognition in non-linear orthographies could certainly be achieved.



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