# Clausal Deficiency

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## Abstract

This thesis investigates the syntactic and semantic properties of clauses which are considered to be deficient in some manner, which are often called infinitival or nonfinite clauses. This thesis is concerned with three types of features that are relevant to the deficiency of a clause: (i) syntactic, for instance the ability of a clause to have an independent subject; (ii) morphosyntactic, or whether the verb of the clause in question is sufficiently marked for inflectional features like tense or agreement; and (iii) semantic, for example whether a clause is fully specified for tense. The fundamental goal of this thesis is to uncover crosslinguistic patterns regarding the syntactic, morphosyntactic and semantic properties of these deficient clauses.

Chapter 1 provides a summary of the current state of affairs in the literature regarding the nature of finiteness in generative grammar and lays the foundation for the upcoming chapters, while providing a summary of each. Chapter 2, based on a detailed analysis of the infinitives of 17 different languages, provides a novel syntactic universal regarding infinitives crosslinguistically: the inability to occur with a high complementizer, building on previous cartographic work on the complementizer domain of clauses. In addition, it provides several novel implicational universals on the left-peripheral properties crosslinguistically: for instance, all languages which allow topics within their infinitives also allow wh-elements within their infinitives, but not vice versa. Also based on

crosslinguistic evidence, Chapter 3 proposes a theory on the relationship between subject size and clause size: for any two clauses in which one is larger than the other, the larger clause can have a subject that is equal to or larger than a subject in the small clause, but not vice versa. In doing so, I provide a new understanding of the null pronoun PRO in control infinitives. Chapter 4 provides a detailed analysis of the semantics of infinitival tense, concluding that all infinitives necessarily lack an independent tense specification. It comes to this conclusion via both an experimental study involving the lack of temporal *de re* in infinitives and a crosslinguistic survey of adjunct infinitives. I distinguish between three separate types of what has been referred to as "tenselessness" for clauses in the literature. Chapter 5 provides an alternate angle to the findings in Chapter 2 and its applications beyond just comparative syntax; namely, its implications on current theories of the origins of syntax and cartography. The goal of Chapter 5 is to show that comparative syntax is able to make a mark on our understanding of the origins of language.

# Contents

To Erdoğdu Satık

# Acknowledgments

It goes without saying that my time at Harvard has helped me grown both as a linguist and as a person. This topic would not have existed if I hadn't gone to a talk by David Pesetsky on Exfoliation, all the way back in 2016. Although he appears to have mostly given up on it, I think his core insights are still on the right track, as I hope this thesis shows. This dissertation also wouldn't have existed if he wasn't so eager to meet regularly with students (even from outside MIT) and so generous with his time compared to other academics. Jonathan Bobaljik, on the other hand, made me grow as a linguist more than anyone else. When I first came to Harvard, I was a confused graduate student too focused on the technical parts of syntax. I learned to instead focus on the data and the big-picture implications that arise from them, which will continue to influence the style of my work, and the way I think well after I leave Harvard. He is also unfailingly nice and generous with his time. Finally, Susanne Wurmbrand made me grow into an independent individual, by encouraging my autonomy and resolve during the writing of this PhD thesis.

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status among other scholars, or writing papers tailored to have the best possible chance of getting published in so-called "prestigious" journals with inflated rejection rates. All he wanted was to know more about the way the world, and its inhabitants, worked. During his PhD, our living room was covered in piles and piles of printed paper of various pirated books and journal articles. He would go through a thick stack of paper every single day, while I struggled (and still do to this day) to even read more than a few pages at a time–though I did pick up the pirating habit. I'm ashamed to admit that I didn't even read a small fraction of what he did during my own PhD. His thirst for knowledge and unparalleled capacity for hard work are things I have never been able to compete with. But to me, he will always serve as an example of what academia ought to be like.

# List of Abbreviations

| | | | | | |
|---|---|---|---|---|---|
| 1 | 1st person | EP | Epenthesis | PL | Plural |
| 2 | 2nd person | ERG | Ergative | POSS | Possessive |
| 3 | 3rd person | FEM/F | Feminine | PRES | Present |
| ABS | Absolutive | FOC | Focus | PROG | Progressive |
| ACC | Accusative | FUT | Future | PST | Past |
| ASP | Aspect | GEN | Genitive | PTCP | Participle |
| AUX | Auxiliary | GER | Gerund | REFL | Reflexive |
| CAUS | Causative | IMPERF | Imperfective | SG | Singular |
| CL | Clitic | INF | Infinitive | SUBJ | Subjunctive |
| COMP | Complementizer | ITV | Intransitive | SUP | Superessive |
| COP | Copula | MASC/M | Masculine | TOP | Topic |
| DAT | Dative | NEG | Negation | TV | Transitive |
| DECL | Declarative | NOM | Nominative | | |
| DEF | Definite | NML | Nominalizer | | |
| DEM | Demonstrative | NPST | Nonpast | | |
| DEP | Dependent | PART | Particle | | |
| EC | Empty Category | PERF | Perfective | | |

# 1

# Introduction

This dissertation is about the deficiency of clauses. Its goal is to figure out in what ways clauses can be deficient, and whether they be grouped into clear and distinct classes with regard to the various kinds of deficiencies in properties that clauses may have. Most importantly, this dissertation aims to come to a better understanding regarding the kind of empirical predictions that can be made on the syntactic properties of deficient clauses in a language. I explore several new generalizations across different languages regarding clauses in a given language which are deficient in certain syntactic, morphosyntactic and semantic features, relative to clauses which are not deficient in that same language. I do so by amassing a significant body of comparative evidence. In the end, I conclude that these crosslinguistic patterns may help lead us to a better understanding of the origins of the language faculty.

## 1.1 What is deficiency?

Consider the following English sentences:

(1) a. Caitlin loves cats.

b. I am a fool.

c. She arrives at 5 PM.

d. You were late.

e. I could be absent tomorrow.

At least under the grammatical rules of English, these sentences appear to be fully specified in terms of various syntactic, morphosyntactic and semantic features. A list of the most common of these properties is given below in (2a)-(2c).

(2) a. *Syntactic properties:* Does the sentence have an independent subject? Is the sentence able to stand alone, i.e. is it able to *not* be an embedded clause?

b. *Morphosyntactic properties:* Is the verb of the sentence in question sufficiently marked for features like person agreement, morphosyntactic tense, mood or other features, which may be required for verbs in independent sentences in the language that the sentence belongs in?

c. *Semantic properties:* Is the sentence fully specified for semantic TAM (Tense, Aspect and Mood)?

Let's apply these properties to the sentences in (1a)-(1e), none of which are embedded clauses. Each of these sentences have a clear and independent subject: *Caitlin*, *I*, *she*, *you*, *I* respectively in (1a)-(1e). In each instance, the verb is sufficiently marked for both tense and person agreement, with the

exception of *be* in (1e) none of the verbs are an infinitive.[1] The possibility of *be* in (1e) is due to the presence of *could*, the past form of *can*. Sentences (1a)-(1c) are in the present tense while (1d)-(1e) are in the past tense.

The same applies when the clauses are embedded, as well:

(3) a. I know that [Caitlin loves cats].

b. I despise that [I am a fool].

c. I believe that [she arrives at 5 PM].

d. It is unfortunate that [you were late].

e. I understand that [I could be absent tomorrow].

So far, so good. But not all embedded clauses in English are so fortunate. The complements of certain predicates in English do not fully satisfy (2a)-(2c). On the surface, these embedded clauses are distinguished by the lack of a subject, the presence of the infinitival marker *to* and the bare form of the verb. Some examples are given in (4a)-(4e) below.

(4) a. Caitlin seems [to love cats].

b. He decided [to be a fool].

c. She tried [to arrive at 5 PM].

d. It is unfortunate [to be late].

e. I claimed [to be absent].

With the exception of (4d), in each of these sentences, the subject of the infinitive appears to be the matrix subject. Perhaps the reason the infinitival clause appears to semantically refer back to the

[1] The notion of "finiteness" can be understood differently: it is traditionally seen as the property of a verb, but with the advent of generative grammar it has also been associated with entire clauses. This is why the verb in (1e) can be described as an infinitive. But this dissertation will only focus on the notion of finiteness that is relevant to clauses.

matrix subject is because it lacks its own subject and needs one, referring back to the matrix subject as a kind of default operation. But in (4d), it somehow appears that the infinitive has a subject of its own, in that the understood referent appears to be a group of contextually salient people. This therefore cannot be the full story.

This is the first hint that, although all of these infinitives are *deficient* in some sense, they differ regarding the properties in (2a)-(2c). We will see throughout this dissertation that even though these embedded clauses all appear to be identical on the surface, in terms of their deficiencies they are anything but. As is well-known in the literature, (4a) is distinguished from the other embedded clauses in this batch of sentences as it involves raising (movement of the subject from the embedded clause to the matrix clause) rather than control, according to which the infinitive has its own invisible subject, called "PRO," that co-refers to the matrix subject.

This only scratches the surface of the variation in clausal deficiency that we see among infinitives. Although I argue in Chapter 2 that all infinitival clauses share a single syntactic property in common, they differ in other properties. For instance, Chapter 3 argues that the control infinitive in (4c) truly lacks a subject, whereas (4e) and (4b) do have a genuine invisible subject. On the other hand, Chapter 4 provides a three-way empirical distinction between the kinds of tense that each of (4b), (4c) and (4e) have. There is thus a great deal of empirical terrain to cover, and much still left to delve into even after the end of this dissertation.

With the background for this dissertation established, we can now begin with a review of the literature. What distinguishes the clauses in (4a)-(4e) is that they have been dubbed as *nonfinite* clauses in the literature, which is perhaps the most poorly understood notion in generative grammar. Let us come to a better understanding of what it may be.

## 1.2 What is finiteness? Is it a worthwhile notion?

*Nonfiniteness* has usually been associated with complement clauses which appear to be "less dependent" than other clauses in terms of their syntactic or semantic properties. For instance, such clauses may rely on the matrix clause for tense specification, or may "share" a subject with it in some sense, via control or raising, or be more transparent in regard to certain cross-clausal operations. Crucially, such clauses often lack visible morphosyntactic markings on the verb, and one question is whether this class of clauses can be defined universally.

Thus, there appears to be a correlation between the lack of morphosyntactic markings on one hand, and syntactic plus semantic deficiency on the other. It would be exceedingly unlikely for this kind of correlation to be a mere coincidence. As such, I would like to repurpose the term "finiteness" to reflect distinctions between clauses that I think are significant. In the end, I will argue that it is a notion worth maintaining. In Chapter 2, I attempt to capture this correlation by proposing that there is in fact at least one specific clausal projection which all nonfinite clauses lack.

For descriptive grammarians studying Latin, the finite/nonfinite distinction was originally defined as the presence or absence of agreement of the verb, though other properties were later considered to be relevant for finiteness as well–the most important of which is tense.[2] Agreement works straightforwardly to analyze finiteness within a European context, but such a definition of finiteness cannot be extended crosslinguistically. Landau (2013) lists a number of languages with inflected infinitives, such as Turkish, Brazilian Portuguese, Basque, Hungarian and Welsh which have nonfinite complements that are inflected for agreement. An example from European Portuguese is provided in (5) below from Raposo (1987) (p. 86):

(5) Será dificil [eles aprovar-em á proposta].
It will.be.difficult they to.approve-3PL the proposal
'It will be difficult [for them to approve the proposal].' European Portuguese

[2] See Nikolaeva (2007) for a helpful introduction to finiteness in linguistic literature.

But morphosyntactic tense marking is not sufficient either.[3] In Tamil, we see the opposite scenario according to McFadden & Sundaresan (2014) (example from p. 9). In (6), the embedded clause is marked with tense but not agreement, yet appears to be nonfinite given its inability to stand alone:

(6) Raman$_i$ [EC$_i$ Seetha-vae naaleeki paar-pp-adaagae] so-nn-aan.
Raman EC Seetha-ACC tomorrow see-FUT-GER.ACC say-PST-3MSG
'Raman$_i$ spoke of [EC$_i$ seeing Seetha tomorrow].' Tamil

Another property that has been commonly assumed to distinguish finite clauses from nonfinite clauses is whether the clause licenses overt subjects, as Chomsky (1977a) suggests. A-movement out of a finite clause is not possible, as in (7a), but it is from a nonfinite clause, as in (7b).

(7) a. * David$_i$ seems [that t$_i$ likes exfoliation].

b. David$_i$ seems [t$_i$ to like exfoliation].

This observation helps us with languages like Mandarin which have no inflectional morphology whatsoever, and hence, no tense and agreement. As has been noted by many in the literature on Mandarin, clausal complements of verbs such as *like* cannot have an overt subject or a null pronoun that does not refer to the matrix subject. In other words, we seem to observe a controlled PRO in the complements of such sentences, as in (8) from Ussery et al. (2016) below. This indicates there might be a finite/nonfinite distinction in Mandarin after all:

(8) Xiaoming xihaun (*ta) chi shousi.
Xiaoming like he eat sushi
'Xiaoming likes to eat sushi.' Ussery et al. (2016) (p. 1), Mandarin

Although in the past such a distinction was tied to Case and agreement, in more recent proposals such as by Pesetsky (2021) it is tied to clause size: (7a) involves a clause as large as CP, which pre-

[3] This must be distinguished with semantic tense, which is a different notion. In Chapter 4, I will touch upon the possibility of *semantic* tense being a diagnostic for nonfiniteness. I will see that it is possible for an infinitive to have an overt tense marking but be dependent on its temporal specification from the matrix clause, or even the context.

cludes the possibility of subject extraction, whereas (7b) involves a clause that is smaller than CP, which allows the possibility of subject extraction.

Relating finiteness to clause size predates Pesetsky's work. Bouchard (1984), Koster (1984) and Hornstein & Lightfoot (1987) all argue that object extraction correlates with the size of the embedded clause; more recently, Müller (2020) has proposed a similar theory to Pesetsky's. Chapter 2 provides novel evidence for these theories of finiteness, but with more fine-grained distinctions than just CP and TP.

In this dissertation, I remain agnostic as to whether, as Pesetsky and Müller suggest, nonfinite clauses start out larger and are truncated during the derivation. The generalizations that will be proposed in this chapter are independent of such theories. When I use the word *truncated*, I do not intend to presuppose that such clauses start out large and end up smaller by some operation. But the possibility of whether infinitives may start out full and finite in size, and whether that may be reconciled with the framework of infinitives proposed in this dissertation, will be discussed further in Chapter 2.

McFadden & Sundaresan (2014) (p. 5) raises further challenges for the Chomskyan line of reasoning, however, based on evidence from languages such as Tamil, Sinhala, Modern Irish and Middle English which have clauses that are clearly nonfinite–that lack tense and agreement–yet allow subjects to be licensed, as in the Tamil example in (235) below.[4]

(9) [**Vasu** poori porikk-a] Raman maavu vaangi-n-aan.
Vasu.NOM poori.ACC fry-INF Raman.NOM flour.ACC buy-PST-M.3SG
'Raman bought flour for Vasu to fry pooris. Tamil

McFadden and Sundaresan undermine the correlation between subject licensing and finiteness, not just for simpler models of subject licensing via Agreement in the GB and Minimalist framework like Raposo's (1987), but also for Landau (2004b) and Szabolcsi (2009), who assume a more complex

[4] A further challenge for this is based on hyperraising constructions, to be discussed in Chapter 2.

relationship between tense, agreement and subject licensing in clauses.

Another potential distinguishing property, briefly alluded to above in our discussion of Tamil, is the ability of a clause to stand alone. This seems difficult to reconcile with the existence of imperatives like *Catch her!* which, even in languages with very rich inflectional morphology, have little inflection, and yet can stand alone. As a result, many works, such as Nikolaeva (2007), have concluded that there is no single morphosyntactic definition or single semantic function associated with so-called nonfinite clauses.

Many morphosyntactic categories have been suggested to be responsible for finiteness in the literature: mood, tense, aspect, person marking, illocutionary force, nominal morphology on the verb, and markings that mark dependent clauses in certain languages.[5] Works like Wurmbrand et al. (2020) claim that different morphosyntactic categories are responsible for finiteness in different languages–such as agreement in the South Slavic languages.

Recall that in the introductory section, I distinguished between three types of deficiency: morphosyntactic, semantic and purely syntactic. Although I believe the evidence that there is no single morphosyntactic determinant of clausal finiteness is conclusive, this only rules out one out of three possibilities. One also has to explore whether there might be a purely syntactic or semantic determinant of whether a clause is finite or nonfinite. And a purely syntactic definition may be possible.

At this point, I would like to bring the attention of the reader to a seemingly trivial fact: an infinitival clause can never co-occur with *that*, which is often referred to as a finite complementizer:

(10) Caitlin claimed (*that) to be beautiful.

In order for this observation to make sense, I must introduce the reader to the basics of the cartographic enterprise in generative syntax, which will lay the foundation for the rest of this dissertation.

[5] The reader is referred to Nikolaeva (2007) for further discussion.

## 1.3 Introduction to the Cartography of Syntactic Structures

It is uncontroversial that the syntactic structures generated by human language use are complex, but determining the sources of this complexity is far more difficult. The goal of the cartographic enterprise in modern generative syntax is to draw highly detailed maps of these structures–as precise and as detailed as possible. As Cinque & Rizzi (2009) point out, under this conception of cartography, it is more of a research topic rather than a theory or hypothesis that attempts to determine what the right structural maps are for natural language. Although people may not agree on what the right map is, or even the right order of the projections on the map, Cinque & Rizzi still think that this shows the question is a legitimate one for modern syntactic theory.

The extension of X-bar theory to the CP-IP-VP structure of the clause was the critical step in allowing the advent of the cartographic program.[6] This enabled syntacticians to conceive of clauses and phrases as made out of functional projections–these are heads like C (the head of the complementizer phrase, CP), I (the head of the inflectional phrase, I) and D (the head of the determiner phrase, D). But once these functional heads were added to the generative theory, it soon became clear that the same kind of evidence in favor of their existence also supported the existence of many more functional projections.

This is precisely what Pollock (1989) accomplished in his seminal paper on the I domain, arguing that I is not a unitary head but rather a domain made up of many functional heads–one for agreement, one for tense, and so on. Most importantly, as Rizzi (1997) has proposed, the functional projection C is not in fact just one functional projection, but it is a highly complex domain made out of many functional projections, each with a specific role.

Comparative evidence is the primary source of evidence for cartographers. Cinque (1999) sought to argue for the existence of a highly detailed and ordered universal hierarchy for clausal functional

[6] Chomsky (1986) is cited by Cinque & Rizzi (2009) as being the first to do so, but den Besten's (1983) analysis of the verb second word order predates it.

projections based on crosslinguistic data from several different languages, each of which are from different language families. This appears to be at odds with traditional analyses of adverbs in which they are adjoined with relative freedom and flexibility. But Cinque shows that they do not appear to have such freedom.

To be more specific, Cinque argues that clauses are made up of many functional projections which are ordered, and into each of those functional projections, an adverb can be inserted. If there is no adverb, then the functional projection is still present but simply not filled. This idea was first argued for by, I believe, Alexiadou (1997) . But if there are multiple adverbs in a sentence, it is likely that they have to be ordered in some way–depending on the kind of adverb. Here is the order of adverbs that Cinque ends up with, based on his survey:[7]

(11) frankly > fortunately > allegedly > probably > once/then > perhaps > wisely > usually > already > no longer > always > completely > well (from Cinque (1999), p. 34)

Let us now see some concrete examples, starting with English. Suppose we have a sentence with two adverbs: *any longer* and *always*, and they both appear before the verb. What we find is that the adverb *any longer* must precede the adverb *always*:[8]

(12) a. John doesn't any longer always win his games.

b. * John doesn't always any longer win his games.

We find that this order is attested in Italian, as well, in addition to the several other languages that Cinque discusses.

[7] I will be unable to present extensive evidence for the hierarchy in this chapter due to reasons of space. The reader is referred to Cinque (1999) for further evidence.

[8] There is one little catch with this data. Notice that the sentence *John doesn't always win his games any longer* is acceptable, in which *always* appears to precede *any longer*. This is also possible in Italian, according to Cinque, but only if *any longer* is emphasized. Without emphasis, it is not possible. As Cinque notes, appearances are deceiving: one could suppose that it involves movement of the adverb from its initial position.

Another example is the ordering of what Cinque calls pragmatic adverbs like *frankly* over what Cinque calls illocutionary adverbs like *fortunately*. In Italian (p. 12 of Cinque (1999)), what we find is that in a sentence with both adverbs, the pragmatic adverb must precede the illocutionary adverb, as in (13a)-(13b). Similar facts follow for the English translations as well: the English translation in (13a) is significantly preferable over the one in (13b), although the intuition may not be as strong as in Italian.

(13) a. Francamente ho purtroppo una pessima opinione di voi.
'Frankly I unfortunately have a very bad opinion of you.'

b. * Purtroppo ho francamente una una pessima opinione di voi.
'Unfortunately I frankly have a very bad opinion of you. Italian

Cinque tests the ordering in (11) in many different languages: in addition to Italian and English, he also tests Norwegian, Bosnian/Serbo-Croatian, Hebrew, Chinese, Albanian and Malagasy. He comes to the same conclusion in each of these languages. That such fine ordering is attested in all of these languages belonging to different language families appears to be strikingly coincidental, if not for the potential presence of some kind of cognitive constraints from which these patterns could be derived.

Indeed, as I point out in Satık (2022a), it is exceedingly unlikely that the ordering of adverbs seen in (11) above can be derived via reference to functional methods, or cultural evolution. The only alternative in that case, as Haspelmath (2020) suggests, is that there are innate building blocks or some other kind of general cognitive constraints, guiding the order in which adverbs are present in syntactic structure.

But there appears to be a problem that puts cartography at odds with the Minimalist framework developed by Chomsky (1995). There seems to be a tension between the very simple mechanism that drives the formation of recursive structure for Minimalists–that is, Merge–and the very fine and

complex cartographic representations that are argued to be innate in the language faculty. However, Cinque & Rizzi (2009) suggest that there is no inherent conflict between the two viewpoints: they believe that the tension is merely "the sign of a fruitful division of labor." They describe how the two approaches might come together very clearly in the quote below:

> Minimalism focuses on the elementary mechanisms which are involved in syntactic computations, and claims that they can be reduced to extremely simple combinatorial operations, ultimately external and internal Merge, completed by some kind of search operation (Chomsky's Agree) to identify the candidates of Merge. An impoverished computational mechanism does not imply the generation of an impoverished structure: a very simple recursive operation can give rise to a very rich and complex structure, as a function of the inventory of elements it operates on, and, first and foremost, of its very recursive nature.

Thus, I believe that cartography is not in conflict with a weaker version of Minimalism, which is more of a philosophy than a thesis: the fewest number of innate building blocks that are necessary ought to be assumed in our theory. But the most natural way to understand cartography is in terms of an innate blueprint. It appears that any account which assumes an innate blueprint for syntactic structure in the language faculty is at odds with Bolhuis et al.'s (2014) Strong Minimalist Thesis (SMT), which will be discussed in detail in Chapter 5.

But what is the nature of this blueprint? The functional hierarchies could be encoded in a certain order, such as (398) directly onto the language faculty. This possibility can be immediately dismissed via Darwin's problem.[9] Furthermore, as Chomsky et al. (2019) note, there is no conceivable evidence that a child would be able to infer fine hierarchical details from experience. It would be preferable to suppose that the hierarchy in (398) may not be directly encoded but could be derived from more general and basic principles and properties, which are a part of the computational machinery of the human language faculty, which Ernst (2002) attempts to do by reference to their

[9] See Bobaljik (1999) for an argument that such an account also leads to a paradox.

semantics. Several intermediate possibilities may exist as well. The blueprint must thus be more minimal than a complex order of functional projections. The job of the cartographer, then, is to find the correct maps and then trace them to more general properties.

This is precisely what I will be doing in Chapter 2 of the dissertation, in which I argue that infinitives, by their very nature, are necessarily truncated in the C domain. The empirical results in the chapter establish other results, as well. A careful and detailed investigation of 17 different languages shows that the possible left-peripheral C domain properties of an infinitive are predictable based on Rizzi's ordered structure of the C domain. In addition, a detailed discussion of this dissertation and its place in the debate on language evolution will be provided in the concluding Chapter 5.

## 1.4 The Infinitive Size Generalization (Chapter 2)

With the cartographic foundations of this dissertation established, we are now ready to discuss a possible syntactic generalization regarding all nonfinite clauses. Recall that a infinitival clause can never co-occur with *that* (at least in English so far) which is often referred to as a finite complementizer:

(14) Caitlin claimed (*that) to be beautiful.

I will argue that (14) is true of all nonfinite clauses across languages. This is, so far, a trivial observation: a finite complementizer cannot head a nonfinite clause. But this merely means that we ought to clarify what we mean by a *finite complementizer*. *Why* are finite complementizers only associated with finite embedded clauses? We can answer these questions if we adopt works which split up the CP domain following Rizzi (1997), to change our conception of what *that* actually is. And this will allow us to bypass this circularity and make a non-trivial crosslinguistic generalization.

Following Rizzi (1997), I split up the C domain in a manner that is schematized below. Further details will be provided in Chapter 2, but we will see that this splitting-up is justified by the possibility of double complementizer constructions crosslinguistically, and the existence of complementiz-

ers which seem higher and lower in the C domain:

(15) **CP2 (high)** > InterrogativeP > FocusP > TopicP > WhP > **CP1 (low)** > TP

I define a *high complementizer* as a complementizer that heads CP2. By definition, high complementizers always precede topic and focus-marked elements. My survey indicates that high complementizers never appear with nonfinite clauses. A complementizer that heads CP1, on the other hand, is a *low complementizer*. It often appears with nonfinite clauses, but it need not, if it has not already been truncated–which is often the case. When topics and focalized elements are possible at all in an infinitive, the low complementizer must follow them.

It is in fact possible to distinguish between these complementizers even in English: *that* is a high complementizer. *For* may be a low complementizer. Although many such tests will be presented throughout Chapter 2, I will provide a simple illustrative example. For example, notice that, as Haegeman (2012) points out, topicalization is possible in the embedded clause complements of non-factives, and in this case, *that* precedes the topic:

(16) I said that Manufacturing Consent$_i$, Chomsky wrote $t_i$.

*That* is a high complementizer in Rizzi's system. On the other hand, infinitives in English never allow topicalization or focalization, indicating that infinitives are truncated in the C domain.[10]

(17) * Chomsky claimed Manufacturing Consent$_i$, to have written.

Languages differ in this regard. For example, Hebrew infinitives seem to display almost the entire range of the properties of the C domain, allowing *why*-embedding, topicalization, focalization and more, according to Shlonsky (2014):

(18) ani roce [et ugat ha pereg]$_i$ lenasot $t_i$.
I want ACC cake the poppyseed to.try
'I want to try the poppyseed cake.' Shlonsky (2014) (p. 12), Hebrew

[10] Here I refer to topicalization and focalization in the cartographic sense, to be defined in Chapter 2.

And yet, Hebrew infinitives crucially cannot be headed by the high complementizer *še*:

(19) ani roce (*še) lenasot et ugat ha tapuxim.
I want (*that) to.try ACC cake the apples
'I want to try the apple cake.' Hebrew

Based on my crosslinguistic survey, the main generalization that I will argue for in Chapter 2 is in (20) below. [11]

(20) **Infinitive Size Generalization (ISG)**: No infinitival complement projects CP2.

No infinitival complement can co-occur with a high complementizer.

This allows for a definition of finiteness in terms of the truncation of the C domain, and hence clause size. My goal in Chapter 2 is to investigate the clause size of infinitives more generally, and see whether cartographic generalizations beyond (20) above can be made. To see the methodology used for this survey, I now provide a quick summary of the properties of the C domain of English infinitives, based on Rizzi's (1997) analysis of the left periphery. The methodology will be presented in detail in Chapter 2.

(21) a. *Infinitival complementizers*: I am eager for Caitlin to please.

b. *Wh-infinitives*: I know what to eat.

c. *No topicalization within infinitives*: *I wanted this book, to read.

d. *No focalization within infinitives*: *I wanted THIS BOOK to read (not that one).

e. *No why-infinitives*: ??I asked Caitlin why to eat salad.

f. *No high complementizer*: I seem (*that) to be happy.

[11] The scope of this dissertation is to cover only the clausal size of infinitives; as such, I will only focus on infinitives. Though I leave the status of the clausal size of gerunds open to future research, it is likely that conclusions that I make concerning infinitives can also be made concerning gerunds as well. I will provide a brief discussion as to whether it might be possible to extend this generalization to subjunctive clauses, which have been claimed to be borderline between finite and nonfinite in the literature.

The results of the detailed survey of 17 languages is summarized below in (22), together with the hierarchy of the left periphery assumed in Chapter 2:

(22) **Hierarchy**: CP2 > IntP > FocP > TopP > WhP > CP1 > TP

a. **Maximally TP Infinitives**: Hindi, Hungarian, Serbian, Turkish, German

b. **Maximally CP1 Infinitives**: Icelandic, Swedish

c. **Maximally WhP Infinitives**: Dutch, English, French, Polish, ?Russian, Spanish

d. **Maximally TopP Infinitives**: Catalan, Irish, Italian

e. **Maximally IntP Infinitives**: Hebrew, ?Russian

f. **Maximally CP2 Infinitives**: ∅

What is most remarkable is that, in addition to the Infinitive Size Generalization being maintained throughout the languages surveyed, the left peripheral properties of the infinitives of each language follow an implicational hierarchy. That is, their left peripheral properties are predictable from the topmost one. For instance, because Hebrew allows *if* and *why* in its infinitives, it also allows all of the other left-peripheral elements in its infinitives. These generalizations are given in (23a)-(23c) below.

(23) a. *Sabel's (2006) Simplified Generalization*: If a language has wh-infinitives, then it also has infinitival complementizers.

b. If a language allows topicalized elements within its infinitives, then it also has wh-infinitives and infinitival complementizers.

c. If a language allows *why* and *if* in its infinitives, then it has contrastive focus and topicalization within its infinitives, wh-infinitives and infinitival complementizers.

But we do not yet have enough evidence to conclude that the Infinitive Size Generalization is true, of course. Absence of evidence is not evidence of absence: the fact that there does not seem to be

a language reported in the literature with a high or double complementizer construction does not mean that we have a universal. I therefore present additional evidence from Serbian and Mandarin in which I directly use left-peripheral properties like topicalization to diagnose whether a clause requires controlled PRO or not, a classic diagnostic for nonfiniteness.

With the foundation for a theory of finiteness in terms of clause size established, I present precise and falsifiable definitions for finite- and nonfiniteness in (24a)-(24b) below.

(24) a. A clause is finite iff it is untruncated in the C domain.

b. A clause is nonfinite iff it its CP2 layer is truncated.

As we will see in Chapter 2, these definitions are likely too simple, though they make an excellent starting point.

## 1.5 An economy theory of PRO (Chapter 3)

In Chapter 2, I argued that infinitives are necessarily truncated in clause size. This is a kind of syntactic deficiency. The subject of control infinitives, PRO, has also been argued to be deficient in syntactic features (Sigurðsson (2008), Chomsky & Lasnik (1995), Kratzer (2009) and Landau (2015)). It would be remarkably unlikely for this to be a coincidence. As such, this chapter provides a novel account of the nullness and the distribution of obligatorily controlled (OC) PRO, based on the results of Chapter 2. Though there is reason to believe that PRO may not always be null (Szabolcsi (2009) and McFadden & Sundaresan (2014)), this chapter shows that the distribution of PRO follows an implicational economy hierarchy, deriving the tendency for PRO to be null. This leads me to argue for the following empirical generalization:

(25) *Implicational Hierarchy for Subject Size and Clause Size*

For any clauses XP and YP where XP is larger than YP:

The maximal subject size of XP must be greater than or equal in size to the maximal subject size of YP.

### 1.5.1 PRO as a deficient pronoun

To do so, I start by showing that PRO is a highly deficient pronoun, building on Cardinaletti & Starke's (1999) (C&S) theory of pronominal deficiency. Via C&S, I first present empirical evidence for the notion that PRO is a reference variable or minimal pronoun. Then, I show via five case studies that as a clause becomes more deficient in syntactic and semantic features, its subject must become more deficient as well. The distribution and nullness of PRO is derived under C&S's framework in which the smallest possible pronoun, PRO, is preferred as the subject of control infinitives because it is the most economical subject that can be interpreted as a bound variable.

I first go over the various empirical properties of OC PRO in relation to the tests used by C&S to distinguish strong and deficient pronouns. I show that PRO has the properties in Table 2, aligning with the properties of deficient pronouns.

| Pronouns | D-antecedent | Expletive | Impersonal | Non-human | Ob. de se reading |
|---|---|---|---|---|---|
| Strong | ✗ | ✗ | ✗ | ✗ | ✗ |
| Deficient | ✓ | ✓ | ✓ | ✓ | ✓ |

**Table 2:** A summary of the properties of strong and deficient pronouns

Let's briefly go over the tests before covering them in more detail in Chapter 3. C&S note that strong pronouns don't need an antecedent in the sentence or context. OC PRO, by definition, must have a local antecedent (disregarding the notorious case of *promise*):

(26) $\text{John}_i$ persuaded $\text{Mary}_j$ [$\text{PRO}_{*i/j}$ to take out the trash].

Like other deficient pronouns, PRO can have an inanimate reading:

(27) a. This key$_i$ will serve/do [PRO$_i$ to open the door].

b. The accident$_i$ is responsible [for PRO$_i$ causing the ship to sink].

It can have an impersonal reading, as Landau (2013) points out:

(28) It was decided to move forward.

But unlike other deficient pronouns, it cannot usually have an expletive reading. However PRO, by stipulation, must receive a θ-role, so this is unsurprising:

(29) There$_i$ can't be peace [without there/*PRO$_i$ being war first].

The final test concerns the obligatory de se reading of PRO and it is not discussed by C&S. It has been well-known that PRO is obligatorily interpreted de se. The overt pronoun in (30a) can be read de re, while PRO in (30b) cannot be:

(30) Winter is very drunk and on fire. He says the man in the mirror is on fire, but it is himself.

a. Winter claimed he was on fire. b. # Winter claimed to be on fire.

The background for this test is as follows. Patel-Grosz (2019) (p. 33) notes that in Kutchi Gujarati, pro must be read de se even in a finite clause, while strong pronouns need not. Although both sentences in (31) are grammatical, the one with a null pronoun is false because it must be read de se:

(31) Context: A group of drunk election candidates watching campaign speeches on television do not recognize themselves in the broadcast. Valji and Lalji, the two confident ones, think "I'll win," but do not recognize themselves in the broadcast. Khimji and Raj, both depressive, think "I'll lose" but are impressed by the speeches that happen to be their own and are sure "that candidate" will win.

*People who believe that they themselves will win*: everyone

*People who believe* de se *that they will win*: only Valji and Lalji

a. Harek manas maan-e ke i jeet-se.
every man believe-3SG.PRES that he win-FUT.3SG
'Every man believes that he will win.' TRUE

b. Harek manas maan-e ke (pro) jeet-se.
every man believe-3SG.PRES that pro win-FUT.3SG
'Every man believes that he will win.' FALSE Kutchi Gujarati

C&S show that whenever a more deficient form of a pronoun is possible in a sentence, it must be picked over all other alternatives, due to an economy constraint *Minimize Structure*. This helps to provide an explanation of why PRO is usually null. As C&S show, as a pronoun becomes more deficient (ex. pro), it is more likely to be null. PRO is independently ruled out from (most) finite clauses because it lacks the features to satisfy the syntactic and semantic needs of finite T.

### 1.5.2 The relationship between subject and clause size

I argue that there is a fine-grained, implicational relationship between clause and subject size: the more deficient a clause is, the more deficient its subject must be. This follows a framework of clause size by Wurmbrand & Lohninger (2019) (W&L). Following the results of Chapter 2, I assume that infinitives are always truncated, but come in three sizes: a truncated CP (ex. the complement of *claim*, TP (*decide, want*) and vP (*try, begin*). I show that all languages obey an *implicational hierarchy*, in that a more deficient clause never allows a larger subject than that is possible in a larger clause. All of this data is summarized in Table 3 below.

| Language | Finite CP | Nonfinite CP | TP | vP |
|---|---|---|---|---|
| English | Overt NP | PC PRO | PC PRO | EC PRO |
| Greek | Overt NP | | Overt NP | EC PRO |
| Tamil | Overt NP | Overt NP | Overt NP | EC PRO |
| Serbian | Overt NP | | PC PRO | EC PRO |
| Mandarin | Overt NP | | | EC PRO |
| Icelandic | Overt NP | PC PRO | PC PRO | EC PRO |

**Table 3:** A summary of the various possible subject sizes in different complement sizes for the languages discussed in this section. An empty cell means that the language does not have that kind of complement clause. PC stands for *partial control*; EC stands for *exhaustive control*.

According to McFadden & Sundaresan (2011) (p. 5 and 17), Tamil allows overt NPs without case or focus in adjunct infinitives (CP or TP) (32a), but not in vP-infinitives (*try* in (32b)).

(32) a. [**Vasu** poori porikk-a] Raman maavu vaangi-n-aan.
Vasu.NOM poori.ACC fry-INF Raman.NOM flour.ACC buy-PST-M.3SG
'Raman bought flour for Vasu to fry pooris.

b. Raman$_i$ PRO/taan/*Vasu saadatt.ai saappi.d.a paa.tt.aan
Raman.NOM PRO/self.NOM/*Vasu.NOM rice.ACC eat.INF try.PST.3MSG
'Raman$_i$ tried [PRO$_i$ for himself$_i$/*for Vasu to eat the rice].' Tamil

W&L show that Greek is similar to Tamil, allowing pro (a deficient pronoun under C&S's framework) in CP or TP embedded clauses but only allowing PRO as a vP-subject.

Icelandic, on the other hand, appears to lack a subject entirely in the vP-complement of *try*, but not in the TP-complement of *hope*. As is well-known, (33) shows case concord between PRO and *ein*. But in (33), *try* instead of *hope* is not acceptable in the appropriate context. (33) is only acceptable with *try* if *eina* is in the nominative form, which is *ein*.

(33) María$_i$ vonast/*reydni til [að **PRO$_i$** vanta ekki **eina$_i$** í tíma].
Mary.NOM hopes/*tried for to lack not alone.ACC in class
'Mary hopes/*tried not to be missing alone from class.' Icelandic

Corroborating evidence for the possibility that vP- and TP-infinitives have different subjects is the phenomenon of *partial control* (PC). PC indicates that languages appear to allow even more deficient subjects in vP-infinitives. PC is only attested in CP- and TP-infinitives:

(34) The department chair wanted/*tried to gather at 6.

To recap, in Tamil and Greek, vP-infinitives necessarily have smaller subjects than CP- or TP-infinitives. In Icelandic, the subject of the smallest vP-infinitive appears to be missing entirely. Finally, the phenomenon of PC is restricted to larger (CP or TP) infinitives. This indicates a fine-grained correlation between the deficiency of a clause and its subject. Beyond this, evidence to be presented in Chapter 2 regarding Serbian and Mandarin provide further evidence that CP- and TP-complement clauses in these languages necessarily have different sized subjects.

This leads me to provide a typology of pronoun sizes, together with the economy hierarchy that constrains their distribution. A summary of my pronoun sizes and economy hierarchy is below:

(35) a. Strong: DP > FocusP > ϕP > NP

b. Deficient: FocusP > ϕP > NP

c. Clitic: ϕP > NP

d. PRO: NP (CP/TP) or ∅ (vP)

(36) **Economy hierarchy**: ∅ > PRO > Clitic > Weak pronoun > Strong pronoun

I account for PC and Icelandic concurrently by assuming Wurmbrand's (1998) theory of semantic control, in which vP-infinitives lack a subject entirely. This is represented by the symbol ∅ in (257) above, which trivially satisfies Minimize Structure. Thus, there is a finer-grained relationship in

subject and clause size than just finite vs. nonfinite: vP-infinitives can allow even smaller subjects than TP-infinitives. As W&L point out, as an embedded clause decreases in size, it becomes more and more dependent on the matrix clause. I extend this notion of dependency to subjects, as well.

PRO is allowed as the subject of nonfinite T as a result of the semantics of the control construction provided by Chierchia (1990) and Kratzer (2009), in which PRO is interpreted as a bound variable. PRO exists simply because it is the most economical bound variable subject.

### 1.6 The semantics of infinitival tense (Chapter 4)

Building on the results in Chapter 2 and 3 that infinitives are necessarily syntactically deficient, this chapter provides two pieces of novel evidence for the view that infinitives are temporally deficient. This indicates that in addition to being syntactically deficient, infinitives are also semantically deficient.

I provide evidence for this conclusion based on both experimental evidence and comparative evidence. First, based on the results of an experiment conducted with over 600 participants recruited from Prolific, I show that native speakers of English have a clear preference for finite complements when a de re interpretation is intended. This follows if infinitives lack tense but is not expected if tense is present. Second, a survey of infinitival adjuncts in English, Catalan, Spanish, Japanese and Korean indicates that although the temporal interpretation in such adjuncts varies across languages and even in different kinds of infinitival adjuncts within the same language, each case is best analyzed by assuming that the adjunct is temporally deficient.

#### 1.6.1 Background

Traditional grammars classify infinitives as tenseless in languages like English, due to the lack of tense morphology. This notion was first refined by Stowell (1982) in the context of infinitives. As

shown in the table, however, the classification of tense is controversial, as Table 4 below demonstrates. What we find is that some authors assume that infinitives are always temporally deficient (Wurmbrand), or are never deficient (Pesetsky), or their deficiency may vary across different contexts (Landau).

| Type | Null Case | Pesetsky | Landau | Wurmbrand |
|---|---|---|---|---|
| Event (*begin)* | +tense | +tense | –tense | –tense |
| Forward expanded (*decide)* | +tense | +tense | +tense | –tense |
| Implicative (*manage)* | +tense | –tense | –tense | –tense |
| Factive (*hate)* | +tense | –tense | +tense | –tense |
| Propositional (*claim)* | +tense? | +tense | +tense | –tense |

**Table 4**: A comparison of four different accounts of infinitival tense. Given that Null Case theories do not have an account of tense in propositional infinitives, it has been marked with a ?.

Let's take a look at some preliminary evidence from English on why one might think infinitives are temporally deficient. English PRES is indexical and must include the utterance time, which excludes a before-present interpretation (37a) and triggers a *double access* reading (319a). The parallel infinitives in (37a) and (319a) show neither of these restrictions, which Wurmbrand (2014b), following Ogihara (1995), takes as evidence for their lack of tense.

(37) a. Winter decided a week ago [that he will go to the party (*yesterday) / to go to the party yesterday].

b. 5 years ago, she claimed [#that she is pregnant / ✓to be pregnant].

Pesetsky (2021) revives this debate by reconsidering the properties noted by Wurmbrand (2014b). Pesetsky suggests that infinitives can include either semantic PRES or PAST. In both cases in (37a) and (319a), the infinitive is generated with PAST, which is deleted under *sequence of tense* (SOT),

leading to tenselessness. On the other hand, in (38) an embedded PRES would be postulated in the infinitive, which blocks deletion of the PAST on *were*, disallowing the interpretation where the meal occurs simultaneously with Winter's telling.

(38) Winter will promise me tonight to tell his mother tomorrow that they were having their last meal together (when...).

Further evidence for the presence of PRES is as follows. Following Abusch (1984), among others, future is not a simple tense but composed of two parts: PAST or PRES tense, and a modal *woll* contributing a forward expanded interpretation. Morphologically, PRES + *woll* is spelled out as *will*, while PAST + *woll* is spelled out as *would*. Since in the finite context in (39b) only *will*—i.e., PRES—is possible, the infinitive in (39a) would also have to contain PRES in Pesetsky's system.

(39) a. In a year, Caitlin will promise to become pregnant.

b. In a year, Caitlin will promise that she will/*would become pregnant. (unless counterfactual)

The facts in (319a)-(39) indicate that if infinitives were to contain tense, the following generalization holds: if the matrix tense is PRES, the embedded tense of the infinitive must also be PRES. Although the facts above can derived in both a tensed and a tenseless view of infinitives, I provide new evidence that distinguishes between the accounts and favors the tenseless view.

### 1.6.2 Experimental Evidence

I propose that the two accounts can be distinguished in PRES-under-*will* constructions. Ogihara & Sharvit (2012) [O&S] note that some, but not all, speakers accept the interpretation of (40), which I refer to as *temporal shifting*.

(40) Two months from now Mary will tell her mother that she is going to the Catskills tomorrow.

%*Temporal shifting*: Mary said to her mother: "I went to the Catskills about two months ago." O&S (p. 659)

O&S note that this interpretation requires temporal de re and is predicted by Abusch (1997), who, along with Ogihara (1995), originally suggested a de re approach for double access interpretations as in (319a). A simplified LF for (40) is given in (41) (O&S p. 660), where tense has *res*-moved.

(41) John $\text{PRES}_1$ woll [$\text{tell}^{\text{de re}}$-$\text{PRES}_3$ his mother $\lambda 3 \lambda 1$ [he $t_3$-be-going to the Catskills]

If temporal shifting in PRES-under-*will* requires a de re interpretation, one question arises for infinitives. As mentioned previously, infinitival subjects must be interpreted de se. Abusch (1997) and Schlenker (2004) also show that the same de se restriction applies to tense in infinitives. This then leads to the following prediction: if infinitives contain the same PRES tense as finite clauses, as Pesetsky (2021) would predict, the infinitival version of (40) should allow a de re interpretation, whereas the tenseless view predicts that only a de se should be available in cases like (42).

(42) Brian is preparing to buy a car tomorrow for his wife as a present, but he's keeping it a secret for her birthday next week. In a week, he will tell his wife "I bought you a car last week!"

a. Next week, Brian will claim that he is buying a car for his wife. *finite*

b. Next week, Brian will claim to be buying a car for his wife. *infinitive*

Since the judgments are subtle and subject to idiolectal variation, as O&S point out, I conducted an experiment to determine whether a contrast exists among speakers who accept temporal shifting. The goal was to isolate speakers who accepted O&S's temporal shifting interpretation in (40), Group A, and then determine whether this group preferred the finite or the infinitival form in cases like (42). Tensed approaches to infinitives predict that Group A should not prefer the finite or infinitive form in temporal shifting contexts like (42). However, if tense in infinitives is read de se (and hence tenseless), then I predict Group A to have a significant preference of the finite form.

As seen in the tables below, my prediction is borne out: Group A preferred the finite form over the infinitive at p<0.001 (in bold in the table). Group B, who find (40) unacceptable, did not make a contrast. This is because Group B requires a de se reading of tense in cases like (40), created by Ogihara's SOT rule on PRES.

| Type | Finite | Infinitive | Sample size | p<0.001? |
|---|---|---|---|---|
| Lack of double access | 31.58% | 68.42% | 76 | Yes |
| De re reading of pronoun possible? | 69.74% | 30.26% | 76 | Yes |
| **De re reading of PRES-under-*will*** | **63.16%** | **36.84%** | **152** | **Yes** |

**Table 5**: The results of the experiment for Group A.

| Type | Finite | Infinitive | Sample size | p<0.001? |
|---|---|---|---|---|
| Lack of double access | 21.05% | 78.95% | 524 | Yes |
| De re reading of pronoun possible? | 73.68% | 26.32% | 524 | Yes |
| De re reading of PRES-under-*will* | 48.03% | 51.97% | 1048 | No |

**Table 6**: The results of the experiment for Group B.

The results of this experiment indicate that the de re interpretation of tense is not obtained with infinitives, even in the subset of speakers who accept temporal shifting in finite contexts. I suggest that the finite form is preferred, because only finite clauses may contain PRES, required to licenses a de re interpretation. This indicates the fundamental deficiency of infinitival tense.

### 1.6.3 A COMPARATIVE SURVEY OF ADJUNCT INFINITIVES

In addition to providing experimental evidence regarding the deficiency of complemental infinitives, this chapter provides a novel comparative survey of the temporal deficiency of infinitival adjuncts.

If my empirical generalization is on the right track, the same result should be extendable from infinitival complements to adjuncts. I provide evidence of a survey from English, Catalan, Spanish, Japanese and Korean in support of this.

Landau (2013) (p. 221-222) provides a survey of infinitival adjuncts in English, as shown in (43) below. Extending Stowell's (1982) observation that subject-purpose clauses have a future-oriented reading while rationale clauses have either a future-oriented or simultaneous reading, I note that all infinitival adjunct constructions in English have either a simultaneous or future-oriented temporal interpretation. I make similar observations in Catalan and Spanish, as well.

(43) a. *Result clause*

Mary$_i$ grew up [PRO$_i$ to be a famous actress].

b. *Outcome/telic clause*

The ship$_i$ sank [only PRO$_i$ to be dredged up again].

c. *Goal clause*

Max$_i$ works hard [PRO$_i$ to stay out of jail].

d. *Stimulus clause*

Mary$_i$ smiled [PRO$_i$ to think what a fool she had been].

e. *Object purpose clause*

We bought Mary$_i$ the dog [PRO$_i$ to play with].

f. *Subject purpose clause*

She called a detective$_i$ [PRO$_i$ to investigate the affair].

g. *Rationale clause*

We$_i$ bought Mary$_j$ the dog [(in order) PRO$_{i/*j}$ to play with it].

Different languages show a freer temporal interpretation of infinitival adjuncts than what we see in languages like English. In the Japanese and Korean infinitival constructions seen in (44a)-(44b), any

order of events is possible. For example, in the movie, E.T. flies while riding his bike at the same time, though it might be tempting to assume that he rode his bike prior to flying.

(44) Context: After watching the ending scene of the movie *E.T.*, Yenghi says:

a. E.T.-ka cacenke-lul tha-ko, pihayng-ul ha-ess-ta.
E.T.-NOM bike-ACC ride-and flight-ACC do-PAST-DECL
'E.T. rode a bike. And he flew.' Lee & Tonhauser (2010) (p. 314), Korean

b. E.T.-wa jitensha-ni not-te ton-da.
E.T.-TOP bike-at ride-and fly-PAST
'E.T. rode a bike and flew.' Lee & Tonhauser (2010) (p. 315), Japanese

I follow Lee & Tonhauser's (2010) analysis of these constructions, in which the temporal interpretation of the infinitival adjunct in such constructions is fully determined by the discourse context, mirroring the interpretation of tense in truly tenseless languages such as Yucatec Maya and Kalaallisut. It is not part of the truth-conditional meaning in narrative discourse, but rather merely implicated. This is evidenced by the fact that it is possible to cancel the contextually implied reading via the right context.

### 1.6.4 Infinitives with *have*

After presenting the novel evidence in favor of the temporal deficiency of infinitives, I present an analysis of infinitival constructions with *have*. These complement clauses are problematic because they appear, at first glance, to have an independent temporal reference of their own. For instance, the sentence below has two adverbs, one of which modifies the matrix tense and the other which modifies the embedded tense. Given that the closing of the window can take place at a time preceding that of Mary's claim, this seems to show that the infinitive can itself have its own independent temporal interpretation

(45) Earlier today, Mary claimed to have closed the window yesterday.

I would instead like to propose that this temporal reading arises not from a non-deficient temporal reading of the infinitive, but rather due to the semantics of *have*, which is very similar to that of the semantics of past tense:

(46) a. $[\![\text{PAST}_i]\!]^{w,t,g} = \lambda P_{it}: \exists t'.\ t' < t \ \& \ t' \in g(i) \ \& \ P(t') = T$

Tenses come with an index and are mapped to a set interval of times

b. $[\![\text{have}]\!]^{w,t,g} = \lambda P_{it}.\lambda t: \exists t'.\ t' < t \ \& \ P(t') = T$

The most important piece of evidence in favor of this analysis is the fact that infinitival clauses with *have* show a two-way ambiguity that embedded past perfect complement clauses also show, as Kiparsky (2001) notes. In (47a), we see that the complement clause with past perfect exhibits an amibiguity regarding the time of the escape. The same ambiguity is attested with the infinitival *have* in (47b).

(47) a. The convict claimed that she had escaped at 3.

Reading 1: The convict claimed the following: at 3, she had just finished escaping (the actual time of the escape may have been slightly earlier).

Reading 2: The convict claimed: she had escaped, and the escape took place at 3.

b. The convict claimed to have (already) escaped at 3.

Reading 1: The convict claimed the following: at 3, she had just finished escaping (the actual time of the escape may have been slightly earlier).

Reading 2: The convict claimed: she had escaped, and the escape took place at 3.

By contrast, clauses with simple past tense show no ambiguity; they have only one reading and thus do not allow the adverb *already* to modify them.

(48) The convict (??already) escaped at 3.

Reading: The convict had escaped, and the escape took place at 3.

A fuller analysis of infinitival *have*, in addition to the different kinds of semantic deficiency we find in different types of infinitives, is provided in detail in Chapter 4.

## 1.7 Cartography and innateness (Chapter 5)

In the concluding chapter of this dissertation, I present evidence for the existence of ordering restrictions on Merge, based on Rizzi's (1997) distinction between high and low complementizers, built upon empirically in Chapter 2. The data from Chapter 2, with a few additional pieces added during Chapter 5, are summarized below.

(49) a. **High indicative complementizers:** English *that*, Bangla *je*, Welsh *mai*, Italian *che*, Icelandic *að*, Romanian *că*

b. **Low indicative complementizers**: Irish *go*, Welsh *fe*, Welsh *mi*, Welsh *y*, Welsh *a*

c. **High subjunctive/irrealis complementizers**: Romanian *ca*, Russian *čtoby*

d. **Low subjunctive/irrealis complementizers**: Romanian *să*, English *for*

e. **Other high complementizers**: Icelandic relative complementizer *sem*, Lubukusu *-li*

f. **Other low complementizers**: Lubukusu *mbo*, Icelandic *að*, Italian *di*

This leads me to propose that the language faculty may specify two possible locations in which complementizers may be base generated and Merged, as schematized in (50) below:

(50) $CP_2 > \ldots > CP_1$

This implies the existence of purely syntactic and linguistically proprietary entities, given that high complementizers must be Merged *after* topics, focalized elements and other left peripheral elements, while low complementizers must be Merged *before*. This will raise a problem for the Strong Minimalist Thesis (SMT), first defended by Chomsky (1995), once alternative explanations for this pattern are ruled out. Furthermore, this data is problematic to a very strict conception of cartography

such as Cinque's (1999) which posits a rich array of ordered functional projections. This leads me to purpose a "middle ground" between cartographic and Minimalist approaches to syntax, which I refer to as a "weak Minimalist" approach.

This has a direct consequence on saltationist theories of language evolution defended by Berwick & Chomsky (2016) among others, in which language evolved as a result of a sudden but single mutation. I argue that the most natural way to account for the existence of multiple linguistically proprietary entities is via a gradualist view of the evolution of language, following Progovac (2019).

The basic idea behind the SMT is that all the properties of human language syntax can be derived from the three following principles (51a)-(51c):

(51) a. The syntactic operation Merge

b. interface conditions (the principled part of $S_0$)

c. principles of efficient computation

One consequence of this formulation of the SMT is as follows. If there is any cause for Merge apply or not apply not explainable by reference to (51b) or (51c), then it must also be a linguistically proprietary entity. I claim that this pattern is attested in the ordering of complementizers, which I argue do not participate in interface conditions. Nor does it seem possible to be able to reduce the ordering of complementizers to high or low positions, or principles of efficient computation. If this is right, then it would imply the existence of linguistically proprietary entities that are not *solely* Merge, raising a novel problem for the SMT, and a new perspective on how language could have evolved, simply from comparative evidence.

# 2

# The Infinitive Size Generalization

This chapter argues for the following empirical generalizations involving infinitives crosslinguistically, based on a detailed survey of 17 languages belonging to several different language families.

(52) a. **Infinitive Size Generalization (ISG)**: No infinitival complement projects CP2. No infinitival complement can co-occur with a high complementizer.

b. *Sabel's (2006) Simplified Generalization*: If a language has wh-infinitives, then it also has infinitival complementizers.

c. If a language allows topicalized elements within its infinitives, then it also has wh-infinitives and infinitival complementizers.

d. If a language allows *why* and *if* in its infinitives, then it has contrastive focus and

topicalization within its infinitives, wh-infinitives and infinitival complementizers.

In addition, I will also consider the possibility that the following generalizations are true:

(53) a. If a language has a *tough*-construction, then it has wh-infinitives or infinitival complementizers.

b. If a language has infinitival complementizers, then it has propositional infinitives.

These generalizations are striking in their own right and represent a major step forward for the study of complementation for multiple reasons. First, they show that all infinitives are syntactically truncated in some manner, though the degree of variation can vary across languages. Second, they constitute major evidence for the cartographic framework proposed by Rizzi (1997). In addition, once we investigate why these generalizations appear to be true to begin with, they have the potential of contributing further to our understanding of syntax more generally, and the origins of language itself, as I discuss in Chapter 5. I will propose that part of the cartographic hierarchy is purely syntactic and innate, which goes contrary to the Minimalist Program as proposed by Chomsky (1995). I conclude at the end of this dissertation that comparative syntactic evidence can provide novel insight into the language faculty, and how it came into being.

I will begin with a more technical introduction to the cartography of syntactic structures than what I previously presented in 1.3, and then present the survey in full detail in section 2.2. Section 2.3 discusses further arguments in favor of the Infinitive Size Generalization, while section 2.4 discusses potential counterexamples regarding it. Section 2.5 presents the two potential generalizations in (53a)-(53b), while section 2.6 discusses a couple of theoretical considerations. I conclude in 2.7. Part 1 of the Appendix contains incomplete data on various languages that are not included in the fully detailed survey.

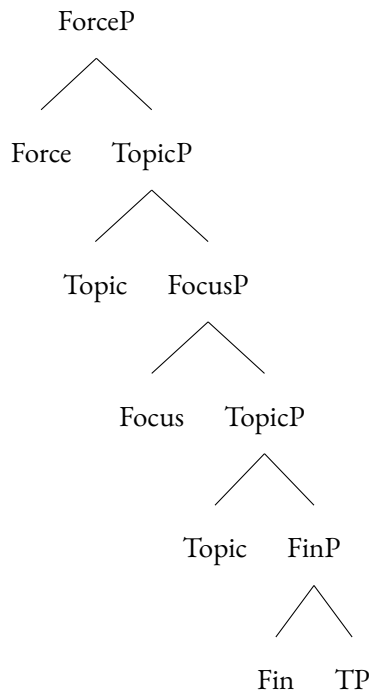
## 2.1 Splitting up the C domain

This section will lay the foundation for the theory of finiteness that I propose in this chapter: namely that finiteness is a property of the C domain. 2.1.1 presents Rizzi's (1997) arguments in favor of splitting up the C domain into several ordered functional projections. 2.1.2 provides evidence for there being high and low complementizers–two separate complementizers–in the C domain. 2.1.3 discusses existing accounts of the truncation of infinitives, and provides an update to Rizzi's structure, changing the labels of Rizzi's ForceP and FinP to CP2 and CP1 respectively. T

### 2.1.1 Rizzi (1997)'s split-CP structure

Rizzi (1997) provides arguments for splitting up the C domain as follows in (54). If we had just one C projection–CP, as is commonly assumed–it would be impossible for a single projection to be responsible for all of these properties that I will discuss in this section.

(54)



Rizzi (1997) argues that two complementizers in Italian, *che* and *di*, are realized in different positions in the C domain: in Force and Fin of (54) respectively. ForceP is the locus of the semantic force of the clause (such as an assertion, a question or an imperative). FinP, on the other hand, simply encodes whether the clause is finite or not. For Rizzi, finiteness is to be understood as a very rudimentary specification of mood, tense and agreement in the IP domain. Fin is merely endowed with certain features that allow this aforementioned specification to take place, with no semantics of its own. This is what I will end up redefining.

Topic and Focus, on the other hand, are projections with an independent semantics of their own, and their specifier position is for topicalized and focalized DPs respectively. There is a difference between focalization and topicalization: they can be teased apart by using different contexts. Rizzi (1997) (p. 286) contrasts between these two in Italian: while (55a) involves Clitic Left Dislocation (CLLD), (55b) involves focus fronting in a context with contrastive focus:

(55) a. Il tuo libro, lo ho letto.
the your book, it I have.read
'Your book, I have read it.'

b. Il tuo libro ho letto.
the your book I have.read
'Your book I have read.' (but not his)

Rizzi takes topics in CLLD constructions to occupy the same position as left-peripheral topics in languages without CLLD. In this chapter, I will assume that FocusP involves focus fronting *solely* for the purpose of contrastive focus, which appears to be the common conclusion in the cartography literature.[1] This does not preclude the possibility of a projection for focus lower than TopicP, such as WhP.

Furthermore, TopicP in (54) is called *recursive*, in that it can appear before or after other projections between ForceP and FinP such as FocusP. Rizzi (1997) (p. 291) provides evidence of this

[1] Here I will focus on the syntactic properties of topic and focus rather than their semantic properties. However, it is worthwhile to note that the notion of contrastive topic exists and appears to be distinct from that of contrastive focus. Tomioka (2010), for instance, notes that topic is an utterance level notion while focus is a propositional one, so contrastive focus would involve a set of alternative propositions while topic would involve alternative utterances.

in Italian, based on the examples such as the ones below, in which a focalized element (in bold) is sandwiched between two topics (in italic):

(56) Credo che *domani*, **questo**, *a Gianni*, gli dovremmo dire.
I.think that tomorrow this to Gianni him we.should say
'I believe that tomorrow, THIS, to Gianni, we should say.' Italian

But there is some controversy in the Italian cartographic literature whether *all topics* are located in Spec,TopicP. In fact, Benincà (2001) provides good reasons to believe *a Gianni* in (56) is in fact located in the T-domain.[2] She shows that there are two kinds of constructions that produce topics in Italian: Left-Dislocation or Hanging Topics. For her, only Hanging Topics are located in Spec,TopicP, whereas other topics are in fact located in the T domain. For Left Dislocated topics like in (56), the clitic is optional and a preposition is present, whereas for Hanging Topics, the resumptive clitic in this case is always required and no preposition is present. For my purposes it is essential to ensure that infinitival topics in Italian are located in Spec,TopicP and not the T domain.

Fortunately, it is easy to verify this. In the often-used example of this dissertation from Italian, (57), the topic *il tuo libro* precedes the complementizer, *di*, which must be located above the T domain. In addition, there is no preposition, and the clitic is obligatory, which for Benincà (2001) indicates that we are dealing with a true topic.

(57) Credo, il tuo libro, di apprezzar-lo molto.
I.think the your book that[-fin] appreciate-it much
'I think that they will appreciate your book very much.' Rizzi (1997) (p. 288), Italian

This is true for all of the examples involving Italian infinitives in this dissertation. Further, in this chapter, I will assume for simplicity that FocusP is always ordered above TopicP.[3] This appears to

[2] I refer the reader to Benincà (2001) for further details.

[3] One common question about (54) is what constitutes a phase head in it. It may vary by language. Given that wh-movement takes place to a position right above FinP, as I will argue later in this next section, it might be assumed that FinP is a phase as well. But there are many contrasts in clausal opacity that can only be captured if ForceP is a phase head but FinP is not. For instance, Carstens & Diercks (2009) observes that FinP

be the correct conclusion according to my survey, in which there are some languages like Italian with true topics in their infinitives but no focalized elements, but vice versa is possible.

### 2.1.2 What are high and low complementizers?

This sets the stage to allow us to distinguish between *high* and *low* complementizers, which are complementizers realized at Force (my CP2) and Fin (my CP1) respectively. Rizzi was the first to note this contrast, which will be essential for the theory of finiteness in this chapter. The goal of this section is to provide extensive evidence from the literature that two positions for complementizers, a higher one and a lower one, exist.

But first, I would like to define the notion of a *complementizer*, which I take to be a word or a morpheme that marks an embedded clause as a subject or object. Complementizers are often derived from determiners (e.g. English *that*), prepositions (e.g. English *for*) or interrogative words (Russian *čto* both means 'what' and is the finite complementizer in Russian). They tend to be optional, for instance in *I believe (that) Mary is happy*. They appear at the start of clauses in head-initial languages like English but at the end in head-final languages like Japanese. In head-initial languages, objects can sometimes precede complementizers, but only if they are topics (in which case the complementizer would be called "low"). In addition, complementizers tend to be in complementary distribution with wh-elements and other elements posited to be part of the C-domain, such as *if* or *whether*. Examples of each of these will be presented throughout this chapter.

The foremost demonstration of the existence of high and low complementizers is in Italian. We see in (58) below that it is impossible to topicalize to a position to the left of the high complementizer *che* (which Rizzi calls a finite complementizer), but it is possible to topicalize to its right.

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is never phasal in Lubukusu. Ultimately, the argumentation in this chapter would not be affected by what is phasal in the C domain.

(58) a. Credo che, il tuo libro, loro lo apprezzerebbero molto.
I.think that[+fin] the your book them it will.appreciate much
'I think that they will appreciate your book very much.'

b. * Credo, il tuo libro, che loro lo apprezzerebbero molto. Rizzi (1997) (p. 288), Italian

This contrasts with the behavior of the low complementizer *di* (which Rizzi calls a nonfinite complementizer), which only allows topicalization to its left in (59):

(59) a. Credo, il tuo libro, di apprezzar-lo molto.
I.think the your book that[-fin] appreciate-it much
'I think that they will appreciate your book very much.'

b. * Credo di, il tuo libro, apprezzar-lo molto. Rizzi (1997) (p. 288), Italian

This indicates that *di* in Italian cannot be in the same position as *che*; for Rizzi, *di* is a low complementizer in FinP whereas *che* is a high complementizer in ForceP. Building on this observation, Ledgeway (2005) presents an example from the Neapolitan variant of Italian dating back to the 15th century, in which these two complementizers can even co-occur. This example is on a par with a sentence like **I hope that Mary for is happy* in English:[4]

(60) Mayo prometto ad dio **che** se la Vostra Singniora me fa tornare ad Napole, **de** yo
I promise to god that if the your lordships me makes to-return to Naples of I
a(m)macczare lo papa et tutty ly cardenale.
to-kill the pope and all the cardinals
'But I promise to God that, if your lordship makes me return to Naples, that I shall kill the pope and all his cardinals.' Ledgeway (2005) (p. 364), Neapolitan

In addition, finite complementizers need not be high. Ledgeway (2005) provides an analysis of the position of complementizers from the perspective of the split C-domain in southern dialects of Italian and Romanian, which I will now discuss. He notes that dialects of southern Italian (here, I

[4] This may, however, be an instance of parataxis, as Villa-Garcia & Ott (2022) point out, even though it strictly speaking doesn't involve recomplementation (which involves two complementizers of the same phonetic form). I will discuss this further at the end of this subsection.

discuss Salentino) and Romanian share a declarative complementizer *ca/ka* (că in Romanian) that, as we might expect, is high, as the examples below demonstrate, both of which involve topicalization or focalization of the bolded element.

(61) a. Addzu tittu ka **la Lia** ene.
I-have said that the Lia comes
'I said that Lia is coming.' Calabrese (1993) (p. 38), Salentino

b. Știu că **pe Ion** l-au văzut (nu pe Popescu).
I-know that on Ion him=they-have seen not on Popescu
'I know that they saw Ion (and not Popescu).' Ledgeway (2005) (p. 365), Romanian

In Italian, the finite subjunctive complementizer is still the high complementizer *che*. But following the same reasoning, finite subjunctive complementizers appear to be lower in Salentino and Romanian (*ku* in Salentino, and *să* in Romanian).[5]

(62) a. Oyyu **lu libbru** *ku* lu kkatta lu Maryu.
I-want the book that it buys the Mario
'I want Mario to buy the book.' Calabrese (1993) (p. 36), Salentino

b. A spus *ca* **florile**, **Ioana** să le trimită la birou.
he-has said that flowers.DEF Ioana that them should-send to office
'He said that, the flowers, Joan should send them to the office' Alboiu & Motapanyane (2000) (p. 34), Romanian

Let us consider other Indo-European languages. Roberts (2004) provides a great deal of independent evidence for high and low complementizers within the Celtic languages Irish and Welsh, whose

[5] Although Ledgeway (2005) and Shlonsky (2021) take *să* to be lexicalized in Fin, the status of *să* as a subjunctive complementizer in Romanian is not so straightforward. Alboiu & Motapanyane (2000) and Paoli (2003) note that it has some properties of complementizers but not others; for instance, it can co-occur with wh-elements unlike other complementizers–di in *Italian*, as we will see in 2.2.2–but it can be omitted. It must also precede negation, which Paoli takes as evidence that it is in the C-domain if, following Zanuttini (1997), negation is located in the T-domain. To explain these mixed properties of *să*, Alboiu & Motapanyane (2000) and Paoli (2003) both take *să* to be base-generated in the T-domain, but it is sometimes capable of moving to Fin. I refer the reader to these works for more arguments and details.

work I will now discuss. As mentioned previously in 1.4, I take *that* in English to be a high complementizer, due to the position of the topic *Manufacturing Consent* relative to *that*.

(63) a. I said that Manufacturing Consent$_i$, Chomsky wrote t$_i$.

b. * Chomsky claimed Manufacturing Consent$_i$, to have written.

Following the same reasoning, Roberts suggests that the finite declarative complementizer of Irish (also its infinitival complementizer, as we will see in 2.2.2) is a low complementizer. The topical adverb *faoi cheann cúpla lá* is in italics in the example below.[6]

(64) Is doíche [*faoi cheann cúpla lá* [go bhféadfaí imeacht]].
is probable at-the-end-of couple day that could leave
'It is probable it would be possible to leave in a couple days. Roberts (2004) (p. 300), Irish

The Welsh complementizers *fe* and *mi* show precisely the same distribution as the Irish *go*. Topical adverbs cannot follow the complementizer, but they can precede it (p. 298):

(65) a. Bore 'ma, fe/mi glywes i'r newyddion ar y radio.
morning this COMP heard I.the news on the radio
'This morning, I heard the news on the radio.'

b. * Fe/mi bore 'ma glywes i'r newyddion ar y radio.
COMP morning this heard I.the news on the radio Roberts (2004), Welsh

The Welsh complementizer *y* doesn't allow topics to precede it at all, which Roberts take as evidence for its being in Fin:[7]

(66) * Dywedodd ef y yfory bydd yn gadael.
said he COMP tomorrow he.will.be ASP leave
'He said that tomorrow he will leave.' Roberts (2004) (p. 301), Welsh

[6] I have added my own paraphrase to most of the examples from Roberts (2004). All mistakes are my own.
[7] See the upcoming 2.1.3 for similar reasoning involving the English *for* being a low complementizer.

Roberts also takes the Welsh particle *a* to be a low complementizer in Fin, which can appear in wh-questions (67a), constructions with focalization (67b) and constructions with topicalization (67c), in all cases following the moved element:[8]

(67) a. Pa ddynion a werthodd y ci?
which men COMP sold.3SG the dog
'Which men sold the dog?'

b. Y dynion a werthodd y ci.
the man COMP sold.3SG the dog
'It's the men who have sold the dog.'

c. Y dynion a werthasant y ci.
the man COMP sold.3PL the dog
'The men, they sold the dog.' Roberts (2004) (p. 298-299), Welsh

Welsh does have high complementizers, however, as showcased in the highly complex examples (68a)-(68b) below. *Mai*, for instance, must precede topicalized adverbs (68a)-(68b), as seen in the double complementizer constructions with both *mai* as the high complementizer and *a* as the low complementizer in bold below. In these examples, we have one topic and one focalized element: *fel arfer* 'as usual' as the topicalized adverb and *y dynion* 'the men' just below it is focalized, and both must be sandwiched between *mai* and *a* (p. 301-302).[9]

(68) a. Dywedias i **mai** fel arfer y dynion **a** fuasai'n gwerthu'r ci.
said I COMP as usual the men COMP would.ASP sell-the dog
'I said that, as usual, it's the men who would sell the dog.'

[8] Outside of these contexts, *a* can also appear as a relative particle (p. 298).

(i) y dynion a ddarllenodd y llyfr
the man COMP read.3SG the book
'the men who read the book'

Roberts takes *a* to mark a wh-dependency in C, though based on (67b)-(67c) this should likely be extended to dependencies in C more generally.

[9] Roberts (2004) also places the negative particles *nad* and *nid* in Force, but I have not included them in this discussion.

b. * Dywedias i fel arfer **mai** y dynion **a** fuasai'n gwerthu'r ci.
said I as usual COMP the men COMP would.ASP sell-the dog Welsh

By contrast, it is possible to put the focalized element *y dynion* in a position preceding *fel arfer*, as in (69) below. This is accounted straightforwardly under Rizzi's account in which TopicP can be below or above FocusP (p. 302).

(69) Dywedias i **mai'r** dynion fel arfer **a** fuasai'n gwerthu'r ci.
said I COMP the.men as usual COMP would.ASP sell-the dog
'I said that it's the men, as usual, who would sell the dog.' Welsh

This concludes our discussion of the Celtic languages. Moving onto Icelandic, Larsson (2017) provides a survey of double complementizer constructions across the Scandinavian languages, providing an example from Icelandic. *Sem* is a relative complementizer, and *að* can follow it. It appears that *að* is in FinP in this case, which I will provide independent evidence for in the case of infinitives in 2.2.2:[10]

(70) Þetta er bokin sem (að) eg keypti
This is book.DEF that that I bought
'This is the book that I bought.' Thráinsson (2007) (p. 450), Icelandic

In Bangla, the finite declarative complementizer *je* usually behaves as a high complementizer as we would expect in English, it can also precede non-focused definite objects, as in (71):

(71) Jon [chatro du-to-ke je dadubhai dekh-eche] bol-lo
John student 2-CL-ACC that grandfather see-PERF say-PST
'John said that grandfather saw the two students.' Hsu (2015) (p. 4), Bangla

[10] Icelandic allows infinitival relatives but they cannot contain *sem*; instead they have the preposition *til*:

(i) Þetta er bón [til að bóna bíla með _].
this is wax for to polish cars with
'This is wax to polish cars with.'

Höskuldur Thráinsson (p.c.) has pointed out to me that *til* behaves as a preposition in such constructions rather than a complementizer, based on the fact that the genitive form of *það* 'it,' *þess*, can be inserted between *til* and *að*.

The primary way of telling apart high and low complementizers is by looking at their position in a sentence.[11] But there might be other hints, as well, depending on the syntactic opacity of an embedded clause. For instance, Bantu languages distinguish between a high, phasal complementizer and a low, non-phasal complementizer. Carstens & Diercks (2009) shows that in Lubukusu, some clauses are transparent for hyperraising, which is raising out of a finite clause, while others are not transparent for it. Here are some examples from Lubukusu, where what they call hyperraising is possible with the complementizer *mbo*:

(72) Mikaeli a-lolekhana **mbo** a-si-kona.
Michael 1SA-seem that 1SA-PRES-sleep
'Michael seems to still be sleeping.' Carstens & Diercks (2009) (p. 11), Lubukusu

But this raising is not possible with the complementizer *-li* which agrees with the matrix subject:

(73) * Mikaeli a-lolekhana **a-li** a-si-kona.
Michael 1SA-seem 1CA-that 1SA-PRES-sleep
'Michael seems to still be sleeping.' Carstens & Diercks (2009) (p.11), Lubukusu

Under this analysis, *mbo* is the low, non-phasal complementizer, and *-li* is the high, phasal complementizer. This, of course, leaves open the question of why hyperraising is permissible in Lubukusu but not in English, which I address in 2.5.2.

We've seen extensive evidence for the distinction between high and low complementizers. In addition, we've seen that finite complementizers tend to be high, while nonfinite complementizers tend to be low. One important concern raised to me by David Pesetsky (p.c.) is why we don't see

[11] A common source of confusion I have encountered is whether there is a principled method of distinguishing between high and low complementizers. For instance, one might ask the following question: how can you tell apart high and low complementizers? As in (58) and many other examples provided in this chapter, high and low complementizers are diagnosed *solely* by their position relative to topics and focalized elements in a principled way. It is merely an empirical observation that is not up for debate. Even if they had the same phonetic form, as in (80a)-(80b), we know that one *that* is high and the other is low. This just *is* the principled way of distinguishing between high and low complementizers in a clausal structure: looking at the position of a topic or focalized element relative to the complementizer. This, of course, raises the question of why two complementizers might exist at all. I take up this vexing question and attempt to answer it with admittedly limited success in Chapter 5.

examples in which both a finite (high) and a nonfinite (low) complementizer are both present, as in (74) below. Nothing prevents this if high and low complementizers both exist.

(74) * I hope that for she is happy.

Of course, the more controversial Italian example in (60), and the less controversial Welsh examples in (68b)-(69) above exhibit precisely this possibility.[12] But we still want to know why there is a strong *tendency* for examples like (74) to be marked and rare.

An answer to this problem is available in the form of Fin-to-Force movement, assumed by Roberts (2000, 2004). In other words, a declarative finite complementizer like *that* in English arises as a result of Fin, with its finiteness features, moving to merge with the declarative features of Force. The resulting head, with both declarative and finiteness features is pronounced as *that*. As such, this is driven purely by theoretical reasons. This immediately explains the rarity of examples like (74), because *that* is base-generated in the same position as *for*. But as I have given up the notions of Force and Fin entirely, I cannot assume this line of reasoning. I must therefore seek purely empirical evidence in favor of this movement–which is in fact readily available.

The first piece of evidence is from English sluicing, as seen in Baltin's (2010) extension of the split-C domain to doubly-filled COMP filter phenomena.[13] If sluicing is the deletion of the complement of Focus (as Wurmbrand (2017) also assumes) and wh-elements are located in Spec,FocusP in root clauses, then the following observation in which *that* cannot be present in sluicing can be straightforwardly explained (p. 1):

(75) They discussed a certain model, but they didn't know which model (*that) __.

[12] Icelandic exhibits this, but only with the relative complementizer in (70). Romanian is also a possibility as (62b) demonstrates this, but there is the possibility of the subjunctive particle being located in the T domain as previously discussed in a footnote.

[13] See Koopman (2000) for a generalized account of the doubly-filled Comp filter within the split-C domain, which Baltin comes close to adopting, if not for one slight complication, for which I refer the reader to Baltin (2010).

Though Baltin doesn't mention it, this explanation requires the assumption that *that* is base-generated in a position lower than Focus–the only candidate being Fin. If it were base-generated in Force, we would predict the possibility of *that* above.

This account necessarily assumes that sluicing precedes head movement, which we have independent evidence for. Not only is Fin-to-Force movement incompatible with sluicing, but C-to-T movement is as well, as Baltin points out (p. 1):[14]

(76) Speaker A: She visited someone.
Speaker B: Oh, really. Who (*did) __?

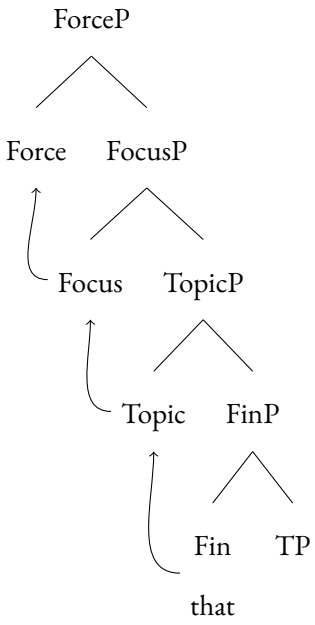
This movement, for Roberts (2000), is step-by-step. In concordance with minimality conditions, head movement of Fin moves to the nearest topmost head, and so on, until it reaches Force:

[14] Roberts (2000) (p. 127) states that the following sentence is problematic for his account. This is because he takes *never in my life* to be a focalized constituent in Spec,FocusP and *had* to be in Foc:

(i) I said that never in my life had I visited Bangor.

However, as David Pesetsky (p.c.) points out, negation is commonly assumed to be in the T-domain; see, for instance, Zanuttini (1997).

(77)




The second piece of evidence in favor of (at least some) high complementizers moving from Fin to Force is in Bangla, which we saw previously. Hsu (2015) argues that the finite complementizer *je* in Bangla can occur either in Force or Fin.[15]

(78) Jon [chatro du-to-ke je dadubhai dekh-eche] bol-lo
John student 2-CL-ACC that grandfather see-PERF say-PST
'John said that grandfather saw the two students.' Hsu (2015) (p. 4), Bangla

Hsu's analysis, which I adopt, is to assume that *je* is always base-generated in Fin, and then copied to Force, and that lower copies can be Spelled-Out, following Bošković (2001) and Bobaljik (2002) among others. *Je* can then be pronounced either in the lower position if a nominal is in a high left-peripheral position. To conclude, high complementizers like *that* or *je* in Bangla need not be base-generated at a high position, as long as they move there at some point in the derivation. Of course, some high complementizers, like those in Welsh and maybe Italian, are base-generated high. But that is not necessarily the case, and is a matter of crosslinguistic variation.

[15] Dasgupta (1982) points out that *je* is completely ruled out from infinitives in Bangla.

Before concluding, I would like to point out that many languages allow double complementizer constructions in which the high and low complementizers have the same phonetic form, as seen in this Spanish example from Villa-Garcia (2012) (p. 12):

(79) Susi dice **que** *a los alumnos* (**que**) les van a dar regalos
Susi says that DAT the students that CL go to give presents
'Susi says that they are going to give the students presents.' Spanish

There is a great deal of evidence of high and low complementizers, and even double complementizer constructions outside of Romance. Haegeman (2012) (p. 89) notes two such examples below from colloquial English, which involve two instantiations of *that*. For Haegeman, the adjuncts in italics are located in Spec,TopicP. The position of the adjunct sandwiched between two complementizers can be used to distinguish the two *that* in (80a)-(80b) below in a principled way.

(80) a. She maintained [$_{\text{ForceP}}$ **that$_{\textbf{high}}$** [$_{\text{TopicP}}$ *when they arrived* [$_{\text{FinP}}$ **that$_{\textbf{low}}$** they would be welcomed]]].

b. He reminds me [$_{\text{ForceP}}$ **that$_{\textbf{high}}$** [$_{\text{TopicP}}$ *in the days of Lloyd George* [$_{\text{FinP}}$ **that$_{\textbf{low}}$** business leaders were frequently buying their way in]]].

This seems like very strong evidence in favor of Fin-to-Force movement, since we could just follow Hsu's reasoning in terms of Spell-Out and assume that some languages allow for the complementizer to be pronounced in both places.

However, Villa-Garcia & Ott (2022)'s new analysis of such double complementizer constructions, superseding the analysis of Villa-Garcia (2012), provide numerous pieces of convincing evidence that such examples involve parataxis, which is the placing of clauses one after another (e.g. *Tell me... how is your day going?*). This immediately explains the colloquial nature of the examples in (80a)-(80b). As such, I will not use these examples as evidence of Fin-to-Force movement. But for now, let us now move onto infinitives and determine just how large their left periphery is, and what kinds of complementizers they allow. We will find that the answer is different across languages.

### 2.1.3 Infinitives are truncated in the C domain

Adger (2007) notes a contrast between English and Italian that we will build further upon in section 3: topicalization is not allowed at all in English infinitives (Hooper & Thompson (1973)):

(81) * I decided, [your book]$_i$, to read $t_i$.

Due to its distribution, *for* has been described as an infinitival complementizer since Rosenbaum (1967):

(82) a. Winter is eager [for her to give him treats].

b. [For the cat to be out of the bag] is highly unlikely.

Adger (2007) takes *for* to be a low complementizer in FinP because it does not allow topics to its left or right. We will see that the reason why (83a) is ruled out is that, unlike Italian, the left periphery of English infinitives is slightly more truncated, lacking a TopicP:

(83) a. * I propose, [these books]$_i$, for John to read $t_i$

b. * I propose for, [these books]$_i$, John to read $t_i$

Following Adger among others such as Haegeman (2006), Barrie (2007) and Shlonsky & Soare (2011), I also take this to be evidence that infinitives are truncated at least to some extent. But as we will see, the degree of truncation can differ between languages.

There is reason to believe that there are many more projections than what Rizzi (1997) has initially claimed, and the number of posited functional projections has increased in works since then such as Haegeman (2012). For our purposes, I will present only the additional projections which are relevant to infinitives–IntP and WhP in particular. The layer IntP is short for InterrogativeP, which according to Rizzi (2001) is higher than FocusP: Spec,IntP houses *why* and *if*.[16] Shlonsky

[16] One puzzle is the difference between *whether* and *if* in infinitives. These words are often interchangeable, e.g. *I asked my mom whether/if I should take out the trash.* But only *whether* is permitted in infinitives:

& Soare (2011) provides a convincing argument that *why* is base-generated in a position lower than Spec,IntP (which precedes WhP) but moves up to it, in the form of infinitives, based on the following observation. Note that the infinitive form is very marginal at best, but the finite form is fine:

(84) a. I asked Bill ??why/*if to serve aubergines.

b. I asked Bill why/if I should serve aubergines. Shlonsky & Soare (2011) (p. 654)

Although it is not relevant for our purposes, Shlonsky & Soare's (2011) (p. 655) argument that it is base-generated lower is as follows. The following question can be construed in two ways: one in which *why* is construed within the matrix clause, and one in the embedded infinitival clause:

(85) Why did you ask her to resign?

a. What is the reason x, such that for x, you asked her to resign?

b. What is the reason x, such that you asked her to resign for that particular reason x?

Given that we have already seen that TopicP is truncated in English infinitives, it is unsurprising that a functional projection ordered even higher is truncated as well.[17]

What about wh-infinitives and WhP? The fact that focalization is impossible with English infinitives whereas wh-infinitives in English do exist, e.g. *I know what to eat*, is not expected under

(i) a. Caitlin asked whether to take out the trash.

b. * Caitlin asked if to take out the trash.

Following Shlonsky & Soare (2011), one explanation is to suppose that *whether* can be Merged in either Spec,WhP or Spec,IntP, whereas *if* must be Merged in Spec,IntP. It then follows that only *whether* can be licensed in infinitives. But it does not appear to be possible to assume that *whether* is always Merged in Spec,WhP, as Jonathan Bobaljik (p.c.) has pointed out to me with the following contrast. Adjuncts that precede the embedded subject must follow *whether* in finite embedded clauses. I take adjuncts in the C domain to be located in Spec,TopicP.

(ii) Caitlin asked whether under any circumstances she should leave.

(iii) * Caitlin asked whether under any circumstances to leave.

[17] Shlonsky & Soare (2011) note that some native speakers of English accept (84a). This can be accounted for by assuming that for these speakers, *why* does not obligatorily move to Spec,IntP. *If* is ruled out because it is base-generated in Spec,IntP, and not moved from a lower position.

Rizzi's original account, where all wh-words move to Spec,FocusP, at least in finite clauses. As such, Barrie (2007) and Shlonsky & Soare (2011) have assumed the addition of a further functional projection on top of FinP, WhP, which wh-elements first move into prior to moving to Spec,FocusP.[18] Even in a language where fronted topics are possible in infinitives such as Italian, which also has wh-infinitives, Haegeman (2006) and Bocci (2007) note that focalization for the sake of contrastive focus is very marginal:

(86) ?? Gli sembra LE SEDIE di aver venduto (, non il tappeto)!
Him seems the chairs to have sold (, not the carpet)
'It seems to him that the chairs have sold! (not the carpet).' Bocci (2007) (p. 15), Italian

I take both FocusP and WhP to involve semantic focus, but in different ways. I assume that Spec,FocusP is occupied by moved elements for the purposes of contrastive focus. On the other hand, the lower Spec,WhP is occupied by wh-words for the sake of introducing alternatives, in the sense of Hamblin (1973)'s semantics of questions.

Rizzi & Bocci (2017) points out independent reasons beyond just infinitives for thinking that WhP exists, at least in embedded clauses. First, they note that a wh-element and contrastive focus are incompatible in any order in Italian main questions, as in (87a)-(87b). This is congruent with the idea that wh-element and contrastive focus-marked elements occupy the same position in the left periphery of embedded clauses, FocusP (p. 7):

(87) a. * A GIANNI che cosa hai detto, non a Piero?
To Gianni what you say, not to Piero
(Lit.) 'TO GIANNI what did you say, not to Piero?'

[18] Henry (1995) notes that Belfast English permits indirect questions introduced by a wh-element that isn't a subject, to the left of *that*:

(i) I wonder which dish that they picked.

Larsson (2017) notes that several Scandinavian languages allow such constructions. It appears languages may optionally allow a WhP on top of ForceP.

b. * Che cosa A GIANNI hai detto, non a Piero?
What to Gianni you say, not to Piero
(Lit.) 'What TO GIANNI did you say, not to Piero?' Italian

But this observation does not extend to embedded clauses in which case it is impossible for a wh-element to precede a focus-marked element, as (88a) shows. But (88b) shows that it is possible for a wh-element to *follow* a focus-marked element. For Rizzi & Bocci, this indicates the ordering FocusP > WhP in embedded clauses, and that wh-elements move to WhP rather than FocusP, at least in embedded clauses (p. 7-8).

(88) a. ? Mi domando A GIANNI che cosa abbiano detto, non a Piero.
I wonder to Gianni what have said not to Piero
(Lit.) 'I wonder TO GIANNI what they said, not to Piero.'

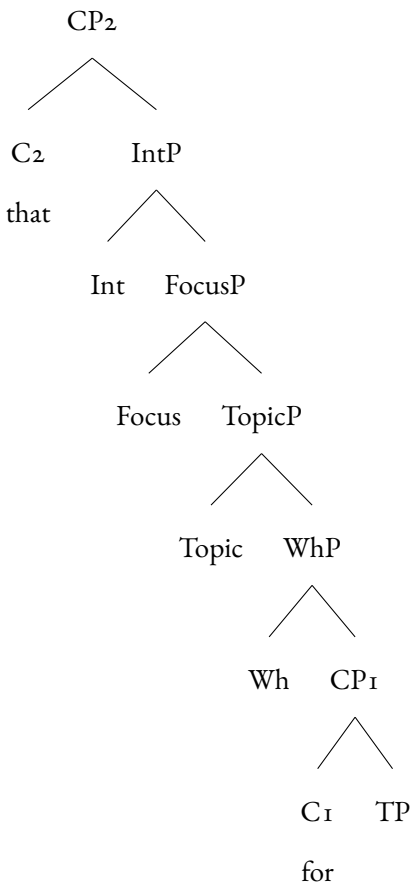
b. * Mi domando che cosa A GIANNI abbiano detto, non a Piero.
I wonder what to Gianni have said not to Piero
(Lit.) 'I wonder what TO GIANNI they said, not to Piero.' Italian

With this established, I would like to point out that there is redundancy between my notion that infinitives are truncated, and Rizzi's label of FinP to begin with. One possibility is that infinitives are nonfinite *because* they are truncated. There are more general problems with Rizzi's definition of finiteness, as well. It appears to be circular, in that a clause is finite if and only if its finiteness feature is encoded as + at FinP, following Adger (2007). It may be possible to define finiteness in terms of other features, such as past tense, agreement and indicative mood on FinP. But even then, it is not a fully explanatory theory of finiteness: truncation theories of finiteness in terms of clause size do make testable predictions.

Thus, I propose eliminating the labels of ForceP and FinP and replacing them simply with CP2 and CP1 respectively.[19] I will assume the structure in (89) throughout this chapter:

[19] This has the added advantage of removing any semantic presupposition on their labels; this becomes useful to my analysis of various crosslinguistic facts in Chapter 5.

(89)




This is what I hope to be the novel idea of the chapter. While I am far from the first to assume that infinitives are truncated, I am synthesizing the approach to finiteness as a matter of clause size together with Rizzi's work on the split C domain. This allows us to bypass any circularity or redundancy in defining finiteness, and thus make novel empirical observations in the next section.

## 2.2 The size of infinitives and empirical generalizations

This section presents a survey of the infinitival left periphery. With the theoretical background established, we are now able to conduct a crosslinguistic survey. 2.2.1 introduces the reader to the methodology used to investigate the infinitival left periphery in different languages and the results

of the survey. Sections 2.2.2-2.2.6 describe the different sizes of infinitives attested, while 2.2.7 provides an interim summary.

### 2.2.1 Infinitives can differ in size, but are always truncated

To see the methodology used for this survey, I now provide a quick summary of the properties of the C domain of English infinitives, seen previously in the Introduction:[20]

(90) a. *Infinitival complementizers*: I am eager **for** Caitlin to please.

b. *Wh-infinitives*: I know **what** to eat.

c. *No topicalization within infinitives*: *I wanted **this book**, to read.

d. *No focalization within infinitives*: *I wanted **THIS BOOK** to read (not that one).

e. *No why-infinitives*: ??I asked Caitlin **why** to eat salad.

f. *No high complementizer*: I seem **(*that)** to be happy.

Assuming that topics, foci and *why* target the positions Top, Foc, Int in (74), we can conclude English infinitives are *maximally* as large as WhP. The maximal size of an infinitive is the most crucial notion of this chapter. Languages appear to vary as to the maximal size of their infinitive, which the reader can discern from Table 1. This will be discussed again in 2.2.7.

Table 1 below presents the survey that will be discussed in detail in this section. The column PROP in Table 1 is not a traditional left peripheral property, but I will give some reasons for believing it is one in section 2.5.2. My goal in section 2.2 is to discuss only the classic properties.

**Table 1:** The summary of the various properties of the infinitival property in 17 languages.

HIGH C: ✓if the language allows high complementizers in infinitives.

[20] From this point onwards, if an example in the survey lacks a paraphrase, then its paraphrase can be easily inferred from the gloss.

INT: ✓if the language allows Int-properties (*why*, *if*) in infinitives.

FOCUS: ✓if the language allows contrastive focalized elements in infinitives.

TOPIC: ✓if the language allows topics in infinitives.

WH: ✓if the language allows wh-words in infinitives with embedded scope.

LOW C: ✓if the language allows low complementizers in infinitives.

RAISING: ✓if the language has raising infinitives (complement of *seem* etc.).

! if a lack of the relevant property appears to contradict the pattern.

| LANGUAGE | HIGH C | INT | FOCUS | TOPIC | WH | LOW C | RAISING |
|---|---|---|---|---|---|---|---|
| Hindi | ✗ | ✗ | | | ✗ | ✗ | ✗ |
| Hungarian | ✗ | ✗ | | | ✗ | ✗ | ✗ |
| Serbian | ✗ | ✗ | | | ✗ | ✗ | ✗ |
| Turkish | ✗ | ✗ | | | ✗ | ✗ | ✗ |
| German | ✗ | ✗ | | | ✗ | ✗ | ✓ |
| Icelandic | ✗ | ✗ | ✗ | ✗ | ✗ | ✓ | ✓ |
| Swedish | ✗ | ✗ | ✗ | ✗ | ✗ | ✓ | ✓ |
| Dutch | ✗ | ✗ | ✗ | ✗ | ✓ | ✓ | ✓ |
| English | ✗ | ✗ | ✗ | ✗ | ✓ | ✓ | ✓ |
| French | ✗ | ✗ | ✗ | ✗ | ✓ | ✓ | ✓ |
| Polish | ✗ | ✗ | ✗ | ✗ | ✓ | ✓ | ✓ |
| Spanish | ✗ | ✗ | ✗ | ✗ | ✓ | ✓ | ✓ |
| Catalan | ✗ | ✗ | ✗ | ✓ | ✓ | ✓ | ✓ |
| Irish | ✗ | ✗ | ✗ | ✓ | ! | ✓ | ✓ |
| Italian | ✗ | ✗ | ✗ | ✓ | ✓ | ✓ | ✓ |
| Hebrew | ✗ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Russian | ✗ | % | | | ✓ | ! | ✓ |

There are limits to this methodology, however. Table 1 contains several entries for the Focus and Topic columns which are blank. An astute reader may have noticed that these languages are notable for having a free word order, and hence, scrambling phenomena. These languages have very free word order even within their infinitival clauses. Here is an example. According to to Bailyn (2001)

and Bošković (2004), Russian is a language with scrambling, though their analyses differ. Its infinitives allow both internal topicalization and contrastive focus fronting, as in (91).

(91) Ja choču [ZDES'$_i$ byt $t_i$ (a ne tam)].
I want here be.INF and not there
Russian

Scrambling languages like Russian may have VP-internal focus and topic positions, so the topicalization and focus fronting tests seen in (90) above cannot straightforwardly be carried on to scrambling languages. How do we know whether *zdes'* 'here' in (91) is truly located in the infinitival left periphery, or if it might involve scrambling within the VP instead? It is usually not possible to verify it. I cannot do so in German, Hindi, Hungarian, Russian, Serbian or Turkish.

However, there are a few scrambling languages–Dutch and Polish–in which it *is* possible to tease apart VP-internal scrambling from topicalization. In Dutch, this is via the infinitival complementizer *om*. In Polish, this is via the topic marker *to*, which has different properties from scrambling.

A few of the languages in this sample appear to have infinitives derived from nouns in some sense, but it does not appear to affect the survey. Turkish has nominalized infinitives, which can be case-marked, as in (92) with accusative case:

(92) Ayşe [oku-ma-ya] karar ver-di.
Ayşe read-INF-ACC decision make-PST.3SG
'Ayşe decided to read.'
Turkish

É Kiss (2002) claims that *-ni*, the infinitive marker in Hungarian, is a nominalizing suffix, responsible for assigning dative case to the experiencer in constructions like (93). She takes it to be a nominalizer because it can appear with ϕ-agreement with the experiencer:

(93) Fontos [János-nak részt ven-ni*(-e) a verseny-en].
important John-DAT participate-INF-3SG the competition-SUP
'It is important for John to participate at the competition.' É Kiss (2002), Hungarian

Finally, according to McCloskey & Sells (1988), Irish infinitives are derived from verbal nouns together with the particle *a*, as in (94) below:

(94) Caithfimid [foighid a bheith againn].
we.must patience be.INF at.us
'We must be patient.' McCloskey & Sells (1988) (p. 143), Irish

### 2.2.2 Infinitival complementizers

I will start by pointing out examples of infinitival complementizers (in **bold**). As Sabel (2006) points out, what distinguishes these from true infinitival markers like English *to* is that they do not occur in all infinitival contexts. For instance, as discussed by Pesetsky (2021), English *for*-infinitives have their own irrealis semantics. Polish infinitives with *żeby* have a similar subjunctive, irrealis mood. Such elements are often ruled from raising constructions entirely and can only occur in control contexts, indicating that they are not infinitival markers. These are seen in (95a)-(95h) below.

(95) a. dat zij probeerde [(**om**) het boek te lezen].
that she tried in-order the book to read Sabel (2006) (p. 246), Dutch

b. En Joan ha intentat **de** cantar.
the John has tried of sing.INF Villalba (2009) (p. 28), Catalan

c. Il a oublié [**de** nettoyer la chambre].
He has forgotten of to-clean the room Long (1976), French

d. Dúirt sé [[duine ar bith a bhí bocht]$_i$ **gan** $t_i$ é a ligean isteach].
say.PST he person any COMP be.PST poor COMP.NEG him let.INF in
'He said not to let anybody in who was poor.' Chung & McCloskey (1987) (p. 221), Irish

e. Maria pensa che Gianni abbia deciso **di** andare.
Maria thinks that Gianni has decided of go.INF Kayne (1991) (p. 677), Italian

f. Acabamos [**de** ofrecer se los].
We-have-just of to-offer-him-them
'We have just offered them to him.' Lujan (1980), Spanish

g. Chciałem [**żeby** aprosić Kasię].
want.1SG.PST COMP.SUBJ invite.INF Kasię Zabrocki (1981) (p. 53), Polish

h. Rina$_i$ xadla [(**me**-) PRO$_i$ le'acben et Gil].
Rina stopped (from-) PRO to.irritate ACC Gil
'Rina stopped irritating Gil.' Landau (2013) (p. 19), Hebrew

I follow Kayne (1984) and Rizzi (1982, 1997) in assuming that prepositional elements introducting infinitives in Romance such as *di* in Italian are nonfinite complementizers, which Rizzi (1997) locates in Fin°/C1° of the left periphery. Here I will summarize Kayne's arguments. First, as Kayne points out, the aforementioned incompatibility of these markers with raising complements would be difficult to understand. Second, like *for* but unlike *to*, *de* in Italian is excluded from wh-infinitives entirely:[21]

(96) a. Je lui ai dit où aller.
I him have told where go.INF
'I told him where to go.'

b. *Je lui ai dit où d'aller.
I him have told where COMP.go.INF Kayne (1984) (p. 104), French

But determining whether the Scandinavian languages have an infinitival marker is more controversial. Let us start with Icelandic. Though *að* is often called the infinitival marker in the literature, it does not appear in raising constructions (97a), among others, though it appears in most control constructions (97b).[22]

(97) a. Hesturinn virðist [hafa týnt knapanum].
horse.DEF seems have lost jockey.DEF
'The horse seems to have lost its jockey.' Thráinsson (2007) (p. 413)

b. Risarnir lofa [að éta ríkisstjórnina á morgun].
the-giants promise to eat the-government to-morrow
'The giants promised to eat the government tomorrow.' Thráinsson (1993) (p. 189)

[21] Kayne's arguments predate the split C-domain. See Koopman (2000) on how to adapt the doubly filled comp filter facts to elements of the split-C domain such as Fin.

[22] See Sigurjónsdóttir (1989), Sigurðsson (1991, 2008) Thráinsson (1993, 2007) among others for the claim that *að* in Icelandic is an infinitival marker. For Johnson & Vikner (1994), *að* is an infinitival complementizer in Icelandic but *att* is an infinitival marker in Swedish.

Following the reasoning used for the Romance languages, this might indicate that they are complementizers instead. At the very least, it is more clear that infinitival *að* is above TP.[23] Sigurðsson (1989) notes that Icelandic has V-to-T (V-to-I in older frameworks) movement in control infinitives, unlike English, and the verb still occurs after *að*.

Notice that in (242), the movement of the auxiliary to T precludes the movement of the embedded verb to T, but this is not the case in (98b), and it does move to T. In control infinitives, V to T is still possible and it is to the right of *að*, as in (98c).

(98) a. Risarnir segja [að þeir hafi stundum [$_{VP}$ étið ríkisstjórnir].
the-giants say that they have sometimes eaten governments
'The giants say that they have sometimes eaten governments.'

b. Risarnir segja [að þeir éti$_i$ stundum [$_{VP}$ t$_i$ ríkisstjórnir]].
the-giants say that they eat sometimes governments
'The giants say that they sometimes eat governments.'

c. Risarnir lofa [að éta$_i$ oft [$_{VP}$ t$_i$ ríkisstjórnir]].
the-giants promise to eat frequently governments
'The giants promised to eat governments frequently.' Thráinsson (1993) (p. 189), Ice.

As such, I follow Holmberg (1986), Platzack (1986) and Christensen (2007) in assuming that *að* and Swedish *att* (99) are both infinitival complementizers.[24]

(99) Jag har försökt [(**att**) inte köpa boken].
I have tried (to) not buy.INF the-book
'I have tried to not buy the book.' Swedish

Moving on, to the best of my knowledge, Hindi, Serbian and Turkish have not been reported to have infinitival complementizers in the literature. Dékány (2017) reports that Hungarian did not

[23] Thráinsson (1993) cites the data in (242)-(98c) to indicate that *að* is in AgrSP, a projection in the IP domain above TP. But this was before Rizzi's structure of the left periphery, and this data can be accounted for by assuming infinitival *að* is in CP1.

[24] Christensen (2007) provides further arguments from negation that infinitival *að* is located in C1. For Christensen, Norwegian and Danish do not have infinitival complementizers, because their infinitival markers can occur in raising constructions unlike Icelandic and Swedish, among other reasons.

have them at any point in its history. In the case of German, Sabel (2006) notes that the phonetically realized complementizer *um* is excluded in German complement infinitives. This is relevant, because by definition a complementizer is introduced in complement clauses.

(100) * dass sie versuchte [um das Buch zu lesen].
that she.NOM tried COMP the book to read Sabel (2006) (p. 247), German

In Russian, the subjunctive complementizer *čtoby* is possible in finite clauses, as demonstrated in (101a), but is ruled out completely from all infinitives which are complement clauses, as in (409). This implies that it is not an infinitival complementizer:

(101) a. Ivan xočet čtoby Maša pročitala/čitala [Vojnu i Mir]
Ivan wants that.SUBJ Maša read.PST.PERF/.PST.IMPERF War and Peace
'Ivan wants for Masha to read War and Peace.' Antonenko (2008) (p. 1)

b. * Ja choču [čtoby byt zdes].
I want COMP.SUBJ be.INF here Russian

*Čtoby* can occur with infinitives, but only if the infinitival clause is an adjunct.[25] In this case, *čtoby* has a meaning akin to *in order to* in English. According to Jung (2009), these adjuncts can optionally have either an overt subject marked with dative case (102a), or PRO (102b):

(102) a. On prišel [čtoby ej ne obedat' odnoj].
he came in-order her.DAT NEG eat.INF alone.DAT
'He came so that she would not have dinner alone.'

b. $On_i$ zašel v magazin [čtoby $PRO_i$ kupit' maslo].
he stopped.by to store in-order buy.INF butter
'He stopped by the store in order to buy butter.' Jung (2009) (p. 12), Russian

What is the source of the dative case in (102a)? Jung claims that the dative case is in fact assigned by a null prepositional complementizer occurring only in certain infinitival constructions, on a par

[25] By definition, *čtoby* in such cases is not a complementizer. It is therefore not problematic for my generalization, and indeed, my account of finiteness correctly rules it out from argumental infinitives. But it is still puzzling; if finiteness is a matter of clause size. This will be discussed further in the concluding section.

with *for* in English, which can also appear with an accusative case-marked infinitive; when it is not present PRO is required.

(103) $I_i$ stopped in order $PRO_i$ to smoke. vs. I stopped in order for Mary to smoke.

Jung takes this null prepositional element to be the head of Fin, C1 in our terminology, while *čtoby* is treated as an element that occupies the specifier position of a higher projection in the left periphery, on a par with *whether* in English.[26] Given that these are adjuncts, the null element is strictly speaking not a complementizer, but a prepositional adjunct subordinator of some sort.

Dative case-marked arguments appear in other infinitival contexts, as well. It can appear in constructions that represent deontic modality, as demonstrated in (104a), and can occur with the infinitival imperative (104b).[27] This indicates that the null prepositional element really can be an infinitival complementizer, given that it need not only appear in adjunct infinitives (p. 13):

(104) a. Kuda mne bylo ujti?
where me.DAT be.PST leave.INF
'Where did I have to leave for?'

b. Vsem vstat'!
all.DAT stand-up.INF
'(You) all stand up!' Jung (2009)

Under Jung's analysis, the dative case-marked argument in these examples is base-generated as the embedded subject. It moves to Spec,CP1 via an EPP feature to get marked for dative case by the null complementizer, and finally moves to matrix Spec,TP to become the matrix subject.

It appears that Old Russian had a much clearer infinitival complementizer than Russian today does, which indicates that Jung's analysis could indeed be on the right track. Madariaga (2011) presents a survey of the syntactic change in infinitival clauses and dative subjects in Russian, noting that Old Russian allowed an overt dative subject in the infinitive with the marker *jako*, which

[26] Indeed, this would not be surprising since *čtoby* means something like *in order to*, it may have a similar syntax to *in order* in such constructions in English.

[27] See Melnikova (2022) for a survey on this construction in Russian and the most modern account of these constructions. She instead takes these constructions to involve a null modal, although she does not present any arguments against Jung's analysis. I provide evidence from Old Russian which indicates that Jung's analysis may in fact be on the right track, though Melnikova's theory and Jung's can both be right.

Madariaga takes to be an infinitival complementizer; *jako* may have become null as it fell out of favor over time.

(105) a. uvidě knjazb ... [**jako** uže vzjatu byti gradu]
saw prince COMP already taken.DAT to-be.INF town.DAT
'The prince saw that the town had already been taken.

b. Danilovii že rekšu ženěj [jako ne dobro namb$_{i+j}$ stojati sde blizb
Danilo PART saying wife.DAT COMP not good us.DAT to.stand.INF here close
vojujušči<x> na<sb> inoplemenbnikomb
fighting us strangers
'Danilo told his wife that it was not good for them [lit. us] to stay there, close to the strangers that were fighting them [lit. us].' Madariaga (2011) (p. 310), Old Russian

One potential concern with positing a null prepositional infinitival complementizer is that it might lead to overgeneration.[28] However, to the best of my ability, none of the languages without infinitival complementizers have constructions like the ones seen in (102a) or (104a)-(104b), all which involve overt embedded dative subjects without a clear source of dative case. For instance, Turkish requires that the infinitival subject in this case be PRO, unless the possessive suffix *-si* is attached to the infinitive verb, in which case it can license an overt subject. This is unlike Russian.[29]

(106) a. Deniz [PRO$_i$ kedi-yi sev-mek *(için)] gel-di.
Deniz cat-ACC love-INF in-order come-PST.3SG
'Deniz came in order to pet the cat.'

b. Deniz [o-nun PRO$_i$ kedi-yi sev-me-si *(için)] gel-di.
Deniz 3SG-GEN cat-ACC love-INF-POSS.3SG in-order come-PST.3SG
'Deniz came in order for her to pet the cat.' Turkish

Summing up, it would be difficult to account for the distribution of dative case-marked arguments

[28] My reasoning is limited to instances in which a syntactic feature (e.g. dative case in (102a)) does not have an apparent explanation without positing the presence of a null element. As such, I do not overgenerate by predicting the existence of null complementizers with no syntactic consequence. For instance, while there is a null complementizer in *I stopped in order for her to smoke*, there is no reason to believe there is one in *I stopped in order to smoke*.

[29] É Kiss (2002) reports similar constructions to Turkish in Hungarian.

in Russian infinitives without positing the existence of something null: this is likely to be a null infinitival complementizer.[30] But even if these arguments are not right, in my view the overall picture regarding the hierarchical relationship of various projections in the infinitival left periphery is still on the right track.

### 2.2.3 Wh-infinitives

We now move onto the second left peripheral property: whether a language can have a wh-word in its infinitive with embedded scope and not matrix scope. This is not possible in a language like Hindi, which does not have true wh-infinitives. The English equivalent, in which the wh-word has embedded scope is ungrammatical:

[30] One prima facie attractive alternative explanation is to analyze wh-movement differently in Russian as compared to languages like English. For the purposes of this chapter, I assume that wh-movement always takes place to WhP. But this has been argued to by Bošković (1998), Stepanov (1998) and Strahov (2001) to not be the case, among others. They take wh-movement in Russian to take place in the T-domain, on a par with scrambling. The primary reason for this is that, unlike English, Russian doesn't exhibit Superiority effects in root clauses:

(i) a. Kto komu darit podarki?
who.NOM who.DAT gives.3SG presents
'Who gives presents to whom?'

b. Komu kto darit podarki?
who.DAT who.NOM gives.3SG presents
'Who gives presents to whom?' Scott (2012) (p. 1), Russian

If Russian wh-movement truly took place within the T-domain, there would be no reason to posit the presence of null complementizers to maintain Sabel's generalization. But as Bailyn (2011) and Scott (2012) rightly point out, this reasoning is limited to root clauses, and once we look at embedded clauses–the focus of this dissertation–Superiority effects are observed.

(ii) a. Ja ne znaju, kto komu darit podarki.
I not know who.NOM who.DAT gives.3SG presents
'I don't know who gives presents to whom.'

b. ?* Ja ne znaju, komu kto darit podarki.
I not know who.DAT who.NOM gives.3SG presents
(Intended) 'I don't know who gives presents to whom.' Scott (2012) (p. 2), Russian

I refer the reader to Bailyn (2011) and Scott (2012) for further arguments on the status of wh-movement in Russian.

(107) * tumhe [kyaa kar-naa] aa-taa hai
you.DAT what do-INF.M.SG come-IMPERF.M.SG be.PRES.3SG
'(Intended) You know what to do.' Keine (2020) (p. 58), Hindi

Wh-in-situ languages like Hindi do allow wh-words in their infinitives, but only if the wh-word has matrix scope. As such, (107) can be acceptable, but only if the wh-word has matrix scope, which would be equivalent to *What do you know to do?* in English, which is expected given that Hindi is wh-in-situ.

Turkish, Icelandic, Swedish, Irish, Serbian and Hungarian are like Hindi in this regard, as (108a)-(108g) below demonstrate. Given that Icelandic, Swedish and Irish have infinitival complementizers, this may appear surprising. But this just means that the infinitival left periphery is truncated to a greater degree than in English or Italian, but less so compared to Hindi or Turkish in these languages. A structure for the different maximal infinitival sizes will be provided in 2.2.7.

(108) a. * Ahmet Ayşe-ye [PRO ne-yi oku-ma-yı] söyle-di.
Ahmet Ayşe-DAT what-ACC read-INF-ACC say-PST.3SG
'Ahmet told Ayşe what to read.' Kornfilt (1996) (p. 192), Turkish

b. * Ég veit hvað að gera.
I know what to do.INF Icelandic

c. * Ich weiß nicht [was zu kaufen].
I know not [what to buy.INF] German

d. * Jag vet inte [wart att gå].
I know not where to go Holmberg (1983), Swedish

e. * Tá a fhios agam [cad a ithe].
I know.PST of.1SG what eat.INF Irish

f. * Ne znam šta jesti.
NEG eat.1SG what eat.INF Serbian

g. * János meg kérdezte mit enni.
John VM asked what eat.INF Hungarian

On the other hand, Catalan, Dutch, French, Italian, Polish, Russian, Spanish and Hebrew, as seen in (109a)-(109h) pattern with English.

(109) a. No sé, d'aquest pernil, on comprar-ne.
not know.1SG of.this ham where buy-of.it
'I don't know where to buy this ham.' Villalba (2009) (p. 3), Catalan

b. Ik weet niet [wie te bezoeken].
I know not who to visit.INF Sabel (2006) (p. 246), Dutch

c. Je lui ai dit [où aller].
I him have said where go.INF
'I told him where to go.' Kayne (1984) (p. 104), French

d. Gli ho detto [dove andare].
Him I told [where go.INF]
'I told him where to go.' Kayne (1981) (p. 351), Italian

e. Janek nie wie [gdzie szukać Marka].
Janek not know where seek.INF Marka Zabrocki (1981) (p. 53), Polish

f. Ja sprosil Ivana kuda bezhat
I asked Ivan.ACC where run.INF Russian

g. No se [qué decirle].
not I.know what to.say.him LaPolla (1988), Spanish

h. ani lo yode'a efo la'avor dira.
I not know where to.move apartment Hebrew

There is more to be said about Irish. It appears that wh-infinitives are ruled out from Irish nonfinite clauses for independent reasons. Oisín Ó Muirthile (p.c.) has pointed out to me that Irish does not have "pure" wh-words, in the sense that they can stand alone without some kind of copula. A preliminary example of *cé* 'who' is given in (110), which is fused with a copula:

(110) Cé hí?
who.COP.PRES she.ACC
'Who is she?' Irish

As (111a) demonstrates, even in finite clauses *cá* 'where' cannot occur without the dependent form of the copula, *bhfuil*, as in (111b). This is because unlike English, Russian, French and so forth, Irish lacks a non-finite copula entirely.

(111) a. * Cá hí?
where she.ACC

b. Cá bhfuil sí?
where is.DEP you.NOM
Irish

It isn't surprising that they would be ruled out from infinitives, which do not have any kind of copulas. The impossibility of wh-infinitives in Irish is thus due to independent reasons (such as wh-words being unable to appear alone), and not due to truncation in the infinitival left periphery.

A remarkable fact about languages with wh-infinitives, first pointed out by Sabel (2006), is that they all have infinitival complementizers:[31]

(112) *Sabel's (2006) Generalization (p. 249)*

If a language possesses *wh*-movement to Spec,CP in infinitives, then this language possesses the option of filling the C-system of this (type of) infinitive with a base-generated overt element.

This is a one way generalization, so it does not imply that languages with infinitival complementizers would necessarily have wh-infinitives. This is the case in Irish, Icelandic and Swedish at the least. My own survey corroborates his observation, but with the important complication of Russian, which clearly does not have an overt infinitival complementizer, but in my view, the evidence in 2.2.2 demonstrates that it at least has a null one, which is sufficient to maintain this.

I take Sabel's generalization to be evidence for the ordering WhP > CP1 under a Rizzi framework. For Sabel, wh-movement simply takes place to Spec,CP, so the presence of wh-movement

[31] Gärtner (2009) also argues for the generalization in (i). A robust indefinite/interrogative ambiguity refers to languages like English which use different words for *who* vs. *someone* whereas German does not need to.

(i) If a language has wh-infinitives, then its pronominal system does not have a robust indefinite/interrogative ambiguity.

He notes that this generalization is attested in Russian as well.

necessitates the presence of a C head, but not vice versa. The presence of an infinitival complementizer does not mean wh-movement is possible. But Rizzi's framework allows us to improve Sabel's approach and build on it, as we will now see, with further cartographic generalizations.

### 2.2.4 Topicalization within infinitives

In this section, I will argue for the following generalization, which is attested in the survey, with the exception of Irish, which as we have seen cannot be included for independent reasons.

(113) If a language has embedded topicalization within infinitives, then it has wh-infinitives and infinitival complementizers.

The Romance languages have an operation known as *Clitic Left Dislocation* (CLLD) in which a constituent–the embedded object for our purposes–is topicalized and its interpretation is mediated through a clitic.[32] This operation is permitted within the infinitives of some Romance languages (Catalan, Italian) but not others (French, Spanish), as demonstrated below.

(114) a. No sé, [d'aquest pernil]$_i$, on comprar-ne.
not know.1SG of.this ham where buy-of.it
'I don't know where to buy this ham.' Villalba (2009) (p. 3), Catalan

b. ?? Je pense, ton livre, pouvoir le comprendre.
I think your book be-able.INF it understand Rizzi (1997) (p. 331), French

c. Gli sembra, il tappeto, di averlo venduto.
Him seems, the carpet, to have-it sold
'It seems to him that the carpet has sold.' Bocci (2007) (p. 15), Italian

d. Gli ho detto, LE SEDIE, di vender-le.
Him have told the chairs to sell.INF-it
'I told him, the chairs, to sell.' Italian

[32] See, for instance, Arregi (2003) for the argument that it involves topicalization (according to Arregi, contrastive topicalization to be precise). Evidence in 2.2.5 implies that contrastive focus fronting is not the same phenomenon as contrastive topicalization, given that languages like Italian allow the latter but not the former.

e. * Juan niega a María haber-le dado el premio.
John deny.3SG to Mary to.have.to.her given the prize
(Intended) 'John denies having given the prize to Mary.' Villalba (2009) (p. 6),

Spanish

f. * Pepe no se acordaba esta novela de haber-la ya leído.
Pepe not REFL remind.PST.3SG this.F novel of have-it.F already read
(Intended) 'Pepe did not remember having already read this novel.' Spanish

The possibility of topicalization within infinitives is not limited to CLLD. It is also possible in Irish and Hebrew.[33] In Irish (115a), we see that topicalization must take place to a position preceding the infinitival complementizer, indicating that it is low and not high.

(115) a. Dúirt sé [[duine ar bith a bhí bocht]$_i$ gan $t_i$ é a ligean isteach].
say.PST he person any COMP be.PST poor COMP.NEG him let.INF in
'He said not to let anybody in who was poor.' Chung & McCloskey (1987) (p. 221),

Irish

b. ani roce [et ugat ha pereg]$_i$ lenasot $t_i$.
I want ACC cake the poppyseed to.try
'I want to try the poppyseed cake.' Shlonsky (2014) (p. 12), Hebrew

It is not possible in Dutch, Icelandic, Polish or Swedish:

(116) a. * dat zij probeerde [[het boek]$_i$ om $t_i$ te lezen].
that she tried the book in-order to read Sabel (2006) (p. 248), Dutch

b. Risarnir lofa [(*[á morgun]$_i$) að éta ríkisstjórnina $t_i$].
the-giants promise to-morrow to eat the-government Icelandic

c. * Jag har försökt [boken$_i$ (att) inte köpa $t_i$].
I have tried the-book (to) not buy.INF Swedish

d. * Chciałem [Kasię$_i$, to żeby aprosić $t_i$].
want.1SG.PST Kasię TOP COMP.SUBJ invite.INF Polish

[33] Landau (2004a) points out that Hebrew does not have productive scrambling, so the possibility of this example cannot be attributed to VP-internal topic or focus positions.

These data confirm the generalization in (113) above, given that all of the languages in which topicalization is allowed, except Irish, have wh-infinitives and infinitival complementizers. I take this to be evidence for the ordering TopicP > WhP > CP1 under Rizzi's framework.

### 2.2.5 Contrastive focus fronting within infinitives

Although CLLD and contrastive focus fronting may seem like similar phenomena, surprisingly languages seem to distinguish between the two. In almost all of the languages we have seen in 2.2.4, focus fronting within infinitives is impossible or at least very degraded:

(117) a. * Luis quiere CERVEZA beber (y no sidra).
Luis wants BEER to.drink (and not cider)
Fernández-Sánchez (2016) (p. 112), Spanish

b. * Pepe no se acordaba ESTA NOVELA de haber ya leído (no esta
Pepe not REFL remind.PST.3SG this.F novel of have already read not this
revista).
magazine
(Intended) 'Pepe did not remember having already read THIS NOVEL (not this magazine).' Spanish

c. * En Joan es pregunta, EL SOPAR, on fer (no el dinar).
the John to himself asks the dinner where to.make not the lunch
(Intended) 'John is wondering where to eat dinner (not eat lunch).' Catalan

d. * Je pense, TON LIVRE, pouvoir comprendre (pas ton magazine).
I think your book be-able.INF understand not your magazine French

e. ?? Gli sembra LE SEDIE di aver venduto (, non il tappeto)!
him seems the chairs to have sold (, not the carpet)
'It seems to him that the chairs have sold! (not the carpet).' Bocci (2007) (p. 15), Italian

f. ?? Gli ho detto, LE SEDIE, di vendere (, non il tappeto)!
Him have told the chairs to sell.INF (, not the carpet)
'I told him, the chairs, to sell, not the carpet!' Italian

g. ?? Dúirt sé [[DUINE AR BITH A BHÍ BOCHT]$_i$ gan $t_i$ é
say.PST he person any COMP be.PST poor COMP.NEG him
a ligean isteach], ach [duine ar bith a bhí saibhir] a ligean.
let.INF in but person any COMP be.PAST rich let.INF
'He said not to let anybody in who was poor, but to let anyone in who was rich.'

The only language in my sample which allows contrastive focus fronting that is not a scrambling language is Hebrew:

(118) ani roce [ET UGAT HA PEREG]$_i$ lenasot $t_i$ (lo et ugat ha tapuxim).
I want ACC cake the poppyseed to.try (not ACC cake the apples)
'I want to try the poppyseed cake (not the apple cake).' Shlonsky (2014) (p. 12), Hebrew

The possibility of focus fronting in Hebrew, together with its impossibility in every other language without scrambling, provides some evidence for the ordering FocusP > TopicP > WhP > CP1. Though it is not as strong as one would like, given that I only have one piece of evidence for this in Hebrew. For this reason, I will move on to the next part of the survey.

### 2.2.6 *Why* and *if* within infinitives

The second to last step is to determine whether Rizzi's ordering IntP > FocusP > TopicP > WhP > CP1 is correct. This would imply the truth of the following generalization:

(119) If a language allows *why* and *if* in its infinitives, then it has contrastive focus and topicalization within its infinitives, wh-infinitives and infinitival complementizers.

I will primarily present *why*-infinitives here. But if a *why*-infinitive is possible in a given language, I will also present data from *if*-infinitives. Because an example of a *why*-infinitive alone is not sufficient evidence to show that *why* has moved to Spec,IntP. This is because it could in fact be located in a low position, as Shlonsky & Soare (2011) note, this is possible even with some native speakers of English. To help eliminate this possibility, I will also show that *if*-infinitives are possible in such languages because *if* is base-generated in Spec,IntP, at least in English.

The vast majority of languages in my survey disallow *why*-infinitives.[34] In my experience, the judgments are clearer than in English, likely because of the dialectical variation Shlonsky & Soare note. Some examples are given below in (120a)-(120f):

(120) a. * En Joan es pregunta perquè fer el sopar
the John to himself asks why to.make the dinner — Catalan

b. * Maria vroeg [waarom om pizza te eten].
Maria asked why in-order pizza to eat — Dutch

c. * Je lui ai dit pourquoi manger une pizza
I her AUX asked why eat.INF a pizza — French

d. * Maria ha chiesto perché andare.
Maria AUX asked why go.INF — Italian

e. * Ana pidió por qué comer pizza.
Ana asked why to.eat pizza — Spanish

f. * Janek nie wie dlaczego/jeśli szukać Marka]
Janek not know why/if seek.INF Marka — Polish

Hebrew is the only language that unambiguously allows both *why* and *if* -infinitives. Though (121a) is from Shlonsky (2014), he merely states *if* -infinitives are possible in Hebrew. I verified his claim in (121b) below:

(121) a. ani lo mevin lama la'avor dira.
I not understand why to.move apartment
'I don't understand why to move apartments.' — Shlonsky (2014) (p. 12), Hebrew

b. ani lo yode'a im la'avor dira.
I not know if to.move apartment
(Literally) 'I don't know if to move apartments.' — Hebrew

[34] For space, I will only show data from languages which already allow wh-infinitives, given that *why* would already be ruled out from non-wh-infinitive languages. But I have verified this for all languages studied in the survey.

The possibility of IntP in Russian infinitives appears to be subject to dialectical variation. I have had one native speaker of Russian and 2 native speakers of Ukrainian accept both of the sentences in (122a)-(122b) below, but another did not at all. As such, I marked Russian with % on Table 1.

(122) a. % Ja sprosil Ivana začem bežat.
I asked Ivan.ACC why run.INF
b. % Ja sprosil Ivana bežat li.
I asked Ivan.ACC run.INF if

Though Russian has scrambling and we cannot directly verify the presence of TopicP and FocusP, Russian unambiguously allows wh-infinitives, in addition to the constructions in which dative case-marked arguments appear in infinitives, which likely involve a null infinitival complementizer.

### 2.2.7 Interim Summary

We've thus far seen that with some language-specific exceptions, the infinitival left peripheral properties of a language with infinitives are predictable based on the highest possible left peripheral property in the cartographic structure I presented in (89) above:

(123) a. *Sabel's (2006) Simplified Generalization*: If a language has wh-infinitives, then it also has infinitival complementizers.

b. If a language allows topicalized elements within its infinitives, then it also has wh-infinitives and infinitival complementizers.

c. If a language allows *why* and *if* in its infinitives, then it has contrastive focus and topicalization within its infinitives, wh-infinitives and infinitival complementizers.

Apart from two cases, these generalizations were maintained without issue. These two cases are less clear, but in my view not problematic. First, Irish does not have wh-infinitives despite having infinitives with topicalized objects, but I argued that this was due to the independent nature of wh-elements in Irish. Second, though Russian does not have an overt infinitival complementizer, I argued it has a null one.

I would like to propose to capture these generalizations by assuming that infinitives can come in different *maximal* sizes across languages which have infinitives at all. For instance, given that English allows wh-infinitives but not all the other properties in the hierarchy, the maximal size of an English infinitive would be WhP. I therefore classify the languages presented in Table 1 into the groups presented in (124) below.

(124) **Hierarchy**: CP2 > IntP > FocP > TopP > WhP > CP1 > TP

a. **Maximally TP Infinitives**: Hindi, Hungarian, Serbian, Turkish, German

b. **Maximally CP1 Infinitives**: Icelandic, Swedish

c. **Maximally WhP Infinitives**: Dutch, English, French, Polish, %Russian, Spanish

d. **Maximally TopP Infinitives**: Catalan, Irish, Italian

e. **Maximally IntP Infinitives**: Hebrew, %Russian

f. **Maximally CP2 Infinitives**: ∅

What is crucial is that we never see infinitives occurring with high complementizers; in other words, the Infinitive Size Generalization (ISG) is attested. This is what we will now discuss in more detail.

## 2.3 Can infinitives ever have high complementizers?

In this section, I discuss further evidence for the Infinitive Size Generalization. In the literature, complementizers like *that* in English and *che* in Italian are called *finite* complementizers, and this presupposition precludes them from occurring infinitives. This already accounts for the vast majority of languages in Table 1. But not all of them. I will now discuss apparent counterexamples from Scandinavian which are not, in fact, problematic to my account.[35]

[35] The only direct contradiction of the ISG I am aware of is presented by van Gelderen (1998), who claims that Middle English infinitives project ForceP. According to van Gelderen (1998), it is possible for *ai* in (i) below to be a focus marker; in which case, *til* would be in ForceP (my CP2), flatly falsifying my upcoming

I then present further evidence in favor of the ISG from Serbian *da*-constructions and Mandarin; these examples do not involve the morphological category of "infinitive" strictly speaking, but may involve a finiteness distinction. This supports the idea that embedded clauses without high complementizers are truncated in size, and have properties one would expect nonfinite clauses to have, such as requiring a PRO subject or allowing restructuring phenomena.

The only case I am aware of in which certain elements, that appear to have the same phonetic form as a high complementizer, can occur in infinitives involves the Scandinavian languages. In Icelandic orthography, for instance, both the finite complementizer and infinitival marker share the same phonetic form *að*. Is this a problem for my account?

I think not, for two reasons. First, the two *að* have very different properties. In (125b) below, we find that finite complement clauses with *að* allow internal topicalization. But infinitives with *að* do not allow internal topicalization at all, as (125a) shows, neither to the left or right of *að*:

(125) a. Risarnir segja [að [á morgun]$_i$ éti þeir ríkisstjórnina $t_i$].
the-giants say that tomorrow eat they the-government
'The giants said that they will eat the government tomorrow.'

b. Risarnir lofa [(*[á morgun]$_i$) að (*[á morgun]$_i$) éta ríkisstjórnina $t_i$].
the-giants promise to-morrow to to-morrow eat the-government
'The giants promised to eat the government tomorrow.' Thráinsson (1993) (p. 189)

This indicates that *að* in finite clauses is a high complementizer, but not in infinitives. It must instead be a low complementizer (or something else) in infinitives.

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generalization: no infinitival complement projects CP2. My attempt at glossing her ideas is below:

(i) Til [all oure bale] ai for to bete
COMP all our sorrow FOC COMP to heal
'For all our sorrow to heal...' Middle English

However, according to Jay Jasanoff (p.c.), it appears that this is not a double complementizer construction. *Til* plays the role of complementizer *for* in this construction, making it as large as CP1. *Ai* is not a focus marker but rather a word that means *forever*, whereas "for to" in Middle English is itself the infinitive marker, (cf. *to* in English). When this sentence is translated with modern lexical substitutions into its syntactic structure, we obtain *for all our sorrow forever to amend*, which is not so exotic after all.

The second piece of evidence is that this similarity is in fact the fault of the orthography of the Scandinavian languages. Holmberg (1986) points out that the infinitival marker is not pronounced the same as the finite complementizer in any of the Scandinavian languages, except in slow and formal speech. *Att* in Swedish is pronounced /o/ for instance, while in finite clauses the complementizer is pronounced /at/. The infinitival marker is instead derived from a preposition.

Let us look at some constructions which aren't infinitives. Infinitives often depend on the matrix clause for subject licensing and tense specification, among other things. But there exist dependent complement clauses which are not infinitives in languages like Serbian and Mandarin. I would expect that it would be possible to extend observations on truncated clause size to "nonfinite" constructions in general, and not just infinitives. This prediction is borne out.

Perhaps the strongest evidence in favor of using topicalization to diagnose non-finiteness comes from Serbian *da*-constructions. Though we've seen that Serbian infinitives are highly truncated, Serbian complement clauses also allow another construction with a complementizer-like element *da*, with agreement on the embedded verb.

Both the infinitival form of the verb in addition to the *da*-form are allowed in the complement of *decide*, as demonstrated in (126a). The infinitival form of the verb is not allowed in the complement of *claim*, as seen in (126b), indicating that the complement must be finite.

(126) a. Odlučila sam {da čitam / čitati} ovu knjigu.
decided.SG.F AUX.1SG DA read.1SG / read.INF.IMPERF this book
'I decided to read this book.'

b. Tvrdim {da čitam / *čitati} ovu knjigu.
claim.1SG DA read.1SG / *read.INF.IMPERF this book
'I claimed to be reading this book.' Wurmbrand et al. (2020) (p. 8), Serbian

Although the subject in (126a) is null, it need not be. As (127) shows, the complement of *decide* may allow an overt embedded subject.

(127) Jovan je odlučio da ∅/Petar/on ode.
Jovan AUX decided DA ∅/Petar/he leaves
(Potential reading 1) 'Jovan decided to leave.'

(Potential reading 2) 'Jovan decided that Peter/he would leave.' Serbian

At this point, we do not have enough information to determine whether the possible empty category in (127) is pro or PRO. To figure this out, I have determined that complement of *decide*, in fact, in certain cases does not allow overt subjects. This can be teased apart via clause-internal topicalization–the key empirical test of this chapter.

One possibility might be that there are two locations of *da*. It may be a high complementizer, or it may be a low complementizer:[36]

(128) CP2 (the location of *da* in (126b) > TopicP > CP1 (the potential location *da* in (126a))

If *da* is located in the topmost C2 head in an example involving *claim* like (126b), we would expect it to be required for it to precede clause-internal topics. This is the case:

(129) a. * Tvrdim sam [ovu knjigu]$_i$ da čitam $t_i$.
claim.SG.F AUX.1SG this book DA read.1SG
'I claimed to be reading this book.'

b. Tvrdim sam da [ovu knjigu]$_i$ čitam $t_i$. Serbian

Similarly, if *da* is located in C1 in (126a), we would expect it always be preceded by clause-internal topics. This prediction is partly borne out. According to Todorović & Wurmbrand (2016), *decide*-complements allow topicalization both before and after *da*. I take this to show that *da* can be located either in C1 or C2; in (130a) it is located in C1 while in (130b) it is in C2:

(130) a. Odlučila sam [ovu knjigu]$_i$ da čitam $t_i$.
decided.SG.F AUX.1SG this book DA read.1SG

[36] This is simplified from the analysis proposed by Wurmbrand et al. (2020), because *da* is analyzed as a lower clausal head, such as the head of T or v, rather than a low complementizer. Assuming that *da* can be a low complementizer is sufficient for the purposes here and does not change the result. I suspect that a similar analysis can be applied to *shuo* in Mandarin.

'I decided to read this book.'

b. Odlučila sam da [ovu knjigu]$_i$ čitam $t_i$. Serbian

This being the case, I predict that (130a) can only allow PRO, because it is truncated in size, while (130b) can allow overt subjects. This is borne out. It turns out that when a topicalized element precedes *da* as in (130a), overt NPs are disallowed, as shown in (131a). Only a null and obligatorily controlled subject is allowed. And as predicted, when a topicalized element follows *da*, it allows for an overt NP, as in (131b).[37]

(131) a. * Odlučila sam ovu knjigu da čita Ivan.
decided.SG.F AUX.1SG this book DA read.3SG Ivan
(Intended reading) 'I decided for Ivan to read this book.' ~~CP~~ > TopicP > TP (da)

b. Odlučila sam da ovu knjigu čita Ivan.
decided.SG.F AUX.1SG DA this book read.3SG Ivan
'I decided for Ivan to read this book.' CP (da) > TopicP > TP

In other words, in (131a), when the clause is deficient in size as a result of *da* being located in C1, no overt subjects are allowed. However, when *da* is located in C2–indicating that the clause is not deficient–overt subjects are once again allowed. This, again, strongly indicates that there is a relationship between subject licensing and clause size, diagnosed via topicalization:

(132) *Serbian Generalization*:

*Da* not in C2 → PRO obligatory

*Da* in C2 → PRO not permitted, overt subjects or pro required

Mandarin has a similar pattern to what we see in Serbian *da*-complements. Huang (2018) makes a similar argument in Mandarin, and his analysis can be straightforwardly translated into mine. Huang (2018) shows that *shuo* behaves as a finite complementizer (in our terminology *high*) when it

[37] One complication in the data in (131a)-(131b) is that the speakers I consulted preferred to topicalize the verb above the embedded subject *Ivan*. If Serbian is like Russian, I take this to involve clause-final focalization of *Ivan* following Neeleman & Titov (2009). I am not sure in what way this would affect the data, if at all.

heads a finite embedded clause. In (133), topicalization is only allowed within the embedded clause, because the complement of *believe* must be finite.

(133) a. Wo xiangxin [shuo Lisi [zhe-pian baogao]$_i$ xie-wan-le $t_i$].
I believe SHUO Lisi this-CL report write-finish-PERF
'I believe that Lisi has written this report.'

b. * Wo [zhe-pian baogao]$_i$ xiangxin [shuo Lisi xie-wan-le $t_i$]. Huang (2018) (p. 351)

But *shuo* behaves as a lower complementizer when it heads a nonfinite embedded clause, such as the complement of *try*, with which the pattern in (133b) is possible. The complement of *try* in (134), which appears to be nonfinite–as evidenced by the requirement of a controlled PRO–involves restructuring, as it allows the embedded object to move up and precede the verb:

(134) Wo [zhe-pian baogao]$_i$ hui shefa [shuo jinkuai xie-wan $t_i$].
I this-CL report will try SHUO as-soon-as-possible write-finish
'I will try to finish this report as soon as possible.' Huang (2018) (p. 351), Mandarin

Huang (2018)'s argument relies on the assumption that C2 blocks extraction in Mandarin, which isn't a universally true claim–it is easy to verify that extraction across *that* is possible in a language like English, for instance. As far as I can see, Huang does not provide a reason for this difference. But the difference between English and Mandarin C2 might be accounted for by assuming an instance of selective opacity, which I discuss in further detail in 2.5.2. In other words, operations involving A'-movement across finite embedded clauses might be blocked in Mandarin but not in English.

Once again, we see the fundamental inability of a high complementizer to co-occur with nonfinite contexts. It appears that the untruncated CP2 layer blocks topicalization to a matrix verb-medial topic or focus position, as in (133b). But restructuring–removal of the CP2 layer–allows for this movement to take place, as in (134). Concerning subject licensing, the complement of *like*–a predicate that takes vP complements similar to *try*–requires an OC PRO but that of *hope* does not,

which according to Grano (2017) takes a CP, as predicted:

(135) a. Xiaoming$_i$ xihuan (*ta$_{i/j}$) chi shousi.
Xiaoming like he eat sushi
'Xiaoming likes to eat sushi.'

b. Xiaoming$_i$ xiwang (ta$_j$) chi shousi.
Xiaoming hope he eat sushi
'Xiaoming hopes to eat sushi.'

We can draw this conclusion regarding Mandarin:

(136) *Mandarin Generalization*:

*Shuo* not in C2 → PRO obligatory, restructuring permitted

*Shuo* in C2 → PRO not permitted, restructuring not permitted

These observations purely involve word order; they cannot be pinned on phonologically distinguishable functional heads. The fact that the generalizations from Serbian and Mandarin do not involve infinitives at all strongly implies that there is a universal principle at stake, namely that all nonfinite clauses lack the topmost functional projection of the C domain.

To conclude, infinitives–in addition to clauses which appear to be nonfinite in Serbian and Mandarin–never project the full C domain; in particular, Rizzi's ForceP, or my CP2. I have shown that even in Hebrew, with the largest attested infinitives, infinitives cannot co-occur with the so-called high complementizer *še*.

Of course, one might allege that this might simply be because finite complementizers don't select nonfinite clauses. But I believe this simply begs the question of *why* finite complementizers (in our terminology, high) do not select nonfinite clauses, and does not lead to a greater understanding of this fact. This leads me to present the following potential finiteness generalization:

(137) **Infinitive Size Generalization (ISG)**: No infinitival complement projects CP2.

No infinitival complement can co-occur with a high complementizer.

This, I believe, gives us a foundation to create a theory of finiteness in terms of clause size. It allows us to make precise and falsifiable definitions for the status of finiteness for embedded clauses.

(138) a. An embedded clause is finite iff it is untruncated in the C domain.

b. An embedded clause is nonfinite iff it its CP2 layer is truncated.

As we will see in the next section, it is very possible that these definitions are overly simple, but they make an excellent starting point, given that they account for the ISG.

These definitions do not block finite complementizers from originally appearing in C1, as long as C2 is still present in the finite clause, whether in the form of a null complementizer or due to some PF-level reason.

Notice that certain morphosyntactic properties that have often been associated to finiteness in the literature such as morphological tense or agreement and even purely syntactic properties like subject licensing are not a part of my definition. Such properties merely *correlate* with the presence of CP2 under my account–that is, greater clause size merely correlates with tense and agreement markings. This does not block the puzzling possibility of nonfinite forms which have more agreement than finite forms, which has been claimed to be instantiated in Icari Dargwa according to Kalinina & Sumbatova (2007), for example.

Why the correlation? Namely, what is the relationship between C and T? The definitions provided here posit no additional relationship between C and T. If (non)-finiteness is defined as presence/absence of the highest C under the cartographic framework presented here, why should the aforementioned strong correlation between finite and non-finite clauses exist at all?

This can be reframed as the problem of explaining the difference between finite and nonfinite T, which is the locus for tense and agreement markings in the generative framework. For example, the nonfinite complementizer *for* in English is responsible for accusative case on the embedded subject, while the finite embedded subject has nominative case, and a nonfinite complement with no complementizer has no visible subject at all:

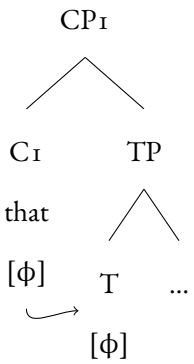
(139) a. ...that I took out the trash.

b. ...for me to take out the trash.

c. ...∅ PRO to take out the trash.

This relationship between C and T has been explained in terms of C-to-T feature inheritance by Chomsky (2008), and it has been developed further by Richards (2008), Miyagawa (2010, 2017a) and Aldridge (2018) among others.[38] To see an example of how this would proceed, recall that *that* in English is base-generated in C1/FinP. Feature inheritance from C1 takes place down to the nearest possible head, which is T. For simplicity, here I assume only ϕ-features are transferred, but Chapter 3 and 4 will both expand on this point.

(140)




Under this account, *that* is the locus for the ϕ-features of embedded clauses in English. As such, no nonfinite clause will have embedded verbs with agreement markings, at least in English. But this allows for language variation and some languages can allow nonfinite T to be base-generated with syntactic tense features, unlike English. These would be languages with inflected infinitives like European Portuguese and Turkish.

There is independent evidence to assume that C is the locus of ϕ-features more generally, as Miyagawa (2010) points out.[39] Carstens (2003) (p. 393) notes the following examples from West

[38] Pesetsky & Torrego (2001) proposes that *that* is base-generated in T rather than C, moving to C later in the derivation. For my purposes, this also provides a natural way of explaining the relationship between C and T, makes identical predictions, and can also be adopted by my account.

[39] Chomsky (2008) intends to extend the notion of C-to-T feature inheritance to phase heads more gener-

Flemish, in which we see agreement show up on the complementizer. In West Flemish, the complementizer must be adjacent to the subject it agrees with, and the embedded verb must also be inflected for agreement.

(141) a. Kpeinzen *dan-k* (ik) morgen goan.
I.think that-I (I) tomorrow go
'I think that I'll go tomorrow.'

b. Kpeinzen *da-j* (gie) morgen goat.
I.think that-you (you) tomorrow go
'I think that you'll go tomorrow.'

c. Kvinden *dan* die boeken te diere zyn.
I.find that.PL the books too expensive are
'I find those books too expensive.' West Flemish

Both Carstens (2003) and Miyagawa (2010) take this to indicate that the locus of agreement is originally C, and moves down to T. For the purposes of this chapter, this concludes our discussion of C-to-T inheritance. But it will be touched upon in the upcoming chapters. In the next section, we will determine whether this definition of finiteness still holds once we consider a range of facts.

## 2.4 Potential counterexamples to the Infinitive Size Generalization

Although I have presented arguments in favor of the ISG, it is not surprising that many apparent counterexamples to it already exist in the literature. Some of these possibilities are listed below:

(142) a. *That*-less embedded clauses have been argued to be truncated in the C domain.

b. Factive embedded clauses have been claimed to be truncated in the C domain like infinitives.

ally, such as v-to-V feature inheritance. But given that the empirical evidence for this is virtually nonexistent and mainly for conceptual reasons, I will follow Miyagawa (2010, 2017b) in limiting my investigation to C-to-T inheritance and not explore phases more generally.

The goal of this section is to argue that none of these constitute true counterexamples for the generalization. 2.4.1 offers two solutions to the problem in (142a): infinitives may be more truncated than merely CP2, or *that* may simply be null in them. 2.4.2 concludes that factives are in fact not truncated in the C domain.

### 2.4.1 *That*-less embedded clauses

The central empirical claim of this chapter is that infinitives necessarily lack the ability to co-occur with high complementizers. But there is a great deal of controversy in the literature whether *that*-less embedded clauses have a CP2/ForceP layer or not, which could lead to a confound.[40] For example, Bošković & Lasnik (2003) (p. 527) notes the following contrast, in which (143d) cannot occur without the high complementizer but (143b) can:

(143) a. It was widely believed [that he liked linguistics].

b. (?) It was widely believed [he liked linguistics].

c. [That he liked linguistics] was widely believed.

d. * [He liked linguistics] was widely believed.

Here is the problem. (143b) is uncontroversially finite, but if it truly lacks CP2, this is a counterexample to my definition of finiteness.

Wurmbrand (2017) provides an interesting discussion of stripping phenomena–the elision of declarative TPs–that may be problematic for my theory of finiteness. Based on the contrast between (144a)-(144b) on one hand and (144c)-(144d) on the other, Wurmbrand (2017) (p. 342) claims that stripping of embedded clauses is only possible when the embedded clause lacks a CP2.

[40] Of course, in the literature previous authors did not refer to CP2; they referred to CP. But to be in line with the rest of this chapter I will refer to CP2 rather than CP. For accounts in which CP2 is present but null, the reader is referred to Pesetsky (1992), Pesetsky & Torrego (2001), Pesetsky & Torrego (2007) and Bošković & Lasnik (2003). For accounts in which CP2 is truncated, see Hegarty (1991), Webelhuth (1992), Doherty (2000), Svenonius (1994), Bošković (1997) and Wurmbrand (2014a).

(144) a. * Abby claimed (that) Ben would ask her out, but she didn't think that Bill (too).

b. Abby claimed (that) Ben would ask her out, but she didn't think Bill (too).

c. * Jane loves to study rocks, and John says that geography too.

d. Jane loves to study rocks, and John says geography too.

For Wurmbrand, ellipsis is the option of not realizing a Spell-Out domain. To get the contrasts in (144a)-(144b) and (144c)-(144d), Wurmbrand assumes a hierarchy CP2 > FocP > TP. If CP2 is present, CP2 is phasal but not FocP, and when CP2 is not present FocP is phasal. The Spell-Out domain of CP2 is FocP, not TP, so it cannot be elided, because stripping is just the elision of TP. But if CP2 is not present, then TP can be elided, because FocP is phasal.

This allows for a natural explanation of her Embedded Stripping Generalization: that stripping of embedded clauses is only possible if the embedded clause lacks CP. As such, this might imply that CP2 really is missing, and not merely null, in instances of embedded stripping. But it is essential to note that whether or not *that*-less embedded clauses have CP2 or not does not have any bearing on whether the ISG is true or not. Regardless, it does complicate what a definition of finiteness could look like.

As such, here are two potential paths one can take:

(145) a. CP2 is always present in *that*-less embedded clauses, but null.

b. The definition of finiteness presented in (138a) above is not correct.

Let's explore the second path. I would have to admit degrees of truncation. In other words, CP2 in finite clauses *can* be truncated, but nonfinite clauses involve deeper truncation than merely CP2. New definitions of finite vs. nonfinite clauses might be presented as follows, assuming the following structure, with ?P now in between CP2 and IntP in my hierarchy:

(146) a. **Hierarchy**: CP2 > **?P** > IntP > FocP > TopP > WhP > CP1 > TP

b. A clause is nonfinite iff it its CP2 and ?P layer are truncated.

The obvious question at this point is what ?P is. Here is one possibility.

Recall that the language with the largest attested infinitives is Hebrew. There is at least one more independent reason from negative polarity item (NPI) licensing to believe that Hebrew infinitives are truncated, and that this is not *solely* due to the truncation of the CP2 layer. Matrix negation can license NPI licensing inside infinitive or subjunctive complements but not indicative ones, as first noted by Landau (2004b). This is shown in (147a)-(147c) below; we see that the subjunctive is headed by the high complementizer *še* and still allows NPI licensing, so this restructuring property may be due to the truncation of some other projection in the C domain (p. 821).

(147) a. Lo darašti me-Gil ledaber im af-exad.
not demanded.1SG from-Gil to-speak with anybody
'I didn't demand of Gil to speak to anybody.' Infinitive

b. Lo darašti me-Gil$_i$ še-pro$_i$ yedaber im af-exad.
not demanded.1SG from-Gil that-pro will-speak-3SG.M with anybody
'I didn't demand of Gil that he speak to anybody.' Subjunctive

c. * Lo he'emanti še-Gil yedaber im af-exad.
not believed.1SG that-Gil will-speak.3SG.M with anybody
'I didn't believe that Gil would speak to anybody.' Indicative, Hebrew

It is possible that there is (at least) one other projection together with CP2 that is truncated when a nonfinite clause is made. Let us call this layer IndicativeP (IndP), given the indicative syntax and semantics of (147c). Admittedly, this is nothing more than merely restating the pattern in (147a)-(147c), but for my purposes this is sufficient. One possibility is that CP2 is necessarily deleted whenever IndP is deleted. In other words, one could define nonfinite embedded clauses as follows:

(148) a. **Hierarchy**: CP2 > **IndP** > IntP > FocP > TopP > WhP > CP1 > TP

b. An embedded clause is nonfinite iff it its CP2 and IndP layer are truncated.

My goal here is not to provide a fully correct definition of (non-)finiteness, but rather show that these issues do not affect the truth of the ISG.

### 2.4.2 Factives are not truncated in the C domain

As has been noted extensively in the literature thus far, factives do not allow many of the properties of the C domain such as topicalization or focalization, as Hooper & Thompson (1973), Haegeman (2012) and others point out. An example with the complement of *regret* is below:

(149) * John regrets that this book Mary read.

This has led Miyagawa (2017b) to claim that factives are in fact truncated in the C domain. Under his analysis, TopicP can be projected above CP (my CP2), which can be truncated. This could be taken to be at odds with my definition of a finite clause, which is fully untruncated in the C domain, in addition to having a different understanding of the left periphery. As such, I adopt and defend Haegeman (2012)'s analysis of null operator movement in complements of factive predicates, rather than truncation. I also present some novel evidence for her account.

Haegeman is not the first to suggest null operator movement in factives. Hegarty (1992) points out that the complement clauses of factives are weak islands for extraction, whereas those of nonfactives are not, as seen below.

(150) a. How do you suppose that Maria$_i$ fixed the car $t_i$?

b. * How did you notice that Maria$_i$ fixed the car $t_i$?

c. Why does Mary$_i$ think that Bill left the company $t_i$?

d. * Why does Mary$_i$ regret that Bill left the company $t_i$?

As Haegeman (2012) points out, almost every property of the C domain that we have discussed thus far involves a step of A'-movement. Both null operators and a truncation analysis would get the

desired result as both disallow movement: in the null operator analysis it is because the null operator occupies the A'-position, whereas in the truncation analysis it simply does not exist. If it ever were possible to base-generate elements into a Spec position in the C-domain, for example Spec,TopP, then it would be possible to distinguish between the accounts, as they make different predictions.

Temporal adjuncts, in fact, seem to be base-generated into a Spec position of the articulated left periphery. Rizzi (1997) assumes they are Merged to Spec,TopP, although Rizzi (2001) distinguishes the position of topics from modifiers, positing a dedicated projection, ModP. However, for simplicity, I will continue to assume that it is Merged onto Spec,TopP:

(151) [$_{\text{TopP}}$ Last week, [$_{\text{TP}}$ I was in Tokyo.]]

If temporal adjuncts are base-generated, then we would predict that they should be acceptable with factives. This prediction is borne out:

(152) John regrets that during dinner Mary read this book.

As mentioned, colloquial English appears to have double complementizer constructions:[41]

(153) She maintained **that** when they arrived **that** they would be welcomed.

According to my consultants, this sentence is equally acceptable with the factive *regret*, indicating the presence of CP2, TopP and CP1 layers and therefore a highly articulated structure:

(154) She regretted **that** when they arrived **that** they weren't welcomed.

On the other hand, we would also predict that, as English infinitives are quite truncated, that they cannot take preverbal temporal adjuncts. This prediction is borne out, according to data from Shlonsky & Soare (2011). In the contrast below, the adjunct *at 5* cannot refer to the cooking of dinner; it must refer to the time of the promise–that is, it must be an adjunct to the matrix sentence rather than the infinitive. However, this is possible with the finite version of the sentence:

[41] This, however, does not appear to be the case in all dialects of colloquial English (Jonathan Bobaljik, p.c.). They may instead sound like false starts or continuations.

(155) a. *John promised us at 5 to cook dinner for his children.

b. John promised us that at 5 he would cook dinner for his children.

I conclude that factives are not truncated in the C domain.

## 2.5 Further cartographic generalizations

Though section 3 presented a few cartographic generalizations, I believe that a few more promising ones remain. I discuss one based on *tough*-constructions in 2.5.1 and another one on the possibility of infinitives with propositional semantics in 2.5.2.

### 2.5.1 *Tough*-constructions

In the literature, *tough*-movement in English and wh-movement have been claimed to take place to a position in the infinitival left periphery. Given this, one would expect something like the following generalization to be true:

(156) If a language has a *tough*-construction, then it has wh-infinitives or infinitival complementizers.

I will propose in this section that this generalization is likely to be true, though an in-depth survey in future work is necessary to ensure that it is.

What is a *tough*-construction? Here are examples from Chomsky (1977b), (p. 105):

(157) a. It is easy to play sonatas on the violin. (without *tough*-movement)

b. The violin is easy to play sonatas on. (with *tough*-movement)

Chomsky (1977c) shows that *tough*-movement involves a step of wh-movement. As it turns out, *tough*-movement and wh-movement at the same time out of the same infinitive is not possible, as

seen in (158a)-(158d). The middle Spec,CP position was occupied by a Copy of *what sonatas* prevents *this violin* from moving up in (158d).

(158) a. It is easy to play these sonatas on this violin.

b. These sonatas are easy to play on this violin.

c. What sonatas are easy to play on this violin?

d. * What sonatas is this violin easy to play on? Chomsky (1977b), (p. 105)

Under my understanding of the C domain, this means that *tough*-movement takes place to Spec,WhP in English infinitives. But movement of the embedded object to Spec,WhP, an A'-position, and then to matrix Spec,TP, would be a violation of Chomsky (1977a)'s Improper Movement constraint. Instead, the embedded object is a null operator that moves to Spec,WhP while the coreferring matrix subject is base-generated:

(159) $\text{Caitlin}_i$ is tough [$_{\text{WhP}}$ $\text{Op}_i$ [$_{\text{TP}}$ $\text{PRO}_{\text{arb}}$ to please $t_i$.]]

We would expect languages like German to not have *tough*-constructions (TCs), given they do not contain an infinitival left periphery.[42]. But according to Comrie (1997) among others, German appears to have TCs. This is contradictory for Chomsky's account. Where would it move to?

Wurmbrand (1994) argues that German does not in fact have TCs, because it has different properties from TCs that we see in English. Out of four of her tests, I will include two. For example, they do not allow arguments intervening between the embedded object and matrix subject (160a) and do not license parasitic gaps (160b). This is because German "*tough*"-constructions do not involve A'-movement, unlike in English.

(160) a. * Dieses Buch ist schwer Hans zu überzeugen zu lesen.
this book is hard John to convince to read
'This book is hard to convince John to read.' Wurmbrand (1994) (), German

[42] Although the next subsection argues that this is strictly speaking false, I do not take PropP to have a specifier position to which A'-movement is possible. It is present purely for semantic purposes.

b. * weil das Buch$_i$ [ohne vorher *pg*$_i$ zu kaufen] schwer t$_i$ zu lesen ist
because the book [without before to buy] hard to read is
(Intended) 'Because the book is hard to read without having bought beforehand.'

Following Wurmbrand, I propose that we call this kind of long A-movement in German *leicht*-movement, with the resultant construction a *leicht*-construction. By contrast, genuine *tough*-movement involves a step of A'-movement to the infinitival C domain prior to A-movement to the matrix subject position, as Chomsky proposes. Chomsky's observation predicts that the C domain must be present in the infinitives of TCs. Thus, we would predict languages with TCs to have wh-infinitives and/or infinitival complementizers, as I proposed at the start of this subsection.

German is the odd one out: it is the only language that has been reported to have TCs but does not have an infinitival complementizer or wh-infinitives. Out of the other languages, Icelandic (Sigurðsson (2016)), Swedish (Klingvall (2018)) Spanish, French, Italian (Hartman (2011)) and Dutch (van der Auwera & Noel (2011)) are all reported to have *tough*-constructions. Outside of my survey, I have verified that wh-infinitives exist in Tamil according to Schiffman (1999), and it too has English-style TCs (Selvanathan (2017)). Stefan Keine (p.c.) has pointed out to me that Hindi does not have TCs, which is fully expected. None of the TP-languages in my sample have been reported to have TCs. I believe this covers most, if not all, of the languages which have been reported to have English-style TCs in the literature.

But the relationship between the infinitival left periphery and *tough*- and *leicht*-movement is not yet fully understood. Cardona (2023) reports that Italian *tough*-constructions may in fact be classified as *leicht*-constructions. Recall that Italian is classified as TopicP-infinitive language: although this does not contradict the generalization I have presented here, it does mean that just because a language has wh-infinitives, it is possible for it to have *leicht*-constructions rather than *tough* ones. In addition to Romance, future work could determine whether Norwegian and Danish pattern like German *leicht*-constructions, given that according to Christensen (2007) they have true infinitival

markers, unlike Swedish. Finally, outside of Indo-European, Selvanathan (2018) reports that Malay involves *leicht*-constructions. These are all encouraging lines of inquiry for future work to look into.

### 2.5.2 Raising infinitives and the infinitival left periphery

In this section, I will discuss whether the following cartographic generalization is tenable, which appears to be attested in all of the languages of the survey.

(161) If a language has infinitival complementizers, then it has raising infinitives.

All the languages below with infinitival complementizers have raising infinitives, as shown in (162a)-(162j) below:

(162) a. En Joan sembla [estar content].
the John seems to.be happy
Catalan

b. Maria lijkt blij te zijn.
Maria seems happy to be
Dutch

c. Chloé semble être heureuse
Chloé seems to.be happy
French

d. Caithfimid$_i$ [foighid a bheith againn$_i$]
We-must patience be-INF at-us
'We must be patient.' McCloskey & Sells (1988) (p. 143), Irish

e. Mi sembra di essere felice.
I seem of be.INF happy
Italian

f. ha-hafgana omedet lehitkayem be-yom šiši
the-demonstration.SF stands.SF to.occur in-day sixth
'The demonstration is about to take place on Friday.' Melnik (2015) (p. 149),
Hebrew

g. Ana parecía [beber demasiado].
Ana seemed to.drink too.much
Spanish

h. Hesturinn virðist [hafa týnt knapanum].
horse.DEF seems have lost jockey.DEF
'The horse seems to have lost its jockey.' Thráinsson (2007) (p. 413), Icelandic

i. Piotr wydawał się być niespokojny.
Piotr.NOM seemed be.INF uneasy Przepiórkowski & Rosen (2004) (p. 3), Polish

j. Jag verkar vara glad.
I seem be.INF happy Swedish

Russian has at least one raising construction reported in the literature:[43]

(163) Nikto$_i$ ne dolžen [t$_i$ čitat' éti stat'i].
NEG.one.NOM not must.MASC.SG read.INF this-ACC.PL article-ACC.PL
'Nobody must read these articles.' Babyonyshev et al. (2001) (p. 16), Russian

But Russian raising constructions are very marked. According to Keine (2020) (p. 194), nonfinite clauses in Russian are transparent to A'-movement such as topicalization but opaque to A-movement such as subject-to-subject raising, as shown by the contrast in (164a)-(164b) below:

(164) a. Kažetsja [čto èti studenty znajut tri jazyka].
seem.3SG that these students know.3PL three languages
'It seems that these students know three languages.'

b. * Èti studenty$_i$ kažutsja [t$_i$ učit' tri jazyka].
these students seem.3PL learn.INF three languages
(Intended) 'These students seem to be learning three languages.' Russian

For Keine, this is an example of *selective opacity*, which are configurations in which a constituent is transparent to some operations but opaque to others. However, the fact that Russian allows *some* instances of raising indicates that Keine's story is not complete, and (161) remains true in my survey.

German is unique in my sample in that it is the only language without infinitival complementizers that has raising infinitives. Given that (161) is a one-way implication, this is unproblematic; it is possible for languages to have raising infinitives but not infinitival complementizers. An example involving the nonfinite propositional complement of *seem* with subject raising is given in (165):

[43] Thanks to David Pesetsky for pointing this out.

(165) Er scheint [intelligent zu sein].
he seems intelligent to be
German

On one hand, German lacks any of the classic properties of the C domain. On the other, if (161) is true, we would expect there to be some relationship between the left periphery and the presence of raising infinitives. One possibility is to assume the presence of a very low projection in the left periphery, PropositionP (PropP), with the updated hierarchy below.

(166) **Hierarchy**: CP2 > IntP > FocP > TopP > WhP > CP1 > PropP > TP

a. **Maximally TP Infinitives**: Hindi, Hungarian, Serbian, Turkish

b. **Maximally PropP Infinitives**: German

For the time being, I have decided to call this layer PropositionP because of independent evidence from Wurmbrand (2001) that propositional semantics is intimately related to the left periphery, and given the propositional semantics of the classic raising predicate *seem* it is plausible that raising infinitives project a PropositionP.[44]

I will now present independent syntactic evidence for PropP from control infinitives. Following Wurmbrand & Lohninger (2019) (W&L), I assume that infinitival complements can come in four sizes: vP, TP and CP. W&L provide empirical data that control complements can in fact have CP and TP layers. They propose that there are three kinds of control complements: propositional, which are CPs; situational, which are TPs; and events, which are vPs.

The semantics of vP-infinitives will be presented in Chapter 4. But CP-complements involve those which can be assigned a truth value, while TP-complements do not (167a)-(167b). On the other hand, TP-complements have a future-irrealis reading with respect to matrix tense, whereas CP-complements are read with tense that is simultaneous to the matrix tense (167c)-(167d):

(167) a. Caitlin claimed to have eaten salad, which is true.

[44] See Brogaard (2013) for the propositional semantics of *seem*.

b. # Caitlin decided to eat salad tomorrow, which is true.

c. Caitlin decided to fly tomorrow.

d. * Caitlin claimed to be happy tomorrow.

The only control infinitive with a propositional semantics in English is the complement of *claim*.

Now, we would like to know why W&L place the propositional semantics of such infinitives into the C domain in particular, rather than somewhere lower. Wurmbrand (2001) notes a distinction between vP- and TP-infinitives like *try* and *decide* on one hand, and *claim* on the other, regarding the restructuring phenomenon known as *splitting* in German. In cases of splitting, a matrix element (the matrix subject in bold in (168a)-(297b)) can occur between material from the embedded complement. This is seen in (168a)-(297b) below.

The infinitival complement can occur to the left of the matrix verb, so pronoun fronting across the matrix subject is used in (168a). We see that in (168a) the matrix subject is sandwiched between the embedded object and the infinitival verb. Although the complement of propositional complement usually occurs after the matrix verb, splitting isn't possible at all in (297b), in either position for the infinitival verb:

(168) a. weil ihn **der Hans** zu reparieren versuchte/beschloss
since it.ACC the John to repair tried/decided
'since John tried/decided to repair it' Wurmbrand (2001) (p. 268)

b. * weil sie **der Hans** {zu mögen} behauptete {zu mögen}.
since her the John {to like} claimed {to like}
'since John claimed to like her' Wurmbrand (2001) (p. 336), German

Wurmbrand takes this to indicate that the complement of *claim* has more structure than that of *decide* or *try*, which are TP- and vP-infinitives respectively. A natural suggestion is to suppose that the complement of *claim* is a CP, blocking this kind of restructuring phenomenon. Under the conception of the C-domain presented in this chapter, positing the low C-domain projection PropositionP is sufficient to account for Wurmbrand's observations without giving up the ISG.

Should we classify Hindi, Hungarian, Serbian and Turkish as PropP languages as well? They do not seem to have propositional infinitives of any kind. Wurmbrand et al. (2020) demonstrate this for the South Slavic languages. According to Bhatt (2006), Hindi lacks raising predicates like that of English entirely. Although Szabolcsi (2009) demonstrates that Hungarian has raising predicates, 'látszik' *seem* can only take finite complements. Finally, in Turkish, propositional complements must be gerunds, as in (169), and cannot be infinitival:

(169) Deniz [kapı-yı ac-tığ-ı-nı] iddia et-ti.
Deniz door-ACC open-GER-POSS.3SG-ACC claim AUX-PST.3SG
'Deniz claimed that he opened the door.' Turkish

Thus, German remains the sole maximally PropP language.

Before concluding, I would like to talk about the notion of *opacity*, briefly mentioned in the context of Russian. One aspect of my theory that may seem counterintuitive is the fact that different structures vary crosslinguistically in terms of their opacity. The operation of *hyperraising*–that is, raising from a finite clause–appears puzzling, because it does not seem to require any kind of structure removal. As Wurmbrand (2019) notes, it is a common phenomenon crosslinguistically.

An illustrative example of hyperraising in Greek, which was first noted by Felix (1989). Greek systematically lacks infinitives and allows hyperraising from subjunctive complements co-occurring with an overt complementizer:

(170) Ta pedhia arxisan na trexoun.
the children.NOM started.3PL COMP.SUBJ run.3PL
'The children started to run.' Roussou (2009) (p. 1816), Greek

However, rather than finding this to be a problem for my account, I believe that hyperraising can be analyzed as an instance of selective opacity.[45] In other words, finite clauses across languages can vary as to whether they allow raising or not. Regardless, there appears to be a strong correlation between

[45] Jonathan Bobaljik (p.c.) rightfully points out that the Mandarin facts discussed prior might be analyzed as an instance of selective opacity, as well.

the presence of the C domain in the infinitives of a language and whether that language has raising infinitives at all. This is a curious correlation that deserves further attention.

## 2.6 Theoretical Considerations

This section considers various empirical and theoretical applications of the ISG to existing debates in the field. Section 2.6.1 discusses Pesetsky (2021)'s Exfoliation theory of clause size and how the framework would need to be adapted to account for the cartographic generalizations we have seen in this paper. Section 2.6.2 discusses possible applications of my finiteness-as-clause-size approach to subjunctive clauses, which have long been considered to be borderline between finite and nonfinite in the literature.

### 2.6.1 The Exfoliation Framework

The core questions that Exfoliation seeks to address are: why do nonfinite clauses exist in the first place, and why do the properties of the subject position in nonfinite clauses differ from their finite counterparts? For Pesetsky, ultimately all nonfinite clauses are created via a process of subject extraction, even control constructions which do not prima facie involve subject extraction, putting aside movement theories of control like Hornstein (1999)'s. All clauses are born as full and finite CPs. Infinitives are made, not born, contra selectional accounts in which different predicates, like raising and control predicates, picked the size of their complement.

One piece of evidence for this is as follows. It has often been considered, since Vergnaud's letter to Chomsky and Lasnik, that the driving factor for raising-to-object constructions is Case assignment, and all nouns need Case. The distribution of DPs appears to be restricted:

(171) We are sure [$_{CP}$ that the world is round] vs. *[$_{DP}$ the world's roundness].

Under Case-driven accounts of raising-to-object constructions, the subject of the nonfinite clause in

(**??**) is not able to get Case in its base-generated position, so it needs to move up, perhaps to Spec,VP of the matrix verb. There, it is assigned accusative Case. A similar line of reasoning drives the assigning of nominative Case to the matrix subject in raising-to-subject constructions in (**??**). In (193a)-(172f), we see that elements which cannot assign Case lead to unacceptability:

(172) a. Caitlin believes him$_i$ [t$_i$ to be smart]. *raising-to-object*

b. Caitlin$_i$ seems [t$_i$ to be smart]. *raising-to-subject*

c. * It seems Caitlin to have solved the problem. *unaccusative matrix verb*

d. * It was believed Caitlin to speak Irish well. *passive matrix verb*

e. * Caitlin is aware Madeline to be the cutest. *adjective*

f. * Caitlin's belief it to have been raining. *noun*

But this makes an incorrect prediction. If elements like CPs don't need Case, we would predict structures like the ones below to be grammatical. We obtain the same contrast with CPs:

(173) a. Caitlin considers [that the world is round] to be a tragedy. *raising-to-object*

b. [That the world is round] seems to be a tragedy. *raising-to-subject*

c. * It seems [that the world is round] to be a tragedy. *unaccusative matrix verb*

d. * It was believed [that the world is round] to be a tragedy. *passive matrix verb*

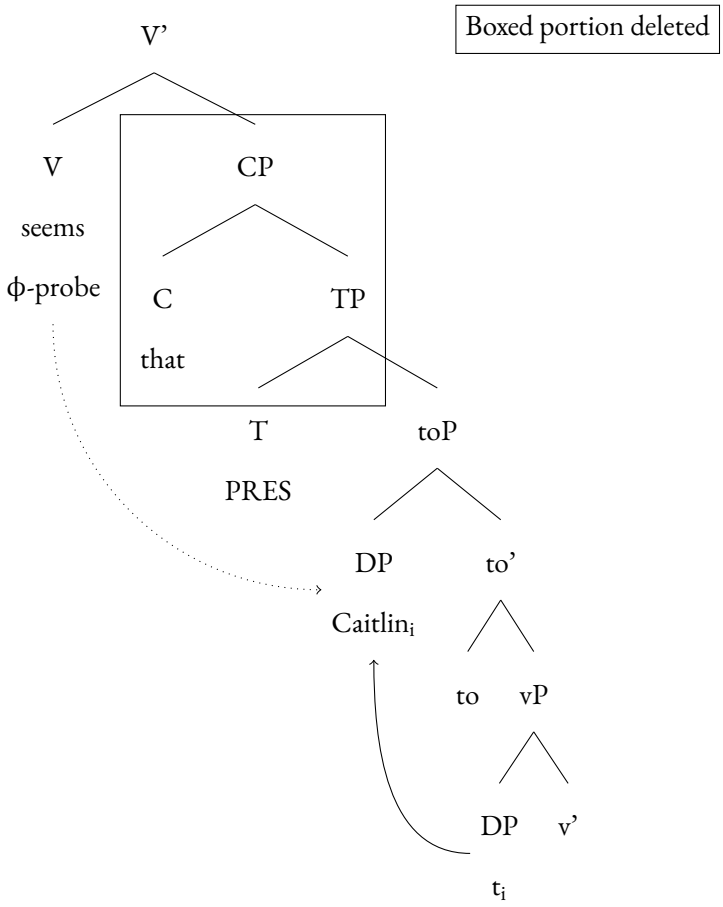
e. * Caitlin is aware [that the world is round] to be a tragedy. *adjective*

f. * Caitlin's belief [that the world is round] to have been raining. *noun*

Under Exfoliation, these examples do not follow from Case. All clauses are born finite and are reduced in structure to nonfinite via a process of subject extraction. While raising-to-object and -subject constructions allow (172a) and (172b) because they involve subject extraction, (193a)-(172f) are ruled out because they involve illegal infinivization, or subject extraction: these constructions simply do not have a subject extraction probe.

Let's see how a derivation of the sentence *Caitlin seems to be happy* would work. First, it is assumed that the embedded clause is born finite, so the embedded clause might look like *seems that Caitlin is happy* at a point in the derivation, as shown in the tree below. Further, all clauses are born with a toP, the relevance of which will be discussed shortly: it can only be pronounced post-Exfoliation.[46] Exfoliation removes structure to allow the probe on *V* to extract the subject:

(174)




The projection toP is present in all finite clauses, as well. Though it is present, to ensure that *to* is pronounced only with infinitives, Pesetsky adds a further condition–dubbed the Exposure Condition–

[46] I have not discussed several technical details in Pesetsky's proposal for space; for example, the phase property of CP moves to toP after Exfoliation, and it is assumed that the DP *Caitlin* need not move to Spec,TP immediately.

on how certain elements can be pronounced if they head a phase:

(175) **The Exposure Condition**

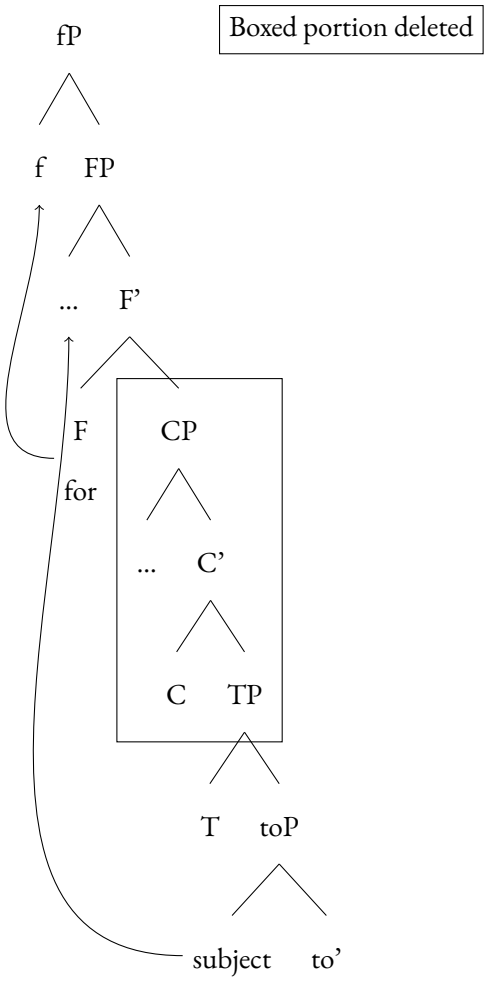
a. A is *exposed* iff it heads a phase and does not retain a specifier. (In other words, if it is the highest element in its phase.)

b. A functional head is overt iff it is exposed.

It's easy to see how derivation would apply to raising-to-subject and -object constructions. But under Exfoliation, sentences with *for*-infinitives like *Mary is eager for Caitlin to discuss the topic* involves subject extraction, as well. This seems counterintuitive given that *for* only occurs with infinitives to begin with: if infinitives are made and not born, how would *for* even come into play during a derivation? The answer is simple: *for*-infinitives have a similar syntax to raising-to-object constructions.

I will now discuss what I find to be the most controversial notion in this framework: the notion of a *superstructure*. *For* is not a complementizer, but rather an irrealis element that takes a CP as its complement. This irrealis element is contained in a superstructure that Exfoliates and allows the embedded subject to raise to a position at which *for* can assign it with accusative Case. A simplified illustration of a derivation of a for-infinitive is provided below:

(176)




To get a structure for control infinitives, we have two options. First, we can either assume Hornstein (1999)'s movement theory of control, which would have a derivation identical to that of (174), involving subject extraction in a very natural way. But if we don't assume Hornstein's theory, the subject extraction is not obvious. In that case, the derivation of a control infinitive would require a superstructure and an invisible *for*, as in (176).

Putting aside superstructures, we've seen that under Exfoliation, infinitives all come in the same size: toP, which is smaller than CP and TP but larger than vP. This is at odds with Wurmbrand & Lohninger (2019)'s (W&L) recent work which, in my view, show that infinitives can also come in

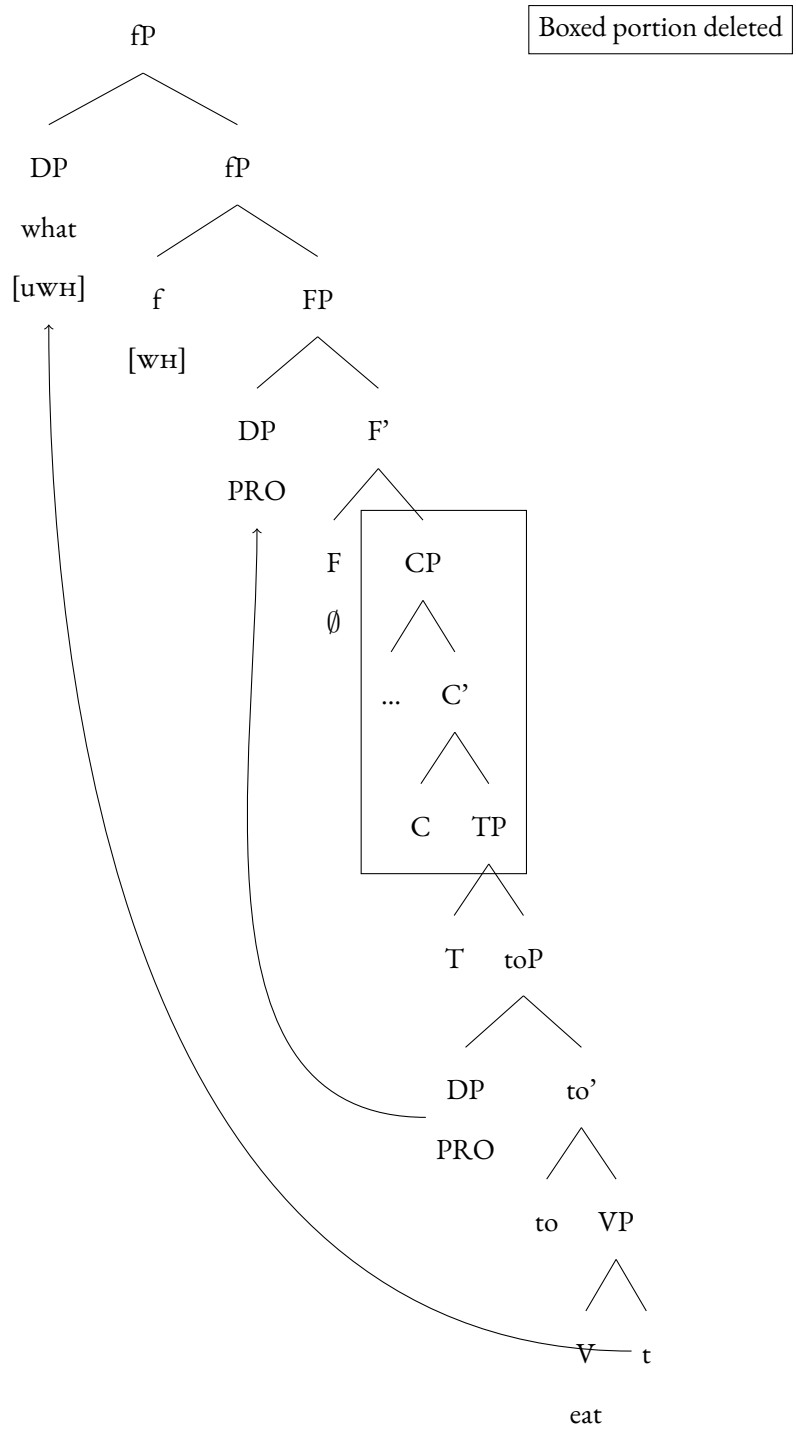
different sizes. Under Exfoliation, it is not straightforward to capture such contrasts, given that all infinitives–putting aside superstructures–are only as large as toP.

On one hand, I believe that the ISG is very straightforwardly predicted by Exfoliation. Structure removal takes place because CP2 is a barrier for syntactic operations like subject extraction. Most importantly, it provides strong empirical support for the presupposition that finiteness is a matter of clause size. As such, Exfoliation *predicts* my generalization, while other frameworks of complementation do not.

On the other, the evidence from this chapter is at odds with Pesetsky's "one-size-fits-all" approach, where all infinitives have the same size: toP, apart from the superstructure that is sometimes added. To see where this goes wrong, let us see an attempt, under the Exfoliation framework, to derive a wh-infinitive such as *I know what to eat*. In this tree, f° has a WH-feature allowing the wh-infinitive to be formed.[47]

[47] I am omitting the movement of F° to f° for simplicity. One might object that this tree violates minimality conditions on movement. See, for example, Preminger (2014) on why it does not: the probe on f° looks specifically for WH-features even if PRO is a more local DP. It can skip past PRO because PRO does not have WH-features.

(177)


Boxed portion deleted
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This sets the stage to present the first problem with the Exfoliation framework: it misses generalizations concerning the size of infinitives cross-linguistically. That is, it is not obvious under Exfoliation why wh-infinitives do not exist in languages like Hindi, German, Swedish and Icelandic, or why infinitival complementizers do not exist in Hindi and German, given that *all* of these languages have control constructions and hence, superstructures.

To account for these predictions, it seems impossible to not assume a Rizzi-style left periphery for superstructures. But at this point the superstructure has become indistinguishable from Rizzi's articulated C domain; the notion of a superstructure thus seems redundant. Crosslinguistic variation between the sizes of infinitives has to be allowed by some kind of mechanism.

### 2.6.2 Subjunctive Clauses

We now move to subjunctive clauses. The status of the finiteness of subjunctives has been perplexing for decades: they seem to both have finite (for example agreement, high complementizers) and nonfinite properties (OC PRO); see, for example, Landau (2004b). I believe that the novel approach to finiteness in this chapter could provide a new angle for understanding the finiteness of subjunctives. Empirically, it appears possible that there are at least two strategies that are attested for subjunctives crosslinguistically, summarized below:

(178) a. Potential Strategy 1: $CP_2 > \emptyset > TP$ Truncation in the middle

b. Potential Strategy 2: ~~$CP_2$~~ $> \ldots > CP_1 > TP$ Truncation at the top

But both of these strategies are extremely problematic for different reasons. Strategy 1 is problematic because it undermines the central result of the paper regarding the cartographic ordering between the elements of the left periphery in infinitives. If the left periphery could be selectively truncated, why do we not witness this in infinitives as well?[48] Strategy 2 is at an even greater disadvan-

[48] I am indebted to Jonathan Bobaljik for pointing this out.

tage. It directly contradicts the facts I present regarding subject licensing and PRO in Chapter 3, in addition to being seemingly falsified by evidence from Hebrew and Spanish. As such, I leave their precise structure for future research. Regardless, I will provide empirical tests below.

In languages like English and Hebrew, subjunctive clauses must be headed by a high complementizer, which might indicate the presence of CP2, but what is more clear is that they show truncation in the middle of the left periphery. On the other hand, in languages like Spanish, subjunctives *must* be headed by a low complementizer *que*. Here is how such an investigation might take place under this account.

Recall the following paradigm:

(179) a. *No topicalization within infinitives*: *I wanted this book, to read.

b. *No focalization within infinitives*: *I wanted THIS BOOK to read.

c. *No why-infinitives*: ??I asked Caitlin why to eat salad.

d. *No if*: *I asked Caitlin if to eat salad.

e. *No temporal adjunct*: *I asked Caitlin during dinner to eat salad.

Surprisingly, even though subjunctives are headed by a CP2 projection, most of these tests fail.

(180) a. *No topicalization within infinitives*: *I suggested that this book he read.

b. *No focalization within infinitives*: *I suggested that THIS BOOK he read.

c. *No why-infinitives*: *I suggested why she eat salad.

d. *No if*: *I suggested that if he eat ice cream (, then he exercise).

e. *No temporal adjunct*: ??I suggested that during dinner she eat salad.

This could indicate that subject licensing in English is somehow tied to the presence of a CP2 projection: PRO can be licensed with complements as small as TP or even vP (following W&L), but a

full subject which is not merely a minimal bound pronoun requires CP2, if that is indeed the right analysis of the subjunctive.[49]

Under accounts of finiteness like Bouchard (1984), Koster (1984) and Hornstein & Lightfoot (1987), and Pesetsky (2021), obligatory control (OC) is possible into clauses which are as large as IP/TP, whereas CPs block OC–the latter of which are seen as phases in today's minimalist framework. Landau (2013) considers clause size a "bogus" criterion for OC, because there seem to be cases of so-called "finite" control in languages like Hebrew and the Balkan languages. In Landau (2004b)'s example (181) from Hebrew below, Landau argues that the embedded clause is in the subjunctive mood, and headed by the high complementizer *še*. The null subject of the embedded clause must refer to *Gil*.

(181) himlacti le-Gil$_i$ še-*ec*$_{i/*k}$ yaršem la-xug le-balšanut.
I-recommended to-Gil that-ec will-register.3SG.M to-the-department to-linguistics
'I recommended to Gil to register to the linguistics department.' Landau (2004b), (p. 813)

At the time, this was a very strong argument that control complements can be as large as CP. But with the articulated left periphery that I have assumed in this paper, it might be possible to reanalyze what exactly we mean by finite control. But it is possible that these "finite" control complements are in fact truncated in the middle. As such, control ends up being nothing more than a restructuring phenomenon, for which I present arguments in Chapter 3.

Recall the pattern with NPI licensing across clause boundaries in Hebrew; matrix negation can license NPIs across infinitive and subjunctive complement clauses but not indicative ones (p. 821):

(182) a. Lo darašti me-Gil ledaber im af-exad.
not demanded.1SG from-Gil to-speak with anybody
'I didn't demand of Gil to speak to anybody.' Infinitive

[49] See Chapter 3 for more details on subject licensing with infinitives of different sizes.

b. Lo darašti me-Gil$_i$ še-pro$_i$ yedaber im af-exad.
not demanded.1SG from-Gil that-pro will-speak-3SG.M with anybody
'I didn't demand of Gil that he speak to anybody.' Subjunctive

c. * Lo he'emanti še-Gil yedaber im af-exad.
not believed.1SG that-Gil will-speak.3SG.M with anybody
'I didn't believe that Gil would speak to anybody.' Indicative

I assumed that this restructuring phenomenon was possible *because* some functional projection common to both the Hebrew infinitive and subjunctive was truncated, calling it IndP in (146b) above. And yet, what is even more puzzling is that it appears that finite control complements, such as in Hebrew, can be as large as CP2. That *še* is a high complementizer in indicative clauses can be verified with the following example from Shlonsky (2014) (p. 2), in which the topicalized or focalized constituent *Dani* follows *še*.

(183) ani xošev še et Dani$_i$ pitru t$_i$.
I think that ACC Dani, (they)-fired
'I think that Dani, they fired.' Hebrew

Tis complementizer behaves as such in subjunctive clauses as well (Ur Shlonsky, p.c.):[50]

(184) Hem$_i$ kivu še *ha-bayta* hem$_{i/k}$ yelxu t mukdam.
they hoped that home they will-go.3PL early
'They hoped that they would go home early.' Hebrew

To sum up, subjunctive complements in Hebrew involve some restructuring, despite apparently projecting a good deal of the left periphery (CP2 and TopicP). This is puzzling. Restructuring phenomena seem more common with subjunctive control complements crosslinguistically. Ewe subjunctive control complements patterns with Hebrew in terms of NPI-licensing; it is possible across subjunctive clauses headed by complementers, which have an overt PRO, as Satık (2019) argues:

(185)

[50] For independent reasons, a null subject in a subjunctive with topicalized/focalized elements is ruled out.

a.* Kofi$_i$ me-be yè$_i$ dzo o.
Kofi NEG1-COMP YÈ leave NEG2
'Kofi$_i$ didn't say that he$_i$ left.'

b. Kofi$_i$ me-be yè$_i$-a dzo o.
Kofi NEG1-COMP YÈ-POT leave NEG2
'Kofi$_i$ didn't say that he$_i$ could leave.'
Ewe

This pattern isn't limited to NPI licensing across subjunctive clauses; in line with Keine's selective opacity effects, we find that different subjunctive complements are transparent to different operations crosslinguistically. Felix (1989), for example, points out subjunctive complements in Greek are transparent to A-movement, allowing raising in addition to control; Watanabe (1993) notes the same for Romanian–in both languages, indicatives are opaque to A-movement.[51] Landau describes both of these languages as exhibiting finite control.

We've so far seen languages–English, Hebrew and potentially Ewe–in which the complementizer appears to be located in CP2. But there is reason to believe that not all subjunctives are truncated in the middle; sometimes, in Spanish, they may be truncated at the top like infinitives, as well. According to Villa-Garcia (2012), *que* in Spanish is a low complementizer in CP1, exclusively associated with the jussive or optative mood. In such a context, the topic must precede *que*:

(186) *A la fiesta* *(que) vayan
to the party that go.3PL.SUBJ
'I demand that they go to the party.'
Villa-Garcia (2012) (p. 94), Spanish

According to Villa-Garcia (2012), Spanish subjunctives can optionally have a high complementizer and an overt realization of the Top° as well–all of the form *que*. Villa-Garcia (2012) provides an example with two topics, indicating the presence of an articulated left periphery (p. 122):

[51] Alexiadou et al. (2010) argue that Greek subjunctive complements cannot be analyzed as instances of restructuring. Their evidence is based on two facts: first, event modifiers can modify the event of both the matrix and embedded clause. Second, they also claim that NPI licensing can take place across the subjunctive clause boundary, but it can also be in the matrix clause, as well. I do not find these arguments convincing: even in languages like English, the infinitive complement of *try* can be modified by an event modifier, so even if restructuring was present we would predict this to be possible. NPI licensing itself might merely be an instance of selective opacity: for example, Hebrew bans NPI licensing across indicative clause boundaries while English allows it, so this is again not surprising. Felix's observation and the fact that indicative complements do not allow raising is itself evidence for restructuring.

(187) a. Que *a tu hijo*, (que) como *va a suspender*, *(que) lo castiguen
that your son that since goes to fail that cl. punish.3PL.SUBJ
'I/somebody ordered that they punish your son, since he's going to fail (the course).'

b. [$_{CP2}$ [$_{C2'}$ que [$_{TopP}$ Topic 1 [$_{Top'}$ que [$_{TopP}$ Topic 2 [$_{Top'}$ ∅ [CP1 [C1' que ...]]]]]]]]

Although this subjunctive is highly truncated, it's not in principle impossible for it to be truncated in the middle as well. One would have to verify, for example, whether contrastive focus is possible in these constructions.

It is not clear which group Japanese subjunctives belong to, but there is evidence that they are truncated, as well, based on restructuring phenomena.[52] Uchibori (2000) extensively notes selective opacity effects in Japanese subjunctive complements, which also have been noted to exhibit finite control with some, but not all predicates. Here I will focus on the subjunctives that allow control, though the transparency effects obtain for the ones that do not as well.[53]

Crucially, though, Uchibori's solution is to posit that although subjunctives in Japanese are CPs, the C head is not a strong phase. It would be possible to get Uchibori's result, however, under a Rizzi-style framework, if we assume that the subjunctive complementizers are low complementizers in CP1 and the phasal CP2 has been truncated–or perhaps some truncation in the middle, as in Hebrew. Here is the data Uchibori discusses to come to this conclusion. Uchibori notes that scrambling out of subjunctive complements can remedy WCO violations (188a), but not out of an indicative complement (188b) (p. 221-222):

(188) a. Daremo$_i$-o [[soitsu$_i$-no hahayoya]-ga [iinkai$_k$-ni e$_k$ t$_i$
everyone-ACC guy-GEN mother-NOM committee-DAT

[52] It is not clear whether the term "subjunctive" is appropriate for these clauses, given that traditional Japanese grammars describe Japanese as not having a subjunctive. Uchibori repurposes the term "subjunctive" for clauses which show more transparency and have certain semantic properties like defeicient tense. I refer the reader there for further details on his arguments.

[53] All of these examples involve clauses with the subjunctive marker *yooni-* which are distinct from the clauses that allow hyperraising in Japanese, which also only allow A'-scrambling. See Tanaka (2004) and Wurmbrand (2019) for further details.

suisensu-ru-yoo(-ni(-to))] tanon-da].
recommend-NONPAST-SUBJ-COMP ask-PAST
(lit.) 'Everyone$_i$, his$_i$ mother asked the committee to recommend.'

b. * Daremo$_i$-o [[soitsu$_i$-no hahayoya]-ga [iinkai-ga $t_i$ suisensi-ta
everyone-ACC guy-GEN mother-NOM committee-NOM recommend-PAST
to] omot-ta].
COMP think-PAST
(lit.) 'Everyone$_i$, his$_i$ mother thought that the committee recommended.' Japanese

Furthermore, a quantifier scrambled out of subjunctive complements may have wide scope over other quantifiers (189a), but not out of indicative clauses (189b) (p. 219):

(189) a. Daremo-o$_i$ [dareka-ga iinkai$_j$-ni [$e_j$ $t_i$
Everyone-ACC someone-NOM committee-DAT
suisenru-ru-yoo(ni-(-to))] meiji-ta].
recommend-NONPAST-SUBJ-COMP order-PAST
'Everyone, someone ordered the committee to recommend.' ($\forall > \exists$)

b. Daremo$_i$-o [dareka-ga [John-ga $t_i$ hihansi-ta to] it-ta]
Everyone-ACC someone-NOM John-NOM criticize-PAST COMP say-PAST
(lit.) 'Everyone, someone said that John criticized.' (*$\forall > \exists$)

Finally, Uchibori notes that the reciprocal anaphor *otagai* 'each other' must be locally A-bound. Scrambling out of a subjunctive complement can license the anaphor (190a), but not out of an indicative one (190b) (p. 214):

(190) a. ? Karera$_i$-o [otagai$_i$-no sensei-ga [John$_j$-ni [$e_j$ $t_i$
them-ACC each.other-GEN teacher-NOM John-DAT
hihansu-ru-yoo(-ni(-to))] it-ta.
criticize-NONPAST-SUBJ-COMP tell-PAST
(lit.) 'Them$_i$, each other$_i$'s teacher told John to criticize.'

b. * Karera$_i$-o [otagai$_i$-no sensei-ga [John-ga $t_i$ hihans-ita to]
teacher-ACC each.other-GEN teacher-NOM John-NOM criticize-PAST COMP
it-ta.
say-PAST
(lit.) 'Them$_i$, each other's teachers said that John criticized.' Japanese

I believe that these observations from Hebrew, Ewe, Spanish and Japanese and to a lesser extent Greek and Romanian show that all control complements may be truncated in some regard. And yet, for reasons mentioned at the start of this subsection, at this time there is no satisfying analysis of subjunctive clauses. This is without a doubt a new line of research worth exploring.

## 2.7 Conclusion

This chapter has been an investigation on the size of infinitives. After laying the groundwork for this endeavor in section 2.1, section 2.2 presented evidence that the size of infinitives can vary across languages. Section 2.3 argued that finiteness is a matter of clause size, and defined finite clauses as those which are untruncated in the C domain, whereas nonfinite clauses are those which lack a CP2/ForceP layer. I have defended this approach in further detail in section 2.4 against potential objections, and presented further avenues of inquiry in section 2.5.

But much remains open for future investigation. I have not discussed the nature of imperatives like "*Catch her!*" and how they come into being. But it is natural to suppose that they are missing many functional projections, leading to a truncated structure. Indeed, there are other kinds of structures that are often associated with nonfiniteness and/or a truncated structure, like subjunctives and gerunds. It remains to be seen how this account can be extended to gerunds, which have a nominal nature, and structures like nominalized infinitives in Turkish, which I have shown are highly truncated.

One line of research that would be worth pursuing is looking at the clausal size of adjunct infinitives. Another reason why subjunctives are puzzling is because of the Russian subjunctive complementizer *čtoby*. I noted in section 2.2.2 that it is ruled out from infinitival complements entirely (191a), but it can occur in infinitives which are adjuncts (191b):

(191) a. * Ja choču [čtoby byt zdes].
I want COMP.SUBJ be.INF here
Russian

b. On$_i$ zašel v magazin [čtoby PRO$_i$ kupit' maslo].
he stopped.by to store in-order buy.INF butter
'He stopped by the store in order to buy butter.' Jung (2009), Russian

The ISG does make the correct prediction here. By definition, a complementizer can only occur in complement clauses; *čtoby* in adjuncts is not strictly speaking a complementizer. But it is still puzzling for my account of finiteness, as one would expect it to be ruled out regardless, given that finiteness is a matter of clause size. For this reason, it would be useful to look at the syntax of *čtoby* in more detail. Perhaps it has the same syntax as English *in order* in adjunct infinitives. Jung (2009) assumes a solution that is compatible with my account: *čtoby* is not a true complementizer, but rather an element that occupies a specifier position in the higher left periphery. Further evidence would help determine what the right analysis for *čtoby* is.

As the astute reader may have noticed, I have sidestepped here the issue of how to define finiteness for root clauses, creating definitions restricted to embedded clauses. However, Roberts (2000) proposes that ForceP (CP2 in our terminology) is either absent or present but inert in root declaratives. For our purposes, in order to extend the definitions in (138a)-(148b) to clauses in general, C in root clauses would have to be inert.

There are, of course, cases in which C in root clauses is not inert, however. Cruschina & Remberger (2018) discusses constructions in Romance in which a complementizer is present in root clauses, and is preceded by an adjective or an adverb, as in (192):

(192) Certo che la capito!
certain that have.3SG understand.PST.PTCP
'Of course she understood!' Cruschina & Remberger (2018) (p. 1), Italian

Prima facie, this might seem puzzling, as I have defined a complementizer as something that marks an embedded clause as a subject or object. But this can be straightforwardly extended to root clauses following Cruschina & Remberger (2018), for whom a set of projections above ForceP/CP2 encode speaker-oriented and pragmatic features such as evaluative, evidential or epistemic values.

These functional heads are then responsible for marking root declaratives as a complement in Romance, in the form of a complementizer. The existence of finite root clauses is thus not puzzling for my account, but rather amenable to explanation via my terminology.

At the very least–no matter what one thinks of the analysis of finiteness in this chapter–the goal of this chapter has been to introduce the reader to novel empirical generalizations concerning nonfinite clauses. It does not seem coincidental that the cartographic generalizations noted in this chapter appear to be attested in the vast majority, if not all, of the cases in the survey. The inability of infinitives to appear with high complementizers under the articulated C domain is a mystery worth investigating.

# 3

# An economy theory of PRO

That infinitives are *deficient* in some manner, whether syntactic or semantic, is an ubiquitous claim in the literature. In addition, the subject of control infinitives, PRO, has also been noted to be deficient in syntactic properties: nothing more than a "reference variable" according to Sigurðsson (2008) and a minimal pronoun, lacking ϕ-features entirely, according to Chomsky & Lasnik (1995), Kratzer (2009) and Landau (2015). This might lead one to suspect whether the deficiency of infinitives has something to do with the nature of PRO. My goal is to motivate this relationship: I argue that the reason PRO exists–in other words, why the subject of control infinitives is null–arises *because* its clause is syntactically and semantically deficient.

Let's start with some of the basics. The subject of an infinitive cannot in many cases be an overt NP, as in (193a) below, so PRO has often been taken to be in complementary distribution with

overt pronouns.[1] But certain embedding predicates like *believe* allow for an accusative-case marked infinitival subject as in (193b). Alternatively, the prepositional complementizer *for* can be used to allow an overt subject in the infinitive in (193c).

(193) a. Caitlin decided (*Mary/*herself) to leave. *Control*

b. Caitlin believed {Mary/herself} to be smart. *Exceptional Case Marking (ECM)*

c. Caitlin is eager for Mary to eat pizza. *Complementizer for*

The ECM/control distinction received further attention with the advent of the Minimalist program. The basic idea to account for the difference between the subject licensing of finite and nonfinite T, originating with Vergnaud (1976), was to suppose there is some kind of abstract relation between finite T and its subject. The first possibility is Case. One version of this account was first presented by Chomsky & Lasnik (1995), and developed further by Martin (1996, 2001) and Bošković (1996). These authors posited the existence of *Null Case* for the subject position of control infinitives. On the other hand, no such Case is available in the subject position of ECM infinitives. PRO is claimed to be the sole NP that can receive Null Case. The Case Filter could then be taken to regulate the distribution of all nominal phrases, even PRO.

As Bobaljik & Wurmbrand (2008) note, however, there are reasons to think that this relation is not Case. I will note three empirical issues here. First, there are multiple languages like Icelandic (Sigurðsson (1991)), Italian, Russian and Latin (Cecchetto & Oniga (2004)) in which PRO itself seems to receive detectable morphological case. I will provide a more detailed discussion of Icelandic here. Unlike English, Icelandic has so-called *quirky case* subjects, which are marked with a case other than nominative. I provide examples from Zaenen et al. (1985) in (194a)-(194b) below, who provide a great deal of evidence that quirky case-marked subjects are in fact subjects. For instance, the verb *hjálpa* 'help' governs lexical dative case on the object, and in the passive it shows up on the subject.

[1] See, for instance, Chomsky (1980, 1981), Chomsky & Lasnik (1995), Martin (1996, 2001) and Bošković (1996).

(194) a. Þeim/honum var hjálpað.
them/him.DAT was.SG helped
'They/He were/was helped.'

b. Ég hjálpaði honum.
I.NOM helped him.DAT
'I helped them.' Zaenen et al. (1985) (p. 96-99), Icelandic

As such, in the Icelandic example (195), the quirky accusative case from the embedded verb resurfaces on the quantifier, which must agree with the subject (Thráinsson (2007) p. 419):

(195) María$_i$ vonast til [að PRO$_i$ vanta ekki eina$_i$ í tíma].
Mary.NOM.SG.F hopes for to lack not alone.ACC.SG..F in class
'Mary hopes not to be missing alone from class.' Thráinsson (2007) (p. 419), Icelandic

The second problem is that infinitival tense is used to predict the lack of Case on the infinitival subject. According to Stowell (1982), control infinitives typically have a future-oriented temporal interpretation while ECM infinitives typically have a simultaneous one. Future-oriented infinitives are claimed to possess PRO while simultaneous ones do not, with the exception of certain simultaneous infinitives like *claim*, to be discussed further in Chapter 4. But Bobaljik and Wurmbrand, plus Pesetsky (1992), note that infinitival tense cannot be used to determine the presence of PRO. For instance, there are control predicates like *claim* whose complement has a simultaneous interpretation.[2] The lack of Case assignment thus may not be independently predictable via the temporal interpretation of the infinitive.

Finally, it may not even be true that PRO is in complementary distribution with overt pronouns. McFadden & Sundaresan (2014) (p. 5) present evidence from languages such as Tamil, Sinhala, Modern Irish and Middle English which have clauses that are clearly nonfinite–that lack tense and agreement–yet allow subjects to be licensed, as in (196) below. This is different from *for*-infinitives in English in that *Vasu* has nominative case-marking and there is no complementizer:

[2] See Wurmbrand (2014b) for further discussion.

(196) [**Vasu** poori porikk-a] Raman maavu vaangi-n-aan.
Vasu.NOM poori.ACC fry-INF Raman.NOM flour.ACC buy-PST-M.3SG
'Raman bought flour for Vasu to fry pooris. Tamil

In my view, explaining the distribution of PRO remains equally pressing, for two reasons. First, overt infinitival subjects in control constructions are quite marked; the vast majority of control infinitives crosslinguistically have a null subject. This correlation still has to be accounted for. Second, it turns out that virtually all of the examples in the literature which involve non-controlled but overt subjects in control infinitives involve either case- or focus-marking on the infinitival subject. This pattern also has to be explained.

I will argue that the distribution of PRO is tied to two factors: first, its semantics ensures the necessity of a pronoun that is read as a bound variable. Following Kratzer (2009)'s syntax and semantics of control infinitives, PRO is bound locally by an operator in the left periphery and interpreted as a bound variable. Its subject must therefore be a pronoun of some kind. I do take it to be a minimal pronoun (following Sigurðsson (2008), Chomsky & Lasnik (1995), Kratzer (2009) and Landau (2015)). But one additional step is needed to derive its nullness. Second, I adopt Cardinaletti & Starke (1999)'s (C&S) framework of deficient pronouns, explaining its nullness as due to a syntactic economy constraint on pronouns.

C&S show that if a more deficient form of pronoun is possible in a sentence, it must be picked out of all other larger alternatives. This is captured via an economy constraint to minimize syntactic structure. I first present evidence to show that PRO is a deficient pronoun. I then claim that PRO is syntactically the smallest possible pronoun: it is a bare NP, capable of bearing Case, that is nothing more than a variable, and such a pronoun is sufficient to get the right syntax and semantics for control. PRO is null *because* it is so deficient in features. And the possibility of the very economical PRO blocks clitics and other deficient pronouns from appearing as the subject of a control infinitive. I will end up with the following typology on the syntactic structure of the different kinds of

pronouns:[3]

(197) a. Strong pronoun: DP > FocusP > ϕP > NP

b. Weak pronoun: FocusP > ϕP > NP

c. Clitic: ϕP > NP

d. Nonfinite CP or TP PRO: NP

e. vP PRO: Ø

The relevant nominal projection in regard to the finiteness distinction is ϕP. In other words, the subject of a finite clause must have ϕ-features. Thus, PRO itself is blocked from appearing in finite clauses. As such, my account does end up assuming an abstract relation between finite T and its subject, though this relationship is not Case.

The plan is as follows. In section 3.1, I introduce the reader to Cardinaletti & Starke (1999)'s framework on the syntactic structure of deficient pronouns, and argue in section 3.2 that PRO is in fact a deficient pronoun–a mere NP. I conclude that we should not take it to be a coincidence that both control infinitives and their subject are deficient, accounting for this relationship in terms of an economy constraint. Section 3.3 presents finer-grained evidence in favor of the relationship between subject size and clause size, based on Wurmbrand & Lohninger (2019). Section 3.4 presents the analysis in further detail, addressing certain puzzles. Section 3.5 proposes a possible extension of the theory, and 3.6 concludes.

## 3.1 Deficient pronouns

My goal in this section is to introduce the reader to Cardinaletti & Starke (1999)'s seminal work on the typology of strong and deficient pronouns.[4] 3.1.1 introduces the empirical background for the

[3] vP PRO is not strictly speaking a pronoun; it is non-existent.

[4] Although there are other accounts which separate pronouns into different classes, here I will use C&S as the foundation of this chapter. See also Corver & Delfitto (1993), Déchaine & Wiltschko (2002) and

distinction between strong and weak pronouns, while 3.1.2 provides an account.

### 3.1.1 Strong vs. deficient pronouns

As C&S note, words fall into classes. What appears to be one pronoun can end up having very different properties in different contexts. As the summary in Table 1 below demonstrates, the class of pronouns that can only have human referents can also be coordinated. There is no necessary connection between the two properties, but it persists even so. This is represented in Table 1 with Italian *loro*, *esse* and French *elles*:

| | | Only human referents | Occurs in coordination |
|---|---|---|---|
| Class 1 | *loro*, *elles*$_1$ | + | + |
| Class 2 | *esse*, *elles*$_2$ | − | − |

**Table 1:** A summary of the properties of two classes of pronouns, C&S (p. 146)

The first class of pronouns are called *strong* pronouns, whereas the second class of pronouns are called *deficient* pronouns.[5] To see some examples, in Italian, the third person plural feminine nominative pronoun splits into two distinct classes, each with its own different syntactic and semantic properties. The pronoun *esse* in (198a) cannot be coordinated, and it need not have human referents. *Loro* in (198b) can be coordinated, but it must have human referents.[6]

(198) a. **Esse** (*e quelle accanto) sono troppo alte.
3PL.FEM.NOM (and those besides) are too tall/high
'They (and those next to them) are too tall/high.'

Holmberg (2005) among others for similar syntactic analyses of pronouns. Each of these accounts have some differences but are largely similar: most importantly, for Déchaine & Wiltschko, NP pronouns cannot have bound variable readings while there is no such restriction for C&S. ϕP, however, appears to be mostly the same in all accounts: it must be bound by some antecedent. In all of these accounts D is the locus of referentiality, though the technical details differ slightly. The reader is referred to these works for further details.

[5] Deficient pronouns split into two categories: clitics and non-clitics, which are called *weak* pronouns.

[6] I have added paraphrases to C&S's examples. All mistakes are my own.

b. **Loro** (e quelle accanto) sono troppo alte.
3PL.FEM.NOM (and those besides) are too tall/high C&S (p. 145), Italian

C&S propose an analysis of French *elles* 'they' in which they separate the pronoun into two separate classes, despite the pronoun being phonetically identical in both instantiations. This pronoun behaves differently when its referent is human; in particular, the non-human reading of *elles* vanishes in coordination (199b):[7]

(199) a. Elles sont trop grandes.
They are too big

b. Elles et celles d'à côté sont trop grandes.
They and those next to are too big C&S (p. 145), French

C&S provide four tests to distinguish between strong and deficient pronouns: whether the pronoun requires a discourse antecedent; whether the pronoun can have an expletive reading; and whether the pronoun can have an impersonal reading and whether the pronoun must be human. I also add a novel test of whether the pronoun must obligatorily be read de se. Table 2 provides a summary of these tests, which I will discuss further shortly:

| Pronouns | D-antecedent | Expletive | Impersonal | Non-human? | Ob. de se reading |
|---|---|---|---|---|---|
| Strong | ✗ | ✗ | ✗ | ✗ | ✗ |
| Deficient | ✓ | ✓ | ✓ | ✓ | ✓ |

**Table 2:** A summary of the properties of strong and deficient pronouns

I will now summarize C&S's presentation of the properties of strong vs. deficient pronouns.

*Must have a D-antecedent?*: According to C&S, strong pronouns are fully independent, in that they are able to bear their own referential index. In other words, they can refer to entities that are

[7] Examples whose paraphrase can be inferred easily from the gloss will not be given a paraphrase.

not contextually salient in the discourse, nor do they need to have an antecedent in the sentence. By contrast, deficient pronouns need such an antecedent.

I present examples from French involving ostension from C&S below. A strong pronoun can easily accompany ostension, as in (200a). Although in most cases deficient pronouns cannot accompany ostension, as in (200b), this is simply because it is not sufficiently prominent in the discourse. In (200c) and (200d), *this house* and *this book*, both non-human, are sufficiently prominent in the discourse. This allows for the weak pronoun to accompany ostension (C&S p. 153-154):

(200) a. J'ai vu Marie puis je ai vu ☞elle.
I have seen Mary then I her have seen
'I saw Marie and then I saw her.'

b. * J'ai vu Marie puis je ☞l' ai vu.
I have seen Mary then I her have seen

c. Mets-toi içi et regardes cette maison. Tu ☞la vois bien maintenant?
come here and look-at this house. You it see well now
'Come here and look at this house. Do you see it well now?'

d. Mais, tu ne vois donc pas ce livre? Bien sûr que je ☞le vois.
but, you don't see therefore not this book of course that I it see
'But, don't you see this book? Of course I see it.' French

*Can be expletive?* Expletive constructions require personal pronouns to be deficient. Strong pronouns can never be present in such positions:

(201) a. Il pleut.
he rains
'It is raining.'

b. * Lui (il) pleut.
he (he) rains

c. Il est arrivé un grand malheur.
he is arrived a big disaster
'A great misfortune has happened.'

d. * Lui (il) est arrivé un grand malheur
he (he) is arrived a big disaster C&S (p. 154), French

*Can be impersonal?* Strong pronouns cannot be used in impersonal constructions. The deficient pronoun *on* in French can occur in an impersonal as in (202).

(202) On t' a vendu un livre pas cher.
they$_{\text{non-ref}}$/we$_{\text{ref}}$ you have sold a book not expensive
**Non-referential interpretation**: You were sold a cheap book. French, C&S (p. 155)

Whereas in (203a)-(203c), only the deficient form of the third person plural pronoun *ils* may occur. Its strong counterpart *eux* cannot. In other words, (203b)-(203c) are unacceptable if read as impersonals with a non-specific reading, but are fully acceptable with a referential reading:

(203) a. Ils m' ont vendu un livre pas cher.
they have sold a book not expensive
'They sold me a cheap book.'

b. # Eux ils m' ont vendu un livre pas cher.
they they have sold a book not expensive

c. # Eux m' ont vendu un livre pas cher.
they me have sold a book not expensive C&S (p. 155), French

*Obligatory de se reading?* This is a test that is not in C&S, but rather a more recent discovery by Patel-Grosz (2019), based on evidence from Kutchi Gujarati and Austrian Bavarian. The evidence that I would like to consider involves a little pro, which as we will see later in this section is a deficient pronoun. Patel-Grosz notes that in Kutchi Gujarati, *pro* must be read de se, even in a finite clause. Although both sentences in (204) are grammatical, the one with a null pronoun is false because it must be read de se:

(204) Context: A group of drunk election candidates watching campaign speeches on television do not recognize themselves in the broadcast. Valji and Lalji, the two confident ones, think

"I'll win," but do not recognize themselves in the broadcast. Khimji and Raj, both depressive, think "I'll lose" but are impressed by the speeches that happen to be their own and are sure "that candidate" will win.

*People who believe that they themselves will win*: everyone (de re for Khimji and Raj)

*People who believe* de se *that they will win*: only Valji and Lalji

a. Harek manas maan-e ke i jeet-se.
every man believe-3SG.PRES that he win-FUT.3SG
'Every man believes that he will win.' **T**

b. Harek manas maan-e ke (pro) jeet-se.
every man believe-3SG.PRES that pro win-FUT.3SG
'Every man believes that he will win.' **F** Patel-Grosz (2019) (p. 33), Kutchi Gujarati

With the empirical background mostly established, let us see how to account for these facts.

### 3.1.2 The syntactic structure of deficiency

The most relevant kind of example of a deficient pronoun for the purposes of this chapter is the null little pro, which we just have just briefly seen in Kutchi Gujarati, which has the semantics of a deficient pronoun. It can be an expletive (205a), impersonal (205b), non-human (205c), and it cannot denote a non-prominent discourse referent with ostension (205d).

(205) a. pro piove molto qui.
it-rains a-lot here

b. pro mi hanno venduto un libro danneggiato.
me they-have sold a book rotten

c. pro è molto costoso.
it-is very expensive

d. * ☞pro è veramente bello.
it-is very nice C&S (p. 175), Italian

Perhaps the most important fact to note in this chapter is that deficient pronouns must be picked over strong pronouns whenever there is a choice between the two in unmarked contexts. This notion goes back to Chomsky (1981), (citing J. Guéron) who dubbed it the *Avoid Pronoun Principle*. It was much broader in use, as Chomsky originally used to impose a choice of PRO over overt NPs.[8] Indeed, the weak pro must be picked over the strong *lui* when *pro* is possible, as (206a)-(206b) demonstrate:

(206) a. Gianni ha telefonato quando **pro** è arrivato a casa.
John has called when he is arrived at home
'John called when he arrived home.'

b. * Gianni ha telefonato quando lui è arrivato a casa.
John has called when he is arrived at home C&S (p. 176), Italian

Rather than Chomsky's Avoid Pronoun Principle, such facts are captured by C&S in terms of a more general economy constraint to minimize syntactic structure in a derivation, when possible. Here is a concrete example of a more general economy constraint at play. Both *egli*, the weak counterpart of *he* in Italian, and *pro* can be used in the sentences below.

(207) a. Gianni$_i$ partirá quando pro$_i$, avrá finito il lavoro.
John will.leave when pro will.have finished the work

b. Gianni$_i$ partirá quando egli$_i$, avrá finito il lavoro.
John will.leave when he will.have finished the work
'John will leave when he finishes work.' C&S (p. 198), Italian

This means that a more general economy constraint is preferable over Chomsky's *Avoid Pronoun Principle*, because as C&S note, Chomsky's principle requires that the null pronoun be chosen over

[8] To be more specific, it involved the obviation effect in subjunctive complements of desiderative and jussive predicates. One piece of data that I will not discuss in further detail in this chapter are gerunds. In gerunds, when both *his* and PRO are attested, but *his* cannot appear in gerunds where PRO is possible:

(i) John$_i$ would much prefer PRO$_{i/*j}$his$_{*i/j}$ going to the movie.

It appears that the nominal core of gerunds interacts with the economy constraint I will propose in this chapter in some way that we do not yet fully understand.

the realized one where possible.[9] In other words, whenever a smaller syntactic structure is possible, it must be chosen, and only when the smaller structure is ruled out for independent reasons is the larger, stronger structure possible.

(208) *Economy of Representations*

Minimize Structure

Before concluding, I would like to point out that deficient pronouns split into two types: weak pronouns and clitics. The main reason for this split is that clitics, when possible, are picked over weak pronouns, as C&S's data from Olang-Tirolese demonstrate. In this language, the possibility of the clitic disqualifies the weak pronoun (209a)-(209b), but when the clitic is not possible for independent reasons, the weak pronoun is then possible in (209c)-(209d).

(209) a. ...daβ z=toire isch
...that it=expensive is

b. * ...daβ es toire isch
...that it expensive is

c. * S=isch toire.
it=is expensive

d. Es isch toire.
it is expensive C&S (p. 175), Olang-Tirolese

C&S capture this contrast with the following three-way distinction in syntactic structure between strong pronouns, weak pronouns and clitics. Weak pronouns are "peeled" strong pronouns, while clitics are "peeled" weak pronouns, in the words of C&S.

(210) a. Strong pronoun: DP > FocusP > ϕP > NP

b. Weak pronoun: FocusP > ϕP > NP

c. Clitic: ϕP > NP

[9] C&S provide additional evidence against this (p. 198-199) which the reader can verify.

Strong pronouns project the full array of nominal projections, with D at the top. D is the locus of the referential index of the nominal. A nominal with a D layer is capable of bearing a referential index on its own and need not have an antecedent, whether it is in the sentence, or merely a contextually salient one. Deficient pronouns lack a D layer, and therefore need to have an antecedent.

Both weak pronouns and clitics bear ϕ-features, and this similarity is captured via the presence of ϕP in both. But the contrast between weak pronouns and clitics is captured via an additional layer in between DP and ϕP, which I call FocusP. It is the locus of prosody-related features of the nominal, such as focus and polarity (assertion or negation). C&S show that clitics are not able to bear prosody-related features, but I will not get further into this issue here.[10] We will now determine how PRO fits into the picture involving strong and weak pronouns plus clitics.

## 3.2 The size of PRO

We now have the necessary background to determine the syntactic structure of PRO. Following Landau (2013) among others, I distinguish between two types of PRO: obligatorily controlled (OC) and non-obligatorily controlled (NOC) PRO, and henceforth, when I use "PRO" I mean to refer only to OC PRO. In 3.2.1, I apply Cardinaletti & Starke (1999)'s tests to obligatorily controlled PRO, and conclude that PRO is also a deficient pronoun, but one that is even more deficient than a clitic. 3.2.2 provides a discussion of why PRO is null. 3.2.3 provides a discussion of NOC PRO; I claim it is larger than OC PRO.

[10] I refer the reader to Cardinaletti & Starke (1999) for further details on the possibility of focus-marking on weak pronouns and the contrast with clitics. *pro* is not a clitic because it is able to refer to a prominent discourse element with ostension.

### 3.2.1 PRO as a deficient pronoun

Though many authors such as Chomsky & Lasnik (1995), Sigurðsson (2008), Kratzer (2009) and Landau (2015) have claimed that PRO is a minimal pronoun, an exhaustive list of evidence to distinguish PRO from other pronouns in terms of its syntactic properties has not yet been provided in the literature. My goal here is to do so, before presenting further evidence for a relationship between clause and subject size in the next section. I will now go through the tests covered in section 3.1 one by one, presenting a summary below:

| Pronouns | D-antecedent | Expletive | Impersonal | Non-human? | Ob. de se reading |
|---|---|---|---|---|---|
| Strong | ✗ | ✗ | ✗ | ✗ | ✗ |
| Deficient | ✓ | ✓ | ✓ | ✓ | ✓ |
| PRO | ✓ | ? | ✓ | ✓ | ✓ |

**Table 3:** A summary of the properties of PRO compared with strong and deficient pronouns

*PRO must have an antecedent*: By definition, obligatorily controlled PRO must have a local antecedent.[11] The controller in (211) must be the object *Mary* and not the subject *John*:

(211) John$_i$ persuaded Mary$_j$ [PRO$_{*i/j}$ to take out the trash].

*PRO is obligatorily read de se, when it can*: It has been well-known since at least Castañeda (1966) that PRO is obligatorily interpreted *de se*. Evidence for this is given in (212), in which we see a contrast between overt pronouns, which allow a de re construal, while PRO does not. The context provided brings out a de re interpretation, meaning that Winter does not bear a de se self-acquaintance

[11] Here I am putting aside the well known counterexample to this pattern, *promise*. The reader can find helpful introductions of control as a linguistic phenomenon in Landau (2013) and Potsdam & Haddad (2017). What is important for my purposes is that PRO receives an antecedent from the next clause up, whether it is a subject or an object.

relation to the man he believes to be on fire, in this case himself. The overt pronoun *he* in (212a) can be read de re, while PRO in (212b) cannot be:

(212) Winter is very drunk and on fire. He says the man in the mirror is on fire, not realizing that it is in fact himself.

a. Winter claimed he was on fire.

b. # Winter claimed to be on fire.

*Non-human readings*: As Landau (2013)'s examples (213a)-(213c) demonstrate, OC PRO need not have a human antecedent. [12]

(213) a. This key$_i$ will serve/do [PRO$_i$ to open the door].

b. The accident$_i$ is responsible [for PRO$_i$ causing the ship to sink].

c. The transmission problem forced the car$_i$ [PRO$_i$ to stop]. Landau (2013) (p. 34)

*Impersonal readings*: Landau (2013) notes that English allows a few impersonal passives:[13]

(214) a. It was decided to move forward.

b. It was hoped to provide an accessible and more effective service.

c. It was planned to focus on certain sectors such as tourism. Landau (2013) (p. 181)

These examples likely involve an implicit impersonal pronoun that controls PRO. Now, Landau shows that such examples involve OC rather than NOC PRO. The examples below do not allow for the local agent to be skipped by PRO:

[12] Example (213c) is not such a clear case of inanimate control; it may involve raising, as the following example indicates (David Pesetsky, p.c.):

(i) The transmission problem forced there to be an interruption in our journey.

[13] Landau (2013) states that German and Dutch much more productively derive impersonal passives from subject control verbs (see p. 181 for examples, and van Urk (2013) and Wurmbrand (2021) for more details).

(215) a. * It was decided by John$_i$ [PRO$_i$ to teach him$_i$ Spanish].

b. * Mary$_i$ said that it was decided by John [PRO$_i$ to behave herself]. Landau (2013) (p. 181)

It is expected for PRO to allow impersonal readings, because impersonal pronouns do not refer to a contextually salient individual. If PRO were a strong pronoun, it would simply not be able to be controlled by an implicit impersonal pronoun.

*Expletive control*: Given that PRO must have a θ-role, we would expect expletives to be unable to serve as an antecedent for PRO, as Brody (1984) suggests. This appears to be borne out, no PRO is allowed in (216) when *there* is the controller. Another *there* is needed:

(216) There$_i$ can't be peace [without there/*PRO$_i$ being war first]. Postal (1974) (p. 35)

But Landau (2013) points out that the picture here is mixed. Chomsky (1981) notes that weather *it* can participate in control:

(217) Around here, it$_i$ always snows before [PRO$_i$ raining]. Postal (1974) (p. 161)

It is thus unclear to me what the truth is. But although it may mean that PRO differs from deficient pronouns in this regard, I do not see this as problematic, given that PRO independently requires a θ-role due to its syntactic position.

What we see from these tests is that apart from the potential lack of expletive control, PRO does have the properties of a deficient pronoun. This provides empirical evidence for the common conclusion that PRO is a minimal and deficient pronoun, and is the first step for us to come up with a recipe of why PRO exists to begin with.

I take the only property that PRO possesses to be that it is a "reference variable," as Sigurðsson (2008) suggests, in that it does nothing more than refer back to its controller.[14] Thus, I would like

[14] The reality is not so simple, however, as the discussion of exhaustive vs. partial control in the next section will demonstrate. A further distinction between two kinds of PRO will be necessary.

to propose that PRO is even smaller than a clitic, in that it does not project ϕP, which means that it does not inherently have any ϕ-features. This is perfectly in line with Kratzer and Landau's proposals in addition to C&S's account.

(218) a. Strong pronoun: DP > FocusP > ϕP > NP

b. Weak pronoun: FocusP > ϕP > NP

c. Clitic: ϕP > NP

d. PRO: NP

I assume that the nominal projections are ordered with respect to each other, so that pronouns which, for instance, skip a ϕP but are headed by D do not exist. This follows Wurmbrand (2008)'s view that structure removal or restructuring cannot skip projections.[15]

There are two reasons to associate PRO with the lack of ϕP. As is well-known, PRO does not occur in the vast majority of finite clauses.[16] One way to derive this is as follows. The subject of a finite clause must be as large as possible to satisfy finite T's need for agreement; this would rule out PRO from occurring in the subject position of most finite clauses. In addition, with the exception of inflected infinitives in certain languages, the infinitival verb surfaces without agreement in languages like English. This indicates that infinitival T does not usually participate in ϕ-agreement. These two reasons together highlight the complementary relationship between PRO and finite T. More will need to be said in section 3.4.2 before I can successfully extend C&S's theory of economy to PRO, although that will end up being the most important piece of the puzzle.

[15] This is at odds with Potential Strategy 1 regarding the structure of subjunctives in Chapter 2, which suggests some kind of truncation in the middle.

[16] This is with the exception of the phenomenon of finite control noted by Landau (2004b, 2013) in languages like Hebrew, limited to embedded clauses in the subjunctive mood which I present an account of in section 3.4.2.

### 3.2.2 Why is PRO null?

We can now determine why PRO is often, if not always, null. But before doing so, one has to consider the possibility of languages which might have an overt PRO. Many linguists have claimed that it is attested in several languages. For example, overt anaphors may occur in the subject position of a control complement in Chinese, Korean and Japanese (Yang (1985), Borer (1989), Madigan (2008a), Lee (2009)).[17] An Chinese example is seen in (219):

(219) Zhangsan$_i$ bi Lisi$_j$ [PRO$_{j/*i}$/ziji$_{j/*i}$ xie zuoye].
John force Bill PRO/self write homework
'John$_i$ forced Bill$_j$ PRO$_{j/*i}$ to do the homework.' Chinese, Madigan (2008a)

It is controversial whether such cases involve overt PRO–they may in fact be emphatic doubles as Landau (2013) suggests. Even so, it would not be wise to rule out the possibility of an overt PRO entirely, and I will not do so here. Indeed, Szabolcsi (2009) has convincingly argued that languages like Hungarian and Italian allow overt nominative subjects in unambiguously nonfinite clauses, however, as long as they are modified by a scope-bearing element like *only* or *too*. They must, therefore, be focused: this piece of information will turn out to be crucial to my analysis in section 3.4. Regardless, examples from Hungarian (220a)-(220b) (Szabolcsi (2009) p. 9-10) and Italian in (221a)-(221b) (Szabolcsi (2009) p. 28-29) are given below, of which (220b)-(221b) are raising infinitives:

(220) a. Utálok [**én** is magas lenni].
hate.1SG I.NOM too tall be.INF
'I hate it to be the case that I too am tall.'

b. El-kezdett kevesebb színésznő kapni jó kritikákat.
PFX-began.3SG fewer actress get.INF good reviews.ACC
'It began to be the case that fewer actresses were getting good reviews.' Hungarian

[17] See also McFadden & Sundaresan (2011) for the simplex reflexive in Tamil behaving as an overt PRO, and Sulemana (2018, 2021) for an overt, third person pronoun behaving as an overt PRO in Buli.

(221) a. Ogni ragazzo vuole [lavorare sodo **anche lui**].
every boy wants work.INF hard also he.NOM
'Every boy wants it to be the case that he too works hard.'

b. Non sembro [cantare **solo io** su questo nastro].
not seem.1SG sing.INF only I.NOM on this tape
'It doesn't seem to be the case that only I am singing on this tape.' Italian

Szabolcsi provides evidence that the subject is located in the embedded clause and has not moved up to the matrix clause. For instance, the only interpretation of (221b) is the one in which *only* scopes below *seem*, which she takes to indicate that it has not raised to become the subject of the matrix clause. Szabolcsi provides further evidence from intonation, binding and word-order, ruling out the possibility that it is an emphatic double. Her data and its relevance to the economy theory of PRO will be discussed in further detail in 3.4.3, once some more preliminaries regarding clause size are established.

One piece of evidence for my account is provided by Sulemana (2021), who argues that the Niger-Congo language Bùlì has an overt PRO, and can only be instantiated by the *deficient* third person pronoun *wà*. Crucially, its strong counterpart, *wá*, cannot be present in this construction. This is precisely as C&S's economy constraint predicts: if an overt pronoun is possible in the infinitival subject position at all, it must be the weaker counterpart. An overt pronoun is required in this construction, and it must be the weak one:

(222) a. Asouk sàik *((wà$_i$)/(*wá$_i$)) dà gbáŋ
Asouk agree 3SG buy book
'Asouk agreed to buy a book.' Sulemana (2021) (p. 75), Bùlì

It thus appears that there is simply an overwhelming correlation for the nullness of PRO, but it may not necessarily be the case. To understand why this might be the case, it might be worthwhile to take a look at little pro.

Little *pro* is structurally and referentially deficient. But weak pronouns need not be null; overt

pronouns can also be deficient. Both *egli*, the weak counterpart of *he* in Italian, and *pro* can be used in the sentences below, indicating that they have the same syntactic structure as they are economically equal.

(223) a. Gianni$_i$ partirá quando pro$_i$, avrá finito il lavoro.
John will.leave when pro will.have finished the work
'John will leave when he finishes work.'

b. Gianni$_i$ partirá quando egli$_i$, avrá finito il lavoro.
John will.leave when he will.have finished the work
'John will leave when he finishes work.' C&S (p. 198), Italian

To summarize, it appears that the empirical picture is thus: strong pronouns can never be null; weak pronouns can but need not be, depending on the language; finally, a highly deficient pronoun like PRO must often, if not always, be null. It appears that there is an inverse correlation between the strength of a pronoun and its phonetic overtness: the weaker a pronoun is, the more likely it is to be null. I simply build on C&S's notion of phonological strength by adding PRO as an extreme case involving phonological weakness. PRO, being even more truncated than *pro* and lacking even ϕ-features, will simply not be pronounced. To attempt to capture this correlation, I propose a PF-level generalization as follows:

(224) *Pronunciation Generalization on Pronouns*

Pronouns without ϕ-features are not pronounced.

This analysis shares the core insight of Livitz (2011), who also argues that the silence of PRO also follows from its featural makeup.[18] But I would like to emphasize that my generalization in (224) is not overly strict, so exceptions can be made.

[18] For Livitz, PRO is a ϕP rather than an NP, but it has unvalued ϕ-features. PRO, as a consequence of this, must enter into an Agree relation to value these features. But for Livitz, PRO in such a relation can only be a *defective goal*, in that its ϕ-features are a proper subset of its probe. As a consequence, it is treated like a lower Copy and is not pronounced. The reader is referred to Livitz (2011) for more details.

Languages with overt PRO are handled in two different ways. First, if simplex anaphors like in Chinese truly can be an overt PRO, then these would simply be languages in which the overt simplex anaphor can be the same size as PRO and ϕ-featureless: NP. After all, OC PRO is just an anaphor that occurs in control complements. Alternatively, in languages like Bùlì, the weak pronoun–the other most economical alternative–can be used as an elsewhere condition when a null PRO is not available for use.

So it is not surprising that PRO is null in the vast majority of languages, and this correlation is something that my account of PRO being a bare NP–a mere reference variable–is able to capture. Given the strong correlation, my theory leaves room for language variation, unlike preceding accounts of the nullness of PRO such as the Null Case theory.

But it is not the case that PRO must occur in all infinitives crosslinguistically. As we will see in the following section, this is a matter of variation. I will claim in Tamil and Greek, for instance, that PRO is attested only in the smallest vP-infinitives, and not in the larger TP infinitives. But what is ultimately the case is that all languages obey an *implicational hierarchy* of subject size with regards to clause size. This is given below:

(225) *Implicational Hierarchy for Subject Size and Clause Size*
For any clauses XP and YP where XP is larger than YP:
The maximal subject size of XP must be greater than or equal in size to the maximal subject size of YP.

For instance, a vP infinitive in any language will never allow a larger subject than what is allowed in a TP infinitive. And this is the case in Tamil and Greek. This will help me determine whether there is a finer relationship between subject and clause size. That is, if infinitives do come in different sizes like CP, TP and vP as Wurmbrand & Lohninger (2019) alleges, we would expect larger subjects to be possible in larger infinitives, and smaller subjects to be possible in smaller infinitives. Such

patterns appear to be attested, as we will soon see.

Although in this subsection I have proposed an explanation of why PRO is null, I have not yet provided an explanation for why PRO can only occur in the environment that it occurs in: the subject position of control infinitives and, in some languages, finite clauses in the subjunctive mood. This will be answered in section 3.4.

### 3.2.3 The size of non-obligatorily controlled PRO

Before concluding this section, I would like to provide a discussion of NOC PRO. Its properties have not been fully investigated thus far in the literature, but it appears to behave more like a strong pronoun than a weak pronoun, at least at first glance. Table 4 presents a preliminary empirical summary of the properties of NOC PRO, though I will float the possibility that it is in fact a variant of PRO that is obligatorily controlled by a logophoric center.[19]

| Pronouns | D-antecedent | Expletive | Impersonal | Non-human? | Ob. de se reading |
|---|---|---|---|---|---|
| Strong | ✗ | ✗ | ✗ | ✗ | ✗ |
| Deficient | ✓ | ✓ | ✓ | ✓ | ✓ |
| OC PRO | ✓ | ? | ✓ | ✓ | ✓ |
| NOC PRO | ? | ✗ | ? | ✗ | ✗ |

**Table 4:** A summary of the properties of OC PRO, NOC PRO, strong and deficient pronouns

[19] I have put a question mark on whether NOC PRO can have impersonal readings. Many linguists have taken for granted Bresnan (1982)'s conclusion that subject control verbs cannot be passivized, which she dubbed *Visser's Generalization*, and assumed that PRO in impersonal passives is in fact NOC PRO. However, Landau (2013) gives reasons to believe that at least some of the examples in this case in fact involve OC PRO; the same reasons we discussed in (215a)-(215b) above. It is likely it cannot have impersonal readings, like other strong pronouns, but given the lack of certainty I leave it open.

As we will see, it is somewhat controversial whether NOC PRO requires a local antecedent or not; by definition one could say it does not. What is more clear is that it only allows [+human] interpretations, as Chomsky (1981) shows in (226a)-(226b) below. This precludes it from being an expletive. Note that in (226a), the only possible interpretation involves people possibly rolling down a certain hill. In addition, (226b) does not allow PRO, because it is a NOC context and it is not possible for people to snow.

(226) a. It is possible [$PRO_{arb}$ to roll down the hill].
cf. It is possible [for the rocks to roll down the hill].

b. * [PRO to snow all day] would be a nuisance.
cf. For it to snow all day would be a nuisance. Chomsky (1981) (p. 324-327)

The reason why NOC PRO must be human is because it is in fact a logophor, which means that its antecedent is picked on the basis of a mental perspective. The logophoricity of NOC PRO was first noted by Kuno (1975), but it has been defended by others since, such as Landau (1999, 2013). Before looking at infinitives, let us first look at picture-NPs. Notice that in the examples below, no purely syntactic analysis can explain the following contrast, which differ in the preposition used (*to* vs. *about*).

(227) a. John said to Mary that there was a picture of herself with a Mafia figure in the newspaper.

b. * John said about Mary that there was a picture of herself with a Mafia figure in the newspaper.

This means that the antecedent must be one of a few things, according to Sells (1987): the source of the attitude report, the person with respect to whose consciousness the attitude report is being made, or the person from whose perspective the report is made. What happens in the examples above is that the preposition illicitly shifts the perspectival center from *Mary* in (227a) to *John* in

(227b), which is not possible: the perspectival center must be *Mary*. In other words, the logophoric antecedent must be the subject or object of a verb of communication such as *tell* or *hear*, a psychological predicate such as *anger* or *please*, or a mental verb such as *think*.

A similar contrast is observed with infinitives. The subject of *prepare* can be controlled by the goal of *say* but not its source, so *Mary* is again the only possible perspectival center.

(228) a. John said to Mary that it would be easy to prepare herself for the exam.

b. * John said about Mary that it would be easy to prepare herself for the exam.

And it need not be read de se, in Landau (2013)'s following context-sentence pair. Consider a context in which John's computer was hacked and secret files taken. John does not know it was his computer that was hacked. During an urgent meeting to discuss what happened, John says that whoever was stupid enough to get their computer hacked should be punished severely. Landau notes that (229a) is false but (315b) may be true (Landau (2013) p. 234):

(229) a. $\text{John}_i$ insists on [$\text{PRO}_i$ being punished]. only de se - False

b. $\text{John}_i$ insists that [$\text{PRO}_i$ being punished] will prevent future hacks. de re - True

What is the status of NOC PRO? Is it a strong pronoun? There is reason to believe that it might in fact be an instance of OC PRO, but obligatorily bound by an implicit but contextually salient binder, as Lebeaux (1984), Epstein (1984) and Bhatt & Izvorski (1998) suggest. While these accounts differ in the technical details, all of them share the same general idea. The controller of $\text{PRO}_{\text{arb}}$ might in fact be a covert, implicit argument (ImpA in (230) below), like the argument of *fun* in (230).[20]

[20] But Kawasaki (1993)'s example in (i) shows the difficulty in identifying an antecedent for all occurrences of PRO. In (i), the "implicit" argument seems to have been made overt, and it is contextually highly unlikely for babies to be smoking.

(i) It is dangerous for babies [$\text{PRO}_{\text{arb}}$ to smoke around them].

(230) $PRO_{arb}$ to eat apples is fun (~~for~~ ImpA).

This would immediately provide an explanation as to why NOC PRO must be null. The reason it must be null is because there is technically no such thing as NOC PRO: all instances of NOC PRO are in fact OC PRO, which involve binding by a null logophor, $pro_{log}$.[21] NOC PRO's properties arise because it involves obligatory binding with a perspectival center, which is different from most instances of OC PRO, which need not be. But this null logophor is not little pro, because it has different properties from it: little *pro* need not be human, for instance. Ultimately, the data here indicate that NOC PRO is a separate animal that must be observed on its own terms in future work.

## 3.3 The fine-grained relationship between clause and subject size

This section defends the aforementioned rule in (225), repeated below.

(231) *Implicational Hierarchy for Subject Size and Clause Size*
For any clauses XP and YP where XP is larger than YP:
The maximal subject size of XP must be greater than or equal in size to the maximal subject size of YP.

We've thus far seen evidence that PRO is a deficient pronoun. But *why* is it the case that PRO appears only with a subset of infinitives? The distribution of PRO could have been otherwise, and it is in fact otherwise in languages like Tamil, at least to some degree. If infinitives truly are deficient in syntactic and semantic properties, then I do not think it is coincidental that deficient clauses also require a deficient subject. This would be exceedingly unlikely.

In this section, I provide evidence that there is a finer-grained relationship between clause and

[21] Here I am following Charnavel (2020) in assuming that all logophoric pronouns involve binding by a perspectival center, which she captures in terms of a null logophor. Assuming Charnavel's theory, in addition to Lebeaux (1984), Epstein (1984) and Bhatt & Izvorski (1998), however, in a way still leaves open the issue of *why* this implicit argument, which I analyze as $pro_{log}$, must be null.

subject size. Following Wurmbrand & Lohninger (2019) (W&L), I assume that complements can come in four sizes: vP, TP, a full CP and a truncated CP, which I call nonfinite CP, following Chapter 2. W&L provide empirical data that control complements can in fact have CP and TP layers. They propose that there are three kinds of control complements: propositional, which are CPs; situational, which can be TPs; and events, which can be vPs.

CP-complements involve those which can be assigned a truth value, while TP-complements do not. On the other hand, TP-complements have a future-irrealis reading with respect to matrix tense, whereas CP-complements are read with tense that is simultaneous to the matrix tense:

(232) a. Caitlin claimed to have been eating salad, which is true.

b. # Caitlin decided to eat salad tomorrow, which is true.

c. Caitlin decided to fly tomorrow.

d. * Caitlin claimed to be happy tomorrow.

Though the distinction between TP- and vP-complements will be discussed further in 3.3.2, one preliminary piece of evidence to distinguish between the two is given below, in which the complement of *try* cannot have a future-oriented reading.

(233) a. Yesterday, Caitlin decided to eat salad tomorrow.

b. * Yesterday, Caitlin tried to eat salad tomorrow.

In 3.3.1, I show that in two languages, Greek and Tamil, larger subjects than expected may be allowed in deficient clauses. In 3.3.2, based on evidence from Icelandic and partial control languages like English, I claim that PRO is nonexistent in vP-infinitives, which is even more economical than a minimal pronoun. 3.3.3 provides a novel argument on the relationship between clause and subject size in Serbian and Mandarin. The evidence is based on clause-internal topicalization to diagnose the size of the clausal complement, following Satık (2022b).

My findings are summarized in Table 5:[22]

| Language | Finite CP | Nonfinite CP | TP | vP |
|---|---|---|---|---|
| English | Overt NP | PC PRO | PC PRO | EC PRO |
| Greek | Overt NP | N/A | Overt NP | EC PRO |
| Tamil | Overt NP | Overt NP | Overt NP | EC PRO |
| Serbian | Overt NP | N/A | PC PRO | EC PRO |
| Mandarin | Overt NP | N/A | N/A | EC PRO |
| Icelandic | Overt NP | PC PRO | PC PRO | EC PRO |

**Table 5:** A summary of the various possible subject sizes in different complement sizes for the languages discussed in this section. An empty cell means that whether the language has that kind of a clause is undetermined. PC stands for *partial control*; EC stands for *exhaustive control*.

### 3.3.1 Languages which allow overt subjects in TP-complement clauses

Let us start with Greek, which does not have infinitives, but still has clauses of varying sizes. Wurmbrand & Lohninger (2019) notes that vP-complements in Greek (such as the complement of *begin*) involve obligatory control, as in (234a), whereas the TP-complement in (234b) allows free reference, as does the CP-complement in (234c):[23]

(234) a. Ta pedhja arxisan na trexun/*trexi.
the children began.3PL NA run.3PL/run.3SG
'The children began to run.' Roussou (2009) (p. 1816)

b. Ipa ston Kosta na figi o yios tou.
told.1SG to Kosta NA leave.3SG the son his
'I asked Kosta for his son to leave.' Terzi (1997) (p. 340)

[22] He (2020) shows that Mandarin involves a three-way distinction in terms of the combination of coreference and optionality, which I refer the reader to for more details.

[23] See Iatridou (1988), Varlokosta & Hornstein (1993), Terzi (1992, 1997) and Landau (2004b), among others, for a summary.

c. I Maria ipe oti egrapsan ena piima.
the Mary said.3SG that wrote.3PL one poem
'Mary said that they wrote a poem.' Terzi (1997) (p. 338), Greek

Here, I take obligatory control in Greek vP-complements to involve exhaustive control PRO, while the others (CP and TP) can involve a larger subjects like little *pro* (a FocusP) or full-sized nominal phrases like *his son*, as in (234b). This is different from English: it is necessary for the complementizer to license the infinitival subject by assigning it with accusative case, whereas in Greek there is no complementizer and the subject is in the nominative form.

Tamil has infinitives unlike Greek. According to McFadden & Sundaresan (2011), adjunct infinitives in Tamil freely allow overt NP subjects. I take the infinitive in (235) to be at least a TP, given that it has a future-irrealis interpretation and allows an adverbial like *tomorrow*:

(235) [**Vasu** poori porikk-a] Raman maavu vaangi-n-aan.
Vasu.NOM poori.ACC fry-INF Raman.NOM flour.ACC buy-PST-M.3SG
'Raman bought flour for Vasu to fry pooris. McFadden & Sundaresan (2011) (p. 5)

McFadden & Sundaresan (2011) (p. 17) note that only PRO is allowed as the subject of vP-infinitive like the complement of *try*, and most overt subjects are once again disallowed.[24]

(236) Raman$_i$ [PRO/taan/*Vasu saadatt.ai saappi.d.a] paa.tt.aan
Raman.NOM PRO/self.NOM/*Vasu.NOM rice.ACC eat.INF try.PST.3MSG
'Raman$_i$ tried [PRO$_i$ for himself$_i$/*for Vasu to eat the rice].' Tamil

Again, Tamil is different from English and similar to Greek, in that overt subjects are licensed in certain infinitives under W&L's framework. English allows PRO in an infinitive of any size, while Tamil and Greek only allow it in a vP-complement.

However, all of these languages have something in common. Tamil, Greek and English all obey an *implicational hierarchy*, in that a more deficient clause never allows a larger subject than that is

[24] They argue that the reflexive *taan* is an instantiation of overt PRO, exactly what we witnessed in section 3.2.2 above. The subject of the infinitive must be contrastively focused. This will be discussed in further detail in 3.4.3.

possible in a larger clause. In other words, the largest possible subject in a vP-complement will never be larger than what is possible in a TP-complement. There can be no language which allows an overt NP subject in the complement of *try* but not *decide*. The fact that such an implicational hierarchy with complements of different sizes like vP and TP is strong evidence in favor of a finer-grained relationship between subject and clause size.

### 3.3.2 Partial control and nonexistent subjects in vP-infinitives

We have seen that TP- and vP-complement clauses in Tamil and Greek have different subject licensing properties. What is remarkable is that even more familiar languages like English care about this distinction too, which we can see based on the phenomenon of partial control (PC), first noted by Wilkinson (1971) and developed further by Landau (1999).[25] Note that PRO appears to refer to a group containing the controller in (237):

(237) Mary$_i$ wanted PRO$_{i+}$ to meet at 6.

Under Wurmbrand & Lohninger (2019)'s framework, PC can only be found in infinitives as large as CP or TP, as demonstrated in the contrast below.

(238) a. The department chair wanted to gather at 6.

b. * The department chair tried to gather at 6.

Control with a predicate like *try* is referred to as exhaustive control (EC). Could it be possible that PRO in (237) is slightly larger than a bare NP, perhaps projecting syntactic number features? This possibility is easy to rule out, as Landau (2013) demonstrates.[26] A plural anaphor cannot be li-

[25] Wurmbrand (1998) discusses the same phenomenon, referring to it as "IMPERFect" control instead.

[26] This judgment may not be as robust as Landau states (Jonathan Bobaljik, p.c.). Consider a context in which Mary and Susan are at a party and they encounter a famous person:

(i) ?? Mary wanted to introduce themselves, but Susan didn't.

Although my judgment here is slightly improved, it is still off.

censed in the embedded clause. PC PRO must be semantically, not syntactically, plural.[27]

(239) * Mary wanted to introduce themselves.

Another key difference between PC and EC is that, as Landau (2015) points out, all partial control predicates are attitudinal, meaning that the subject of the predicate must be animate. Since EC PRO can be controlled by inanimates, this means that the obligatory de se reading test for EC PRO is invalid; only animates can entertain a *de se* belief. Furthermore, as Landau (2013) notes, the obligatory de se reading only applies to cases of PRO in which the controller's mental state is implicated by the predicate. Landau provides multiple examples of cases in which the human controller does not entertain a de se belief:

(240) John managed to avoid the draft (because he spent that decade in a coma).

(241) Mary neglected to send the payment. Landau (2013) (p. 34)

What these predicates (*neglect*, *manage*) share in common is that they are all exhaustive control predicates, as can be seen in Pearson (2016)'s comprehensive list of exhaustive and partial control predicates. As such, the obligatory de se reading is unique to partial control complements. Crucially, I take exhaustive control complements to be as large as vP, rather than TP, under the clausal size hierarchy. Regardless, this means that the table we previously saw has to be updated:

[27] On the other hand, a plural anaphor can be licensed in *split control* complements, in which PRO appears to have two controllers, as demonstrated in (i) below.

(i) $\text{Mary}_{i}$ told $\text{John}_{k}$ to introduce $\text{themselves}_{i+k}$.

I do not believe, however, that we have to assume that split control PRO possesses genuine plural ϕ-features, and would therefore be larger than PC PRO. I follow the analysis of split control by Madigan (2008b), also assumed by Landau (2015) in which PRO has a [SUM] feature as a result of receiving both AUTHOR and ADDRESSEE features. PRO is thus encoded to enter two separate binding relations: one with the matrix subject and another with the object. The details remain to be worked out, however.

| Pronouns | D-antecedent | Expletive | Impersonal | Non-human? | Ob. de se reading |
|---|---|---|---|---|---|
| Strong | ✗ | ✗ | ✗ | ✗ | ✗ |
| Deficient | ✓ | ✓ | ✓ | ✓ | ✓ |
| PC PRO | ✓ | ? | ✓ | ✗ | ✓ |
| EC PRO | ✓ | ? | ✓ | ✓ | |

**Table 6:** A comparison of the properties of partial and exhaustive control PRO.

Before presenting an analysis of the difference, I would like to present novel evidence from Icelandic in favor of a distinction between PC and EC PRO. The data concerns case concord in Icelandic control infinitives. As Sigurðsson (1991) has shown, PRO in Icelandic can be case-marked, via quirky case-marking of the subject. Though the controller bears nominative case, the quirky accusative case we would expect the subject to bear shows up on PRO in (242).

(242) María$_i$ vonast til [að **PRO$_i$** vanta ekki **eina$_i$** í tíma].
Mary.NOM.SG.FEM hopes for to lack not alone.ACC.SG.FEM in class
'Mary hopes not to be missing alone from class.' Thráinsson (2007) p. 419, Ice.

The matrix predicate of the example in (242) is *hope*, which takes TP-infinitives under W&L's framework. Therefore, one might wonder whether such case concord would still be present with the vP-complement of *try*. [28] What is surprising is that Sigurðsson (1991)'s case concord facts in Icelandic do not apply to *try*. In (243a) below, we see that (242), with *try* instead of *hope* is not acceptable in the appropriate context (Höskuldur Thráinsson, p.c.). *Eina* in (243a) must be in the nominative form as in (243b), which is *ein*.

[28] This is not possible to verify with *begin* or *continue*, whose complements have a different structure from that of *hope*. For instance, they do not have the complementizer *að*. The reader is referred to Thráinsson (2007) for further discussion.

(243) a. * María$_i$ reydni til [að **PRO$_i$** vanta ekki **eina$_i$** í tíma].
Mary.NOM.SG.FEM tried for to lack not alone.ACC.SG.FEM in class
'Mary tried not to be missing alone from class.'

b. María$_i$ reydni til [að **PRO$_i$** vanta ekki **ein$_i$** í tíma].
Mary.NOM.SG.FEM tried for to lack not alone.NOM.SG.FEM in class
'Mary tried not to be missing alone from class.'

Indeed, the following sentence paired with the appropriate context, in which *ein* is in the nominative and there is no quirky case, is much better (Höskuldur Thráinsson (p.c.)):

(244) María$_i$ reydni til [að **PRO$_i$** vera ekki **ein$_i$** fjarverandi].
Mary.NOM.SG.FEM tried for to be not alone.NOM.SG.FEM absent
'Mary tried not to be absent alone.'

These facts seem difficult to capture under a theory of control in which PRO is present in vP-infinitives. Any theory in which PRO is present at all would predict the possibility of (243a). This indicates the need for an even smaller subject than PRO–that is, a completely empty one.

How do we account for the above contrasts in English and Icelandic? I follow Wurmbrand (1998), Wurmbrand (2002) and Wurmbrand & Shimamura (2017) in assuming that PRO may be absent in the case of *try* and other vP-complements. Its control interpretation is purely semantic.[29] The semantics is based on Chierchia (1984)'s purely semantic approach to control in which control complements are properties rather than propositions; in other words, they have no subject; the subject is semantically "added on" later in the derivation. A sample of this semantics of *try* given in (245) below.

(245) *try*(P)(x) ⇒ □P(x)

whenever x tries to bring about P, then in all the contextually relevant situations (namely those where what x tries actually succeeds), x does P

[29] The reader is referred to Wurmbrand (1998) for the additional evidence in favor of this account.

Although Chierchia intended for his semantics to apply to all control complements, it cannot be extended to partial control. However, nothing prevents it from being restricted to exhaustive control contexts. This accounts for the lack of a partial control interpretation in *try*-complements because the semantics in (245) precludes it; but when a minimal pronoun PRO is present, a partial control interpretation is possible.

A final and more tentative argument in favor of the relationship between subject size and clause size, and using syntactic economy to explain the distribution of PRO is the behavior of *try* in a certain subset of native English speakers, brought to my attention by David Pesetsky (p.c.). As we will discuss in further detail in Chapter 4, *try* is commonly noted to not be a future-oriented infinitive, which would block the possibility of sentences such as the following:[30]

(246) % An hour ago, John tried to catch the plane that is leaving soon.

This sentence specifies that the matrix tense is in the past, while the embedded tense is at a time following that of the matrix tense. I have found that there are some native speakers of English who do fully accept sentences such as (246). But even for native speakers I consulted who do not accept this sentence, it is merely marginal and not fully ruled out. What this indicates is that it is possible in some contexts for the complement of *try* to be a full-fledged TP, with a future-oriented semantics and, as we will see in Chapter 4, anaphoric or *de se* tense. This is on par with the complement of *hope* or *decide*.

If this is the case, in this subset of speakers who fully accept (246), I predict that the subject of the complement of *try* is in fact PRO, rather than nonexistent. In line with my economy theory of PRO, the two native English speakers I consulted who accept such sentences also accepted partial control with *try*:

(247) % John tried to meet at 6.

[30] See Wurmbrand (2014b) and Grano (2017) among others.

What we find is fully concordant with the syntactic economy line of reasoning: the complement of *try* is normally the most deficient possible clause, a vP, and it is subjectless. But once the clause becomes a TP, we find that its subject becomes larger too. However, future research is necessary in order to fully ascertain the potential future-oriented semantics of *try* in this subset of native English speakers.

The typology of different pronouns is now thus:

(248) a. Strong pronoun: DP > FocusP > ϕP > NP

b. Weak pronoun: FocusP > ϕP > NP

c. Clitic: ϕP > NP

d. Nonfinite CP or TP PRO: NP

e. vP PRO: Ø

Though I present the analysis in further detail in section 3.4, the absence of a subject would trivially satisfy C&S's economy constraint. It would be preferable for a clause to have no subject at all, if possible, given that it is the most efficient way to minimize syntactic structure. But if it is necessary for syntactic and/or semantic reasons–for instance, to allow partial control–then the smallest possible alternative is the reference variable NP PRO.

### 3.3.3 Diagnosing clause size via topicalization in Serbian and Mandarin

Perhaps the strongest evidence in favor of a tight relationship between subject and clause size comes from Serbian and Mandarin, and the evidence for this has already been seen in 2.3, which I refer the reader to. But the generalizations that we saw were thus:

(249) a. *Serbian Generalization*:

*Da* not in C2 → PRO obligatory

*Da* in C2 → PRO not permitted, overt subjects or *pro* required

b. *Mandarin Generalization*:

*Shuo* not in C2 → PRO obligatory, restructuring permitted

*Shuo* in C2 → PRO not permitted, restructuring not permitted

Both Serbian and Mandarin therefore indicate a strong relationship between the size, or deficiency, of a clause–as diagnosed by its left-perpheral C domain properties–and the deficiency of its subject. If a clause is more deficient in size or features, its subject is expected to be, as well.

## 3.4 Analysis

With the empirical data established, I will now present the analysis in full detail. 3.4.1 introduces the reader to the semantics of control which I assume here. 3.4.2 extends C&S's notion of pronominal economy to control infinitives, arguing that it is a superior alternative to Null Case theory. 3.4.3 briefly explains how overt infinitival subjects reported in the literature are not problematic for my account, while 3.4.4 discusses the problem of inflected infinitives, discussing a possible solution via Landau's two-tier theory of control.

### 3.4.1 The syntax and semantics of control infinitives

The semantics I will provide in this section is limited to control predicates like *claim* and *decide* that take CP- or TP-complements, and not ones that take vP-complements like *try*. I take for granted Kratzer (2009)'s syntax and semantics for PRO, in which PRO is treated as a minimal pronoun and bound within the left periphery of the infinitival clause. Her semantics is based Chierchia (1990)'s theory of obligatory control.

In order to account for the necessity of the de se reading, Chierchia proposed that a sentence such as *Madeline claimed to be happy* reports Madeline's self-ascription of the property of being happy. He implemented this with an individual abstractor in the left-periphery of the embedded clause.

PRO itself is just a bound variable:

(250) Madeline wished PRO to eat wet cat food.

**LF**: Madeline wished [λx [x eat wet cat food]]

*Madeline* is the attitude holder in the sentence above, so the embedded clause is an attitude report. The infinitive expresses a property of individuals rather than a proposition. PRO is locally bound by an individual abstractor in the left periphery and not by the controller itself. An example of the lexical entry for *claim* and a derivation of *Madeline claimed to be clever* is given in (348), where (348b) is the infinitive built-up from the bottom up and (348c) is the matrix clause:

(251) a. $[\![\text{claim}]\!]^{c,g} = \lambda P_{<e,<st>>} \lambda x_e \lambda w_s . \forall <w',y> \in \textbf{claim}_{x,w}, P(y)(w')$ where $\textbf{claim}_{x,w} = \{<w',y>:$ what x claims in w is true w' and x identifies herself as y in w'$\}$

b. $[\![CP_2]\!]^{c,g} = \lambda x \lambda w.$ x is clever in w

c. $[\![CP_1]\!]^{c,g} = \lambda w. \forall <w',y> \in \textbf{claim}_{\text{Madeline,w}}$, y is clever in w'

This semantics is based on Hintikka (1969)'s semantics for attitude reports where the content of an attitude is not a set of worlds. The attitude predicate does not quantify merely over worlds; it quantifies over sets of *claim*-alternatives <w',y> such that it is compatible with the attitude holder saying she is y in w'. This semantics will ensure that a sentence in a de re scenario will end up false. This is because in the definition such as that given in (348), the attitude holder would be willing to identify refer the person in the *claim*-alternative worlds as herself.

Clause size is intimately related to the semantics of control. As W&L point out, as an embedded clause decreases in size, it becomes more and more dependent on the matrix clause in regards to both syntactic and semantic properties. Beyond the properties of a clause's subject, W&L list numerous properties to mark the independence of a clause, ranging from agreement, independent temporal interpretation, negation, syntactic domain effects and more general lack of morphosyntactic integration of the embedded verb into the matrix predicate (as determined by incorporation or

verb clustering, for instance). I take control itself to be nothing more than a dependence property; in other words, control itself is a restructuring phenomenon.

As a result of this restructuring, the embedded subject becomes more reliant on the matrix subject; the subject, PRO, must be read as a bound variable because it cannot have its own index. This necessitates the usage of the semantics of control above. But CP- and TP-infinitives at least have their own subject, given the possibility of a partial reading. On the other hand, vP-infinitives lack a subject entirely, and are completely dependent on the matrix subject for semantic interpretation. This is a fine-grained distinction in dependence properties between these clause types.

I now present Pearson (2016)'s semantics for the partial control present in CP- and TP-complements, which crucially builds on Chierchia's analysis.[31] The property that is self-ascribed in Chierchia's analysis should instead be applied to a plural individual that includes, but is not limited to, the controller. In Pearson's sentence *John expected to assemble in the hall*, John expects that some group including him would be assembling. In other words, for all of John's *expect*-alternatives y in world w', there is a z that includes y, such that the assembling in the hall is true of z in w'. Pearson's sentence is given the following semantics:

(252) $\lambda w.\ \forall <w', y> \in \textbf{expect}_{\text{John, w}} \rightarrow \exists z\,(y \leq z\ \&\ z \text{ assembles in the hall in } w')$.

As such, partial control is fully compatible with Chierchia's account.

Adopting Kratzer's account is fortuitous for multiple reasons. It is immediately able to rule out any subject of the infinitive that cannot be interpreted as a bound variable. This rules out everything from the subject position of a control infinitive apart from pronouns, which will need further explanation:

[31] Pearson's analysis is more complicated than what I am presenting here due to the need to account for the specific temporal interpretation of partial control complements (CP- and TP-infinitives), which are different than those of vP-infinitives. As such, a method to encode temporal notions in attitude reports is necessary, which Pearson includes. But this is tangenital to the concerns of my theory of PRO, so I have not included it here.

(253) * Madeline wished [the/that cat]/Caitlin to eat wet cat food.

In addition, although this upcoming solution is ultimately a stipulation, under this semantics PRO can't be an object.[32] This is because PRO must be locally bound by the abstraction operator, whereas binding of the object would be a non-local binding relation. Let's see how this would be formalized.

Heim (2002) formalizes via an uninterpretable feature [log] (short for *logophoric*) on PRO. For Heim, logophors necessarily pick out the attitude holder and only occur in the scope of an attitude predicate. The feature [log] must be checked by the abstraction operator, which bears the interpretable version of the feature [log]. The attitudinal predicate passes on [log] to PRO:

(254) $[_{CP_1}\ \lambda w_1\ [w_1$ John claimed$_{[log]}$ $[_{CP_2}\ \lambda x_{2\,[log]}\ \lambda w_3\ [w_3\ PRO_{2\,\sout{[log]}}$ to be clever]]]]

The predicate cannot skip over the more local subject PRO to bind any potential object in the embedded vP.

The existence of inanimate control does not raise a problem for Heim's account.[33] As noted in section 3.3, only exhaustive control PRO can have inanimate readings; partial control PRO cannot. In other words, there are no contexts in which inanimate control co-exists with partial control. Given that Kratzer's accounts apply *only* to contexts in which partial control is possible while exhaustive control is not, Chierchia's semantics would be used instead for inanimate control semantics. As Landau (2013) notes, a predication semantics easily derives the fact that PRO must be a subject, because the embedded clause denotes a property, in which an argument is not saturated. The unsaturated argument is merely the subject.

[32] See Landau (2013) for a summary of a discussion on whether PRO must be a subject. As he notes, the various theoretical devices used to necessitate PRO's subjecthood are mostly unprincipled.

[33] It is by definition true that logophoric pronouns cannot be inanimate, because logophoric pronouns refer to entities whose speech, thought or emotions are being reported. The reader is referred to Charnavel & Sportiche (2016) for further discussion.

However, Kratzer (2009)'s account is not sufficient on its own to derive the nullness of PRO. In the vast majority of cases, overt pronouns still cannot be present:

(255) a. * Madeline wished she to eat wet cat food.

b. * I wished I/me/myself to eat wet cat food.

*She* is a strong pronoun in English, but this fact isn't limited to strong pronouns. PRO is almost always null: languages like Italian never allow weak pronouns or clitics in the subject position of a control infinitive, either. Although Kratzer notes that PRO is a special case of local licensing by C, we can surely improve on this explanation. Why is this the case? Could it not have been otherwise? Kratzer gets us most of the way there, but one more key ingredient is needed for us to come up with a full-fledged alternative to Null Case theory. The key is syntactic economy.

### 3.4.2 Extending pronominal economy to PRO

Recall C&S's economy constraint to minimize syntactic structure in a derivation. Unless ruled out for independent reasons, the smallest possible pronominal subject must be picked in a clause.

(256) *Economy of Representations*

Minimize Structure

Mixed with the structure of the different kinds of pronouns I have thus far provided, this means that we have the following economy hierarchy for clausal subjects (257):

(257) **Economy hierarchy**:

Ø > PRO > Clitic > Weak pronoun > Strong pronoun

a. Strong pronoun: DP > FocusP > ϕP > NP

b. Weak pronoun: FocusP > ϕP > NP

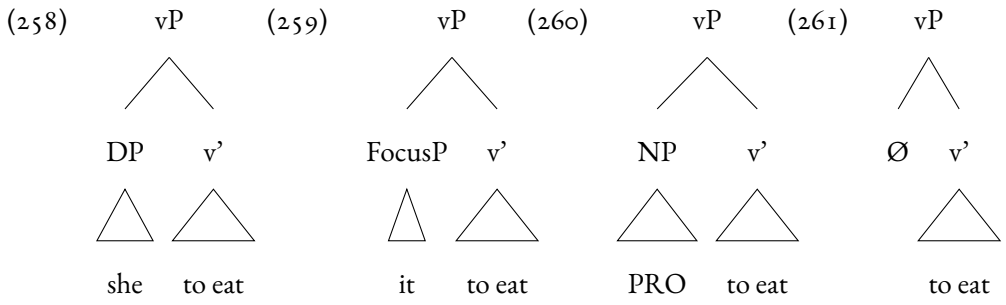
c. Clitic: ϕP > NP

d. Nonfinite CP or TP PRO: NP

e. vP PRO: Ø

Starting from the bottom, subjectless embedded clauses are possible with exhaustive control predicates like *try*. Given that a vP-complement does not need a subject to be semantically interpreted or syntactically licensed, the economy constraint is trivially satisfied. Here is an example derivation of how this economy constraint would work as applied to vP-infinitives, which lack a subject entirely. As is standard for an account that assumes economical restrictions within syntax, I propose that there are competing derivations in the workspace, and that trees are built bottom up, following the Minimalist Program proposed by Chomsky (1995).[34]

A derivation of the sentence *Mary tried to eat*, for instance, will have multiple competing structures, and the most economical one will be picked out–these possibilities are represented in (280)-(261), in order of descending subject size. Given that the semantics of the vP-complement doesn't require a subject, the most economical structure represented out of (280)-(261) is simply the one without a subject, which is (261).

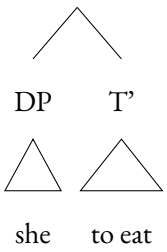



Let's now look at the subject in CP- and TP-sized infinitival complements, as in the sentence *Mary wanted to eat*. Subjectless infinitival clauses are independently ruled out from these clauses,

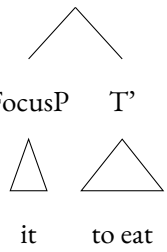
[34]See Hornstein et al. (2005) for a helpful overview of derivations involving economy in syntax.

given that partial control is possible, which can only be derived if the embedded clause has a subject of its own. A subjectless predication semantics like Chierchia's, even if modified to include a partial control reading, still would not be able to account for the obligatory de se reading of the embedded subject. As such, the smallest possible pronominal subject that would satisfy the syntax and semantics of a control infinitive is a reference variable, or in other words, PRO. But C&S's economy constraint still applies, by ruling out all other possibilities in the following derivations (262)-(264) below. The most economical derivation out of these is (264), because it has the smallest subject while still being able to satisfy the syntactic and semantic needs of its clause.

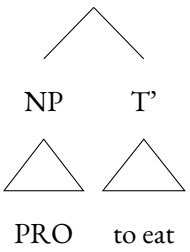
(262)




(263)




(264)




The conclusion in section 3.2.2 based on empirical evidence was that the weaker the pronoun is, the more likely it is to be null. And this is why PRO is in complementary distribution with overt pronouns; it is simply because of C&S's economy constraint. As discussed in 3.2.1, PRO is independently ruled out from the subject position of finite embedded clauses because it is not large enough to satisfy the needs of finite T. This restricts PRO to the right contexts, as desired.

One exception is the possibility of finite control in subjunctive clauses in the future tense, which is attested and surprisingly common: examples are seen in the Balkan languages, Persian, Hebrew, Spanish, Dogrib and Kannada.[35] An example of finite control from Landau (2013) is given in (265) below. Landau argues that PRO is present and not *pro* since the subject of the subjunctive clause

[35] See Landau (2004b, 2013) for a more detailed discussion on finite control.

must be read de se. It must have a sloppy reading with ellipsis, just like PRO.

(265) Rina bikša me-Gil$_i$ [še-PRO$_i$ yivdok šuv et ha-toca'ot].
Rina asked from-Gil that would.check.3SG again ACC the-results
'Rina asked Gil to double-check the results.' Landau (2013) (p. 66), Hebrew

The subject in this case must be null for the same reason as for the infinitives above. Given the obligatory de se reading and sloppy interpretation with ellipsis, the smallest possible pronoun that could satisfy this semantics is PRO. This rules out all other alternatives, such as strong pronouns, which need not be read de re and can have a strict or sloppy reading under ellipsis.[36]

Moreover, under my account, there are no restrictions on what kind of case PRO can have. As noted in the introduction, that PRO can bear case-marking in languages like Icelandic, Russian, Latin and Italian among others is troubling for Null Case theory.

(266) María$_i$ vonast til [að **PRO$_i$** vanta ekki **eina$_i$** í tíma].
Mary.NOM.SG.FEM hopes for to lack not alone.ACC.SG.FEM in class
'Mary hopes not to be missing alone from class.' Thráinsson (2007) (p. 419), Ice.

It appears to simply be a matter of language variation whether a language allows case-marking on a bare NP or not.[37] Although this is perhaps impossible to verify in English, one could imagine that it only allows full strong and weak pronouns (for example *it*) to be marked with case. On the other

[36] One could object that PRO in this case is not a minimal pronoun because there is agreement marking on the embedded verb. This is reminiscent of languages which have inflected infinitives like European Portuguese (see Landau (2013) for further discussion):

(i) La victima intentó ser transferida/??transferido
the victim.FEM tried.3SG be.INF transferred.FEM/transferred.MASC
'The victim tried to be transferred.' Davies & Dubinsky (2008) (p. 214), Spanish

Here, there are two paths I can take. I can either assume Landau (2015)'s two-tier theory of control, in which such examples involve agreement with a null little *pro* that binds PRO. This *pro* shares syntactic features with and is obligatorily bound by the controller. Alternatively, Kratzer (2009)'s own solution involves feature transmission between the controller and the controllee. Regardless, I continue to maintain that PRO is a minimal pronoun in both finite control and inflected infinitival contexts.

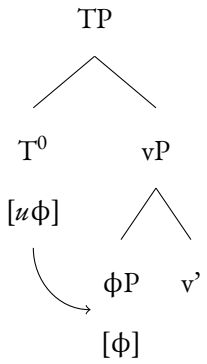
[37] Of course, it may also be the case that PRO always has Case; I am not aware of any evidence which demonstrates that PRO does not have Case in a given language.

hand, Icelandic, Russian, Latin and Italian are more permissive, allowing pronouns of any size to be case-marked. This is not problematic for my theory, given that a syntactic requirement of finite T rules out PRO from occurring in most finite clauses.

This syntactic requirement is what I will now elaborate on. In 3.2.1, I noted that the cutoff for subject size in regard to the finite-nonfinite contrast for clauses appears to be ϕP. Clitics, along with their larger counterparts, do not usually appear in the subject position of infinitival clauses. This cutoff being ϕP is supported by the strong correlation between infinitival complementation and lack of agreement in the vast majority of languages, with the exception of inflected infinitives in languages like Turkish.[38]

As such, I would like to propose that a truly non-deficient and finite T, in all languages, has a ϕ-feature requirement that needs to be satisfied.[39] I will conceive of this as a derivational time-bomb in the sense of Chomsky (2000b), schematizing it below in (267).

(267) *Derivational step for finite T*




Given that PRO does not possess ϕ-features, any derivation in which PRO is in place instead of ϕP will crash, as a result of finite T remaining unvalued. So, finite T always has ϕ, and that means finite

[38] Landau (2013) lists a number of languages with inflected infinitives, such as Turkish, Brazilian Portuguese, Basque, Hungarian and Welsh which have nonfinite complements that are inflected for agreement. This will be discussed in further detail in 3.4.4.

[39] As mentioned in Chapter 2, I am putting aside imperatives and sentences with modals, leaving them open to future research.

clauses cannot have PRO. But it doesn't entail that T with ϕ is finite.

This solution can be extended to ergative languages as well.[40] There are languages in which xistence of languages in which agreement reliably tracks morphologically unmarked case. For instance, in the Hindi-Urdu examples (268a)-(268e) below, agreement must always take place with the morphologically unmarked NP, and if one is not available (as in (268c)) it is otherwise default.[41]

(268) a. raam-ne **rotii** khaayii thii
Ram-ERG (MASC) **bread-Ø (FEM)** eat.PERF.FEM be.PST.FEM
'Ram had eaten the bread.'

b. siitaa-ne larkii-ko dekhaa
Sita-ERG (FEM) girl-ACC (FEM) see.PERF.MASC
'Sita saw the girl.'

c. **siitaa** kelaa khaatii thii
**Sita-Ø** (FEM) banana-Ø (MASC) eat.IMPERF.FEM be.PST.FEM
'Sita (habitually) ate bananas.'

d. **niina** bacce-ko ut$^{b}$aayegii
**Nina-Ø (FEM)** child-ACC lift.FUT.FEM
'Nina will pick the child up.'

e. siita-ko **larke** pasand the
Sita-DAT (FEM) **boys-Ø** like be.PST.MASC.PL
'Sita likes the boys.' Woolford (2000) (p. 10), Hindi-Urdu

In the above examples, NPs bearing an overt case marker never control agreement, regardless of whether or not the NP is a subject or object. It may initially seem that I predict any kind of subject could be licensed in Hindi-Urdu control complements, given that agreement need not take place with the subject. But this is not the case; even in ergative languages, the controllee is always the embedded transitive subject and not the object, as in the Hindi-Urdu example (269):

[40] I am indebted to Jonathan Bobaljik for bringing my attention to this.

[41] Masculine agreement is default. This means that feminine marking on the verb can be used to clearly indicate an agreement relation. In these examples, the parentheses in the gloss indicate the gender of the noun, as it is not morphologically expressed.

(269) tumhe [kyaa kar-naa] aa-taa hai
you.DAT what do-INF.M.SG come-IMPERF.M.SG be.PRES.3SG
'What do you know to do?' Keine (2020) (p. 58), Hindi

Facts such as these lead Woolford (2000) to propose that all agreement is in fact nominative agreement; there is thus no ergative agreement. Given that agreement between finite T and transitive subjects would be impossible, if we do follow Woolford (2000) then we would have to give up (267). However, adopting ergative agreement makes it possible to maintain (267).

Coon et al. (2017) argues that ergative agreement exists, at least in Ch'ol, which is an ergative language but without overt morphological case marking, unlike Hindi-Urdu. For instance, in the basic transitive vs. intransitive paradigm from Ch'ol below, we see that the transitive subject is marked with a prefix. Intransitive subjects and transitive objects are referenced by absolutive morphemes, which Coon takes to be pronominal clitics. For Coon, contra Woolford, these examples represent genuine ergative agreement. Ergative in Ch'ol is an inherent case (Coon et al. (2017) p. 364):

(270) a. Tyi **y**-il-ä-y=**ety**.
3ERG-see-TV-EP=2ABS
'She saw you.'

b. Tyi ts'ăm-i-y=**ety**.
PERF bathe-ITV-EP=2ABS
'You bathed.' Ch'ol

Coon provides further evidence of this from non-finite obligatory control constructions: to be more specific, the complement of *want*. In Ch'ol, non-finite clauses lack pre-verbal tense/aspect/mood marking. An example from Coon (2017) is provided in (271a), in which the embedded transitive appears with ergative marking, while the object surfaces as a clitic.[42] The embedded unaccusative intransitive in (271b) appears with no person or number marking (Coon et al. (2017) p. 365):

(271) a. **K**-om [**k**-mek'=ety].
1ERG-want 1ERG-hug=2ABS
'I want to hug you.'

b. **K**-om [majl-el].
1ERG-want go-NML
'I want to go.' Ch'ol

[42] Coon (2017) discusses this pattern in further detail, in addition to potential counterexamples. The reader is referred to Coon (2017) for further discussion.

Coon points out that these examples do not allow non-obligatory control. A fully finite clause–in which the embedded verb has tense, aspect and mood marking–must be used if the embedded subject does not co-refer with the matrix subject. Ch'ol thus looks remarkably like English in regards to its subject distribution in non-finite clauses despite being an ergative language.

Here is my proposal, based on the idea that genuine ergative agreement exists. In all languages, including Hindi-Urdu, finite T needs to be licensed by ϕ-agreement with its subject. However, this alone is not sufficient to satisfy the post-syntactic requirements of agreement in such languages.[43] After this licensing, another requirement is enforced: the agreement that surfaces on the verb must be from an unmarked NP. In other words, subject agreement *always* takes place in *all* ergative languages–including Hindi-Urdu–but ergative languages may have additional rules that put restrictions on the kind of agreement that can surface on the verb. I attempted to provide evidence for this possibility in the preceding discussion.

This solution does have a consequence, though in my view it is nothing more than the current standard assumption in the literature. This means that two modalities for (ergative) case assignment must be assumed. First, ergative case can be assigned as a dependent case under Marantz (1991)'s configurational approach to case assignment. It is a dependent case in the sense that it is assigned via competition with an unmarked absolutive object, which is what we witness in Hindi-Urdu. Alternatively, inherent ergative case assignment can take place via functional heads as a consequence of agreement, as Chomsky (2000b) suggests. This would be the case in Ch'ol. Coon notes that it would be difficult to tie inherent ergative agreement in Ch'ol to the assignment of dependent ergative case; doing so would require multiple unmotivated stipulations.

[43] It is easier to conceive of this requirement as a postsyntactic one in the sense of Bobaljik (2008), in which agreement is a postsyntactic phenomenon. Otherwise, it is difficult to come up with an account of why finite $T^0$ in Hindi should agree again if it has already received ϕ-features from its subject. Assuming that agreement is postsyntactic is at odds with configurational accounts of case and agreement such as Preminger (2014) and Coon (2017) in which this procedure takes place in the narrow syntax, however. I believe that my solution could ultimately be reconciled with such accounts, leaving it for future work.

Is it a problem to assume two modalities for case assignment? Although this might seem potentially superfluous for the Minimalist, recent empirical work on the nature of case and agreement, such as Baker & Vinokurova (2010) and Baker (2015), suggests that both modalities are needed. In addition, it is exceedingly unlikely that the configurational approach alone can suffice to account for *all* instances of case assignment crosslinguistically. For instance, there is no potential way for dependent accusative case to be assigned in a *for*-infinitive (e.g. *Mary is eager for* her *to please*). The accusative case here must be an inherent case, tied to the complementizer *for*.

### 3.4.3 Overt subjects in infinitives

One potentially puzzling piece of empirical data I would like to consider is the possibility of overt subjects in control infinitives. Chomsky (1980) tied the possibility of nominative Case licensing to finiteness, claiming that nonfinite T cannot assign Case, but this appears to be false. For instance, McFadden & Sundaresan (2014) provide evidence that overt subjects can occur in infinitives in Tamil, Malayalam, Sinhala, Middle English and Irish. They claim that such data undermines the correlation between subject reference and clausal finiteness. Selected examples are provided in (272a)-(273) below (McFadden & Sundaresan (2014) p. 11).

(272) a. [**Matə** teerennə issella] ləkcərekə iwərə unaa.
I.DAT understand.INF before lecture finish become.PST
'The lecture ended before I understood (it).' Sinhala

b. Ghoillfeadh se orm [**tu** me a ionsai].
would.bother it on.me you.ACC me INF attack
'It would bother me for you to attack me.' Irish

Indeed, one can even point out the existence of *for*-infinitives in languages like English as well, which allow for an overt subject to be present in the infinitive. This is distinct from the potential phenomenon of overt PRO discussed in section 3.2.2, because in these cases the overt subject is not

interpreted as a bound variable. Thus, these examples are not relevant for the theory proposed here. I do not predict (272a)-(272b) to be impossible.

More interesting is the possibility of overt pronominal subjects in control infinitives which are interpreted as bound variables, as in (274a)-(273). For instance, the Middle English example in (274a) below from McFadden & Sundaresan (2011) appears to have an overt subject in the infinitive. The subject is in the nominative and interpreted as a bound variable. However, as David Pesetsky (p.c.) has pointed out to me, it might be the case that the infinitival subject in (273) requires focus:

(273) 'That were shame unto the,' seyde sir Launcelot, '[**thou** an armed knyght to sle a
'That were shame unto you,' said sir Launcelot, you.NOM an armed knight to slay a
nakyd man by treson].'
naked man by treason.
'"That would be a disgrace on you," said Sir Lancelot, "for you, an armed knight, to slay a naked man by treason."' McFadden & Sundaresan (2014) (p. 11), Middle English

This state of affairs is robustly attested in Hungarian and Italian as Szabolcsi (2009) notes. In both Italian and Hungarian, the infinitive requires a contrastive context, and the subject must be contrastively focused. Some examples are given in (274a)-(274b) below:

(274) a. Utálok [**én** is magas lenni].
hate.1SG I.NOM too tall be.INF
'I hate it to be the case that I too am tall.' Szabolcsi (2009) (p. 10), Hungarian

b. Anche io odierei [andare solo io a Milano].
also I would.hate.1SG go.1SG only I to Milan
'$I_i$ too would hate it if only $I_i$ went to Milan.' Szabolcsi (2009) (p. 2), Italian

In Hungarian and Italian, the subject must be read de se, it must have a sloppy interpretation under ellipsis, and it must be read as a bound variable. My account correctly predicts that pronoun in such cases must be overt, given that it must at the very least be as large as a FocusP under C&S's hierarchy–only an overt pronoun can bare focus. PRO cannot be focused under the framework of pronominal subjects that I have provided in this chapter. For independent reasons, clitics and all

smaller pronouns are ruled out from this position, and only a strong or weak pronoun can satisfy the syntactic and semantic requirements of these constructions.

Is the overt subject a genuine subject in these cases, or merely an emphatic double? Szabolcsi (2009) shows that it is likely to be a genuine subject, at least in Hungarian.[44] The most straightforward argument in favor of it being a genuine subject is the fact that Hungarian already has emphatic doubles in the form of the simplex reflexive *maga*, and the personal pronoun cannot be used as an emphatic double in the same context:

(275) a. Péter maga is dolgozott.
Peter himself too worked
'Peter himself worked too.'

b. * Péter ő is dolgozott.
Peter he too worked
(Intended) 'Peter himself worked too.' Szabolcsi (2009) (p. 14), Hungarian

But this does not conclude our discussion, as Szabolcsi's observations may be used to further bolster the economy theory of PRO. In principle, given the nature of syntactic economy as a relatively weak licensing condition, I predict that it ought to be possible for vP-infinitives themselves to have subjects, as long as the subjectless alternative is ruled out for independent reasons (and the reason is not *solely* because the infinitive itself is larger, such as a TP, as we saw in the case of *try* in (246) above). For the discussion below, I will assume that the independent reason is due to emphasis of some kind, such as the presence of an emphatic double, or contrastive focus, and I show that vP-infinitives can in principle have a subject, as long as the subjectless alternative is blocked, in line with my theory of PRO.[45]

[44] The case in Italian is more problematic, for which I refer the reader to Szabolcsi (2009). In addition, Szabolcsi provides further arguments that it is not an emphatic double from facts specific to Hungarian, which I will not discuss here.

[45] Wurmbrand (2002)'s claim that some vP-infinitives do have a PRO subject while others do not is in line with this observation. However, one puzzle is the impossibility of partial control in all instances with overt subjects in vP-infinitives. To block partial control with a subject in a vP-infinitive, one possibility is to adopt

Many apparent examples of a subject in a vP-infinitive have been provided in the literature, starting with the East Asian languages. Recall that *ziji*, the simplex anaphor in Chinese, (276) can occur in the place we would expect PRO to be:

(276) Zhangsan$_i$ bi Lisi$_j$ [PRO$_{j/*i}$/ziji$_{j/*i}$ xie zuoye].
John force Bill PRO/self write homework
'John$_i$ forced Bill$_j$ PRO$_{j/*i}$ to do the homework.' Madigan (2008a), Chinese

The complement of *force* is a vP. The first possibility is that *ziji* is in fact the subject of the vP, in line with my prediction. The second, and more likely, possibility is also in line with my account. As Landau (2013) notes, *ziji* in this case may in fact be an emphatic double. But the fact that it is present at all means that it is emphasizing something; I take the only possibility to be that of a null subject PRO, which is present as the subject of the vP-infinitive.

A similar case is also seen in Tamil. As McFadden & Sundaresan (2011) (p. 17) note, only PRO or the simplex anaphoric *taan* can be the subject of the vP-infinitive in Tamil. Furthermore, *taan* is allowed only if it is contrastively focused, similar to what we have seen above.

(277) Ramani [PRO/taan/*Vasu saadatt.ai saappi.d.a] paa.tt.aan
Raman.NOM PRO/self.NOM/*Vasu.NOM rice.ACC eat.INF try.PST.3MSG
'Raman$_i$ tried [PRO$_i$ for himself$_i$/*for Vasu to eat the rice].' Tamil

McFadden & Sundaresan (2011) (p. 22) note that *taan* can be used as an emphatic marker in other contexts, suffixing to the constituent it emphasizes. If this constituent ends with a nasal sound, the initial consonant of *taan* becomes voiced, leading to *daan*. They note that *taan* can co-occur with emphatic *daan*, and argue that this indicates *taan* is not an emphatic marker.

(278) a. Raman.daan pariccai.yai erud.a paa.tt.aan
Raman.NOM.SE exam.ACC write.INF try.PST.3MSG
'Only Raman tried to write the exam.'

an idea by Pesetsky (2021), who proposes a slightly different version of my account, in which vP PRO does exist, but is of an even smaller size than CP or TP PRO. This could be captured by assuming further nominal projections: for instance, a little nP shell (for CP/TP PRO) just above NP (vP PRO).

b. Raman.daan taan pariccai.yai erud.a paa.tt.aan
Raman.NOM.SE SE.NOM exam.ACC write.INF try.PST.3MSG
'Only Raman tried for himself to write the exam.'

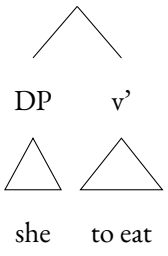
But it is plausible that *taan* in (278b) suffixes to the embedded verb and does not undergo voicing because it is located in the embedded clause rather than the matrix clause, among other possibilities. That being said, either possibility supports my account, namely that it is possible for vP-infinitives to have subjects in cases of emphasis or contrastive focus.

To make this argument even stronger, it would be useful to have an instance of a genuine overt infinitival subject in a vP-infinitive that is not an emphatic double. Szabolcsi (2009) notes that every subject control verb in Hungarian allows an overt subject within its infinitive, most of her examples involve future-oriented, or TP-sized, infinitives. But she does provide one example (p. 12) of a vP-infinitive with a genuine overt subject, with the prefixal control predicate *el-felejt* 'forget':

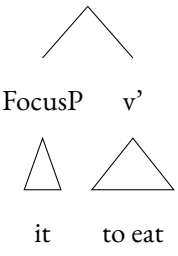
(279) Nem felejtettem el én is aláírni a levelet.
not forgot.1SG PFX I too sign.INF the letter.ACC
(Intended) 'I didn't forget to bring it about that I too sign the letter.' Hungarian

It seems likely, then, that vP-infinitives can have subjects in many different languages. In all of these cases, the subjectless structure is simply not an option due to reasons of emphasis or contrastive focus. Within the economical options presented below, the most economical choice with the smallest subject, the NP PRO, is picked:

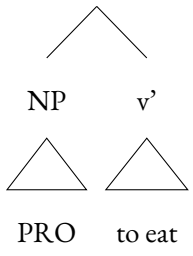
(280)




(281)




(282)



To conclude, the presence of overt infinitival subjects in focused contexts is a blessing, rather than a curse, for my theorty of PRO.

### 3.4.4 Morphosyntactic features on infinitives

In this subsection, I discuss the possibility that the syntax and semantics of control infinitives is much more complicated than the analysis proposes in this section. The problems arise due to the possibility of morphosyntactic features of the matrix subject on the infinitival construction–whether the infinitive itself possesses inflectional features of some kind, or something else. My goal here is to provide an analysis of these structures, based on Landau's (2015) two-tier theory of control. Though this complicates the analysis presented here, it does not challenge the overall picture I have thus presented regarding the relationship between clause and subject size, and the economy theory of PRO.

The existence of *inflected infinitives* raises a potential puzzle for the theory. These are infinitives that are inflected for morphosyntactic agreement. An illustrative example from Spanish is given in (**??**) below, in which the infinitive is visibly inflected for the gender features of the matrix subject.

(283) La victima intentó ser transferida/??transferido
the victim.FEM tried.3SG be.INF transferred.FEM/transferred.MASC
'The victim tried to be transferred.' Davies & Dubinsky (2008) (p. 214), Spanish

Landau (2013) lists a number of additional languages with inflected infinitives, such as Turkish, Brazilian Portuguese, Basque, Hungarian and Welsh, indicating that it is quite common.

The first question the existence of inflected infinitives raises is that the size of PRO in a sentence like (**??**) is more difficult to determine. One could assume that they arise from local agreement with the embedded subject. But I have assumed that PRO never carries ϕ-features, indicating that the morphosyntactic features of the infinitive cannot arise as a result of agreement with the embedded subject. They must come from a longer-distance relation of some kind with the matrix subject.

While this isn't necessarily problematic, it does require an analysis. Kratzer's (2009) theory of bound pronouns, couched within Chierchia's semantics of control, assumes feature transmission between the controller and the controllee at some point in PF.

As a matter of fact, there is a remarkable generalization concerning the nature of inflected infinitives which Landau (2015) notes, which implies that a Kratzer-style solution will not be necessary. Landau notes that inflected infinitival complement can only be those which are, under our terminology, non-attitudinal. In other words, they must be vPs, which I have assumed lack a subject entirely. This being the case, the existence of inflected infinitives is not problematic in the slightest, given that the embedded infinitive can participate in local agreement with the matrix subject, as there is no embedded subject that would take precedence.[46]

But even with inflected infinitives out of the way, this explanation alone is not sufficient. This transfer of morphosyntactic features from the matrix subject to the embedded verb is much more pervasive, and is visible to an extent even in English. This is illustrated by a sentence like *Caitlin tried to wash herself* where the embedded object anaphor represents the syntactic features of the matrix subject. As such, we will have to rely on an explanation involving feature transmission no matter what. Landau (2015) rightly points out that this solution is not satisfactory. As noted previously, under Chierchia's semantics of control, the binding between the controller and PRO is not direct, but rather indirect. This means that there is no *syntactic* relationship between the two: it is purely semantic. So, given that there is only a semantic relation between the controller and PRO and it is not mediated via agreement, there is no way to obtain syntactic agreement.

Here is a possible satisfying solution. Landau's (2015) approach to control intends to solve two problems: why PRO must be read de se in attitude contexts and why there is syntactic agreement between PRO and the controller. The "two-tier" theory of control is named as such because control

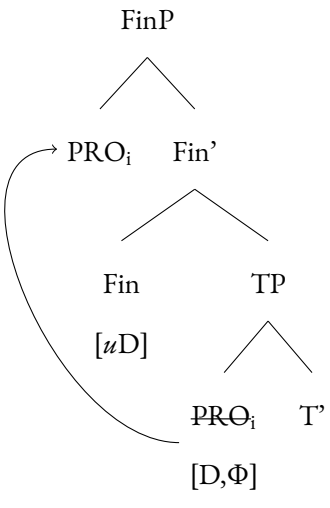
[46] Rather than T°, one would need to assume that v° can carry uninterpretable ϕ-features of its own in languages with inflected infinitives.

complements, according to Landau, divide into two types: in non-attitudinal contexts OC is a kind of predication which is made possible via movement of PRO, where PRO abstracts over the complement. The predicative head is designated as *Fin*, and an example derivation is given in (284). Under my description of control infinitives, these are just the infinitival complements which are as large as vP.

The second tier of control, for attitudinal complements, is established by logophoric anchoring, which builds on the predicative tier. This captures the intuition that partial control complements (CP or TP in size) must be attitudinal, given that PRO in these cases must be animate. Landau's basic idea is that PRO itself is bound not by the matrix controller, but by an obligatorily bound null anaphor that is itself bound by the controller. I give a simplified derivation of a sentence with logophoric control in (285) which keeps the essence of the approach.[47]

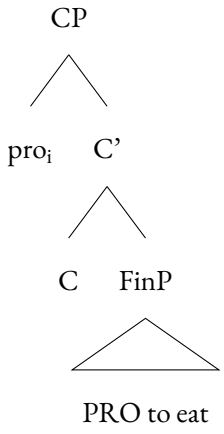
(284) *Predicative control*

John forced the car$_i$ PRO$_i$ to stop.




(285) *Logophoric control*

John$_i$ tried PRO$_i$ to eat.




[47] The null anaphor is in fact located inside a concept generator in Landau's approach, a purely semantic tool that is not relevant for our purposes. This concept generator is used to derive de se as a special kind of de re reading, rejecting Chierchia (1990)'s semantics for de se binding, following Lewis (1979), Schlenker (2005), Anand (2006), among others. Pearson (2020) proposes a preliminary syntax and semantics in which the null anaphor is present but not contained in a concept generator, which is more in line with what I have proposed here.

There are thus "two PROs" in the case of CP- and TP-control complements, as demonstrated in (285): the new $pro_x$ and the old PRO. This greatly alleviates the problem mentioned previously, because the binding relation in which PRO participates is purely syntactic, and it is bound by the null anaphor $pro_x$, which itself is obligatorily bound by the controller. I adopt this solution to solve this general problem regarding the transmission of the morphosyntactic features of the matrix controller to the infinitive in attitudinal (CP and TP) infinitival constructions.

The theory of PRO proposed in this paper proposes that there are two kinds of control, which is perfectly in line with Landau's own theory of control, despite the fact that some technical details differ. For Landau, a subject is present in the case of non-attitudinal control complements, but this is not problematic. However, there are independent purely formal semantic problems for Landau's theory which I cannot address in detail here, that may involve the theory being updated. For instance, Landau has to assume that the de se reading of PRO is a special kind of de re, which Pearson (2018) argues is not able to capture the full set of facts, leading Pearson to keep Chierchia's original theory. Yet Landau's noted problem remains; as such, work in progress by Pearson (2020) to accommodate Landau's two-tier theory of control will be useful for the purposes of my theory of PRO, as well.

## 3.5 Theoretical Applications

Before concluding, I would like to point out one more potential application of syntactic economy to infinitival subjects; in particular, it might be applied to raising constructions. One commonly held assumption is that raising is driven by Case theory, as proposed in the theory of nominal licensing by Vergnaud (1976). It is claimed that CPs don't need to be assigned Case, so they are licit in positions which don't have any Case assignment. A Case Filter-based explanation is often provided for the possibility of ECM-constructions. This yields contrasts like the ones below, in which (c)-(f)

are infelicitous due to the impossibility of Case assignment.

(286) a. Sue considers Mary to have solved the problem. *ECM*

b. Mary seems to speak French well. *Raising*

c. * It seems [Mary] to have solved the problem. *Unaccusative matrix V*

d. * It was believed [Mary] to speak French well. *Passive matrix V*

e. * Mary is aware [Bill] to be the best candidate. *A*

f. * Mary's belief [it] to have been raining *N*, Pesetsky (2021), p. 19

As Pesetsky (2021) notes, the standard account makes a strikingly false prediction: a non-nominal phrase like a CP should be acceptable in all of the bracketed positions. But it turns out that CP subjects have the same distribution as nominal phrases:

(287) a. Sue considers [that the world is round] to be a tragedy. *ECM*

b. [That the world is round] seems to be a tragedy. *Raising*

c. * It seems [that the world is round] to be a tragedy. *Unaccusative matrix V*

d. * It was believed [that the world is round] to be a tragedy. *Passive matrix V*

e. * Mary is aware [that the world is round] to be a tragedy. *A*

f. * Mary's belief [that the world is round] to be a tragedy. *N*, Pesetsky (2021), p. 19

The puzzle for the classical explanation is not limited to clausal subjects. Pesetsky points out that every type of constituent that can function as a subject in English has the same pattern as in (287) above: PPs (e.g. *in this room*) and expletives, for instance. This means that the original Case-based solution for ECM constructions is not sufficient: what explains the infelicitousness of (286c)-(286f) and (287c)-(287f)? We need to start from scratch. This leads Pesetsky to propose the Exfoliation framework for the derivation of infinitives, which we previously discussed in 2.6.1.

The theory of subject economy in this chapter could have applications to this puzzle as well. C&S's economy constraint only applies to pronouns. But suppose one stipulated, or somehow showed, that C&S's economy constraint applies to any subject, and not just pronouns, in the infinitival subject position. This would be an alternative, and relatively simple solution, of Pesetsky's puzzle, given that Movement would allow for a way to escape the economy constraint. In both cases (286c)-(286f) and (287c)-(287f), both DPs and CPs would be simply too large to stay in the infinitival subject position, and would have to move for the sake of syntactic economy.

## 3.6 Conclusion

To conclude, this chapter has presented a novel analysis of the distribution of PRO. I first showed that PRO ought to empirically be classified as a pronoun even more deficient than weak pronouns and clitics–at the very most, an NP without ϕ-features. I then showed that there is a finer-grained relationship between the different sizes an infinitive can be and their subjects. But all languages obey an implicational hierarchy, in that more deficient clauses never allow a larger subject than that is possible in a larger clause.

In order to explain why PRO is (almost always) null, I adopted C&S's notion of the syntactic economy of pronouns. I claimed that the smallest possible pronoun that can be read as a bound variable is one that is null. PRO is independently ruled out in finite clauses because it lacks the features to satisfy the needs of finite T. But nonfinite T has no such requirements, so it is economically preferable. This is able to straightforwardly derive the complementary distribution between PRO and overt pronouns in control infinitives.

# 4

# The semantics of infinitival tense

A thorny issue in the literature, which has become even more vexing recently, is whether infinitives have tense. Owing to the lack of tense morphology, infinitives in English were classified as tenseless by traditional grammars. But appearances can be deceiving. Stowell (1982) argued that control infinitives have a temporal interpretation that follows the matrix tense. This can be seen in a sentence like (288) below, in which Caitlin's eating of a salad must take place after Caitlin's decision to do so. This is further evidenced by the possibility of the adverbial *tomorrow*:

(288) Caitlin decided [to eat a salad (tomorrow)].

On the other hand, the temporal interpretation of exceptional case-marking (ECM) with respect to the matrix tense can range from simultaneous (289a), progressive futurate (289b) or past (289c), as

seen in the set of sentences (289a)-(289c). Their temporal specification is determined by the embedding predicate:

(289) a. Caitlin considers [herself to be the most beautiful].

b. I expect [Madeline to eat the most food].

c. I remember [Periwinkle to be the fluffiest].

Wurmbrand (2014b) provides arguments that such infinitives are tenseless, at least in some sense. Some basic arguments in favor of her account are as follows. It is well known that English PRES is indexical and must include the utterance time. This excludes a before-present interpretation (290a) and triggers a *double access* reading (290b).

(290) a. Winter decided a week ago that he will go to the party (*yesterday).

b. # 5 years ago, she claimed that she is pregnant.

The parallel infinitives in (291a) and (291b) show neither of these restrictions, which Wurmbrand (2014b), following Ogihara (1995), takes as evidence for their lack of tense.

(291) a. Winter decided a week ago to go to the party yesterday.

b. 5 years ago, she claimed to be pregnant.

The goal of this chapter is to defend the idea that infinitives are temporally deficient. But before doing so, we need to clarify what it means for a clause to be deficient in this way. I will attempt to do so based on two primary sources of evidence.

First, I provide experimental data that infinitival tense must be read de se, on a par with infinitival subjects like PRO. This was done via an experiment involving 600 native speakers of English recruited from Prolific. Second, I provide crosslinguistic data from infinitival complements in English, French and Dutch and infinitival adjuncts in Catalan, Spanish, Japanese and Korean. I thus

extend Wurmbrand's conclusion that infinitival complements are tenseless to adjuncts. I conclude that while infinitives show different properties, they all share deficiency in temporal interpretation.

I argue that a clause can be *tenseless* in one of three ways, as described in (292a)-(292c).

(292) *Three kinds of infinitival temporal deficiency*

a. *Anaphoric tense*: There is a deleted tense variable bound by a higher lambda abstractor.

b. *Tense sharing*: The matrix and embedded clauses share the same tense values.

c. *True tenselessness*: The clause is entirely temporally deficient, and its temporal interpretation is the result of an implicature.

I believe that all of these infinitives have something in common. To be precise, I argue for the following empirical and semantic generalization: **infinitives cannot bear a PAST or PRES tense.**. In other words, infinitives are necessarily deficient in tense, by their very nature.

This chapter is structured as follows. Section 4.1 provides a background to the debate on whether infinitives are tensed or tenseless and recent developments, together with some evidence from Dutch and French which Wurmbrand's account predicts. Section 4.2 provides experimental evidence in favor of Wurmbrand's account that infinitives cannot have a de re interpretation. Section 4.3 provides a crosslinguistic survey of infinitival adjuncts in English, Catalan, Spanish, Japanese and Korean all of which exhibit different kinds of tenselessness. Section 4.4 provides an analysis of the different kinds of infinitival complements and adjuncts. Section 4.5 builds on this analysis, providing a tenseless account of *have*-EN infinitives. Section 4.6 concludes, while Appendix Part B provides further details on the experiment.

## 4.1 Are infinitives tensed or tenseless?

Infinitival tense is a complex and controversial topic. It is therefore not surprising that in addition to disagreeing on whether infinitives are tensed or necessarily tenseless, linguists also disagree regarding the classification of tense within different kinds of infinitival complements. Table 1 below provides the reader with a summary of the classification of infinitival tense according to four approaches that have been proposed in the literature.

As shown in the table, however, the classification of tense is controversial, as Table 1 below demonstrates. What we find is that some authors assume that infinitives are always temporally deficient (Wurmbrand), or are never deficient (Pesetsky), or their deficiency may vary across different contexts (Landau).

**Table 1**: A comparison of four different accounts of infinitival tense. Given that Null Case theories do not have an account of tense in propositional infinitives, it has been marked with a ?.

| **Type** | **Null Case** | **Pesetsky** | **Landau** | **Wurmbrand** |
|---|---|---|---|---|
| Event (*begin)* | +tense | +tense | –tense | –tense |
| Forward expanded (*decide)* | +tense | +tense | +tense | –tense |
| Implicative (*manage)* | +tense | +tense | –tense | –tense |
| Factive (*hate)* | +tense | +tense | +tense | –tense |
| Propositional (*claim)* | +tense? | +tense | +tense | –tense |

Thus, it would be essential to provide the reader with a discussion of the different theories. Section 4.1.1 presents the Null Case approaches to infinitival tense, while 4.1.2 discusses Wurmbrand's theory in which all classes of infinitives are tenseless. Section 4.1.3 presents Pesetsky's alternative approach which is almost empirically indistinguishable. Although this section is mostly a background, I provide evidence in favor of Wurmbrand's account from two languages which have indexical PRES

tense like English: Dutch and French. Infinitives in these languages also allow a before-present interpretation and lack a double access reading, as expected.

### 4.1.1 Infinitives are tensed

Stowell (1982) was the first to refine the notion of tense in infinitives. He generalized that control infinitives like (288) were futurate with respect to matrix tense, while ECM infinitives in (289a)-(289c) were not restricted in the same way. Martin (1996) builds on Stowell's generalizations, presupposing Chomsky & Lasnik (1993)'s account of Null Case, which was an attempt to provide a principled explanation for the complementary distribution between PRO and overt elements such as pronouns and proper names. Martin notes two kinds of control infinitives, implicative (293a) and factive (293b), are not future-oriented, as seen below.

(293) a. Caitlin managed to get chocolate on her face.

b. Caitlin was surprised to get a present for Christmas.

Martin thus proposes that, rather than control infinitives necessarily being future-oriented, they just need to have some kind of modal element. This is similar to how the modal *will* can have non-future oriented meaning in certain contexts (e.g. *Winter will be sleeping right now*).

Martin (2001) provides further evidence for Stowell's generalizations, based on the impossibility of eventive complements in ECM infinitives. (294a) below is a control infinitive with an eventive reading while (294b), an ECM infinitive, is unacceptable with such a reading. (294c), however, is acceptable because it contains the aspectual marker *be*. Martin adopts Enç (1991)'s account, in which eventive predicates are bound by a modal or temporal operator to explain the difference between control infinitives, which have such an operator, and ECM infinitives, which cannot.

(294) a. Ginny remembered to bring a beer.

b. * Ginny believed Rebecca to win the game.

c. Ginny believed Rebecca to be competing at the game. Martin (2001) p. 148

Landau (1999), on the other hand, proposes that some infinitival complements are tensed and others are not. According to Landau, partial control predicates take tensed complements whereas exhaustive control predicates do not, as seen in the contrast (295a)-(295c) below.[1]

(295) a. Mary claimed to have met at 6. *propositional*

b. Mary wanted/decided/wished to meet at 6. *future-oriented irrealis*

c. * Mary tried/began/started/continued to meet at 6. *eventive*

This does not yet conclude our discussion of theories in which infinitives are tensed. After all, Pesetsky (2021) proposes such an account. But for the time being, let us consider an alternative.

### 4.1.2 Infinitives are tenseless

The theory of infinitival tense that will be assumed, and built upon, in this chapter is Wurmbrand (2014b)'s. For her, all kinds of infinitives–even the propositional infinitive with the aspectual marker *have*–are tenseless, at least in some sense.[2] I will now review several of her arguments.

If all control infinitives are futurate with respect to matrix tense, Wurmbrand notes this makes an incorrect prediction. Some of them cannot contain the adverbial *tomorrow*, while other predicates like *decide* can:

(296) a. Yesterday, Caitlin decided/wished/hoped to eat chocolate tomorrow.

b. Yesterday, Caitlin tried/began/managed to eat chocolate (*tomorrow).

[1] As Jonathan Bobaljik (p.c.) has pointed out to me, the judgment for the eventive complement is more subtle if the matrix predicate might include a silent comitative. In the right context, *Although Sue changed her meeting time with me to 5, Mary continued to meet at 6* seems to be greatly improved.

[2] Wurmbrand (2014b) and Wurmbrand & Lohninger (2019) argue that infinitival complements should be split into three types based on their different temporal interpretations. I will discuss this in detail in section 4.

Furthermore, Wurmbrand provides a counterexample for Martin (2001)'s generalization regarding ECM infinitives not allowing eventive complements: the predicate *claim*. We have seen in (295a) that *claim* is a partial control predicate. It does not allow eventive readings (297a), which I force with the adverbial *right then*. But it can have aspectual markers like *be* or *have* (297b) and be interpreted habitually (297c).

(297) a. * Caitlin claimed to eat chocolate right then.

b. Caitlin claimed to be eating chocolate/be happy.

c. Caitlin claimed to eat chocolate sometimes.

In addition, the Stowell-Martin view makes incorrect predictions regarding the presence of tense in English control infinitives more generally.

It is well-known, as noted by Enç (1987), Ogihara (1995) and Abusch (1997) among others that the English PRES is indexical.[3] This is illustrated by the *double-access* reading of (298) below, in which the embedded time must be equivalent to the utterance time. (298) is unacceptable simply because pregnancy usually lasts nine months, and the finding-out time precedes the embedded time by five years:

(298) # Five years ago, Winter found out that Mary is pregnant.

In addition, in (299) the embedded time with *will* must take place after the utterance time:

(299) Winter found out that Mary will be pregnant.

This property of *will* follows if, we assume with Abusch (1984) among others that future is not a simple tense but composed of two parts: a modal *woll* contributing posteriority and a PRES or PAST

[3] There does not appear to be a survey of languages in the literature which have indexical PRES, which would be hugely useful. I have personally determined that Dutch has indexical PRES, and Demirdache & Lungu (2011) note that French does as well. It is not the case that all Germanic and Romance languages have indexical PRES, however. German does not have an indexical PRES (Susi Wurmbrand, p.c.) and neither does Italian, according to Giorgi & Pianesi (1997). I am not aware of any other languages with indexical PRES.

tense.[4] Morphologically, PRES + *woll* is spelled out as *will*, while PAST + *woll* is spelled out as *would*. Now, notice that the finite embedded clause in (300) cannot have a before-present interpretation, due to the indexical PRES in English:

(300) Winter decided a week ago that he will go to the party (*yesterday).

At this point, Stowell-Martin approach and Wurmbrand's make distinct predictions. If infinitives are tensed, one would expect that double-access interpretations would be obtained with infinitives as well, while before-present interpretations are not allowed. Neither of these predictions are borne out: infinitives cannot be paired with double-access contexts in English (301a), and they allow before-present interpretations (301b):

(301) a. 5 years ago, she claimed to be pregnant.

b. Winter decided a week ago to go to the party yesterday.

Wurmbrand's approach makes a clear prediction in other languages which have indexical PRES and infinitives. I have verified that French and Dutch have double-access interpretations below:

(302) a. # Il-y-a cinq ans, Pierre a dit que Rose est enceinte.
ago five years, Pierre has said that Rose is pregnant
'Five years ago, Pierre said that Rose is pregnant.' French

b. # Vijf jaar geleden, zei Daniël dat Maria zwanger is.
five years ago said Daniel that Maria pregnant is
'Five years ago, Daniel said that Maria is pregnant.' Dutch

Like English, I have verified that they also lack double-access interpretations with infinitives:

(303) a. Il-y-a cinq ans, Rose a affirmé être enceinte.
ago five years, Rose has claimed be.INF pregnant
'Five years ago, Rose claimed to be pregnant.' French

b. Vijf jaar geleden, beweerde Mary zwanger te zijn.
five year ago, claimed Mary pregnant to be

[4] A semantics for *woll* is presented in 4.4.1.

'Five years ago, Mary claimed to be pregnant.' Dutch

And before-present interpretations are permitted only in infinitives in both Dutch and French.

(304) a. Rose a décidé il-y-a une semaine de faire de l'exercice hier.
Rose has decided ago one week to do of exercise yesterday
'Rose decided a week ago to exercise yesterday.' French

b. Mary besloot een week geleden om gisteren te gaan sporten.
Mary decided a week ago at yesterday to go exercise
'Mary decided a week ago to start exercising yesterday.' Dutch

One more argument in favor of this account remains. The sequence of tense (SOT) phenomenon appears to reveal that future infinitives do not contain the modal *will*; that is, *woll* with PRES tense. Wurmbrand follows Ogihara (1996)'s machinery in assuming that SOT effects arise from a rule that deletes tense at LF, just in case it is in the scope of another tense that has the same value.[5] This is how, under the most salient interpretation of the sentence, the embedded time in a sentence like *Winter found out that Mary was pregnant* overlaps with the finding-out time. In addition, both authors take SOT effects to take place with PRES as well, not just PAST.

Let us now consider a structure with three clauses. In both (305a) and (305b) below, both the matrix tense and the most deeply embedded tense have morphological PAST tense. In (305a), the first embedded clause has *will*, and this prevents the possibility of the time of Winter's telling to be at the same time as the meal time. By contrast, with the future-oriented infinitive which Wurmbrand takes to have *woll*, this is possible, because the infinitive lacks PRES.

(305) a. Winter promised me yesterday that he will tell his mother tomorrow that they were having their last meal together. ✗ *telling time = meal time*

b. Winter promised me yesterday to tell his mother tomorrow that they were having their last meal together. ✓ *telling time = meal time*

[5] My goal here is to only focus on the empirical facts. The formal semantic details of sequence-of-tense readings will be presented in 4.4.1.

As expected, *would* also allows it, as seen in (306).

(306) Winter promised me yesterday that he would tell his mother tomorrow that they were having their last meal together. ✓ *telling time = meal time*

She notes one last fact with the SOT variation of *would*, which is *woll* with PAST tense.[6] *Would* is blocked in an embedded clause if the matrix tense is not PAST, but an infinitive is allowed:[7]

(307) a. * Winter will promise me tonight that he would tell his mother tomorrow...

b. Winter will promise me tonight to tell his mother tomorrow that they were having their last meal together.

Wurmbrand's account is thus at a significant empirical advantage compared to the Stowell-Martin approach. But this does not mean we need to completely give up the idea that infinitives are tensed. One could suppose that the infinitive has a different tense value in different contexts to account for all of Wurmbrand's data–which is precisely what Pesetsky (2021) proposes.

### 4.1.3 Revived from the dead: infinitives are tensed (?)

Another interpretation of Wurmbrand's findings is possible. Pesetsky (2021) argues that Wurmbrand only shows that the future-oriented infinitive does not behave uniformly like a clause with *would* or *will*, not that the infinitive is tenseless.[8] Let us reconsider the sentences in (305a)-(305b) and (307a)-(307b) above. Notice that replacing *will* with *would* allows the telling time to be equivalent to the meal time in (305a), and (307a) is acceptable if *will* is replaced with *would*:

[6] SOT *would* in embedded clauses is only allowed with matrix past tense. It is usually blocked in matrix clauses, except for a somewhat antiquated context: the consequent of a conditional missing its antecedent.

[7] Wurmbrand takes this to indicate that future-irrealis complements lack even anaphoric tense. I argue against this in section 4.4.1.

[8] The reader is referred to Pesetsky (2021) for the syntactic framework in which he proposes his account; the idea within the framework is called the Principle of Unambitious Reverse-Engineering (PURE).

(308) a. Winter promised me yesterday that he would tell his mother tomorrow that they were having their last meal together. ✓*telling time = meal time*

b. Winter will promise me tonight that he will tell his mother tomorrow...

The basic idea is that the future-oriented infinitive, which has the modal *woll*, has one of two temporal interpretations: sequence-of-tense (SOT) PAST, which is equivalent to *would*, or PRES, which is equivalent to *will*.

Here is a more concrete example. Suppose that we are dealing with a predicate like *decide* which accepts both an infinitival complement and a finite one. If in a context only *would* is permissible with a finite embedded clause, in that same context if the infinitive were used instead, it would be interpreted as if it had a *would* (that is, with *woll* and SOT PAST). If in a context only *will* is permissible with a finite embedded clause, then the infinitive would be interpreted with *will*, or *woll* and PRES.

In this way, all of Wurmbrand's data is accounted for. Both of the infinitives in (301b)-(301a) above repeated in (309a)-(309b) below have SOT PAST, precluding the possibility of double access and allowing a before-present interpretation:

(309) a. Winter decided a week ago to go to the party yesterday.

b. 5 years ago, she claimed to be pregnant.

Pesetsky's idea is very difficult to distinguish from Wurmbrand's account, for two reasons. First, it is easy to verify that embedded PRES under matrix PRES is almost identical to SOT PRES anyway, whether or not it takes place. And as we will discuss in more detail in 4.4.1, SOT PAST is already the kind of tenselessness that I have in mind for future-irrealis oriented infinitives.

But one apparent empirical advantage for Pesetsky's account might be the possibility of relative present tense, in bold (310), which Wurmbrand cannot straightforwardly derive.[9] In this reading,

[9] Though the relative present is not available to all native speakers of English, it is robustly attested as

the snowing time is at the same time as the announcement. No PRES is present to derive the relative interpretation. Crucially, this pattern can only happen with future-oriented embedding verbs like *hope*, as Anand & Hacquard (2008) (A&H) point out.

(310) Last week, the weatherwoman hoped/*tried to announce **that it's snowing**.

Wurmbrand suggests that Pesetsky would be able to derive this by generating the infinitive with PRES. I do not believe this is right, however, given that it would predict the possibility of *will* instead of the infinitive in (310), which leads to a highly degraded reading. The same sentence with *would* over *will* is perfect, indicating that the infinitive in (310) may only have SOT PAST:[10]

(311) ?? Last week, the weatherwoman hoped that she will announce that it's snowing.

(312) Last week, the weatherwoman hoped that she would announce that it's snowing.

Thus, this is not an advantage for Pesetsky's account.

Although Pesetsky does not state directly how to determine whether the infinitive bears PAST or PRES, one can note the following tendency regarding the choice of tense in English infinitives. Notice that only *will* is allowed in the embedded clause if the matrix tense is also PRES:

(313) a. In a year, Caitlin will promise to become pregnant.

b. In a year, Caitlin will promise that she will/*would become pregnant.

The following rules thus appear useful to help derive the embedded tense in an infinitive under Pesetsky's account:

---

Anand & Hacquard (2008) show.

[10] The contrast could be derived via the presence of *woll*, if, following Anand & Hacquard (2008), one supposes that PRES is an anti-PAST polarity item that needs to escape the scope of PAST. This derives the de re interpretation of double access readings–if de re readings involve movement. Movement will take place unless there is an intervener like *woll*. One could suppose that the relative present only arises in this context due to the presence of the *woll*. This explains the difference between *hope* and *try* in (310) as well, since *try* does not project *woll*. Both Wurmbrand and Pesetsky would be able to use this, but I will not pursue this solution in this chapter.

(314) a. Matrix PAST → embedded SOT PAST

b. Matrix PRES → embedded PRES

Crucially, I have not specified whether embedded infinitival PRES under this account would necessarily be SOT. For some speakers of English, I believe it need not be. This will now allow me to distinguish between Wurmbrand and Pesetsky's accounts.

## 4.2 The impossibility of temporal de re in English infinitives

We are currently at an impasse. But I believe that the PRES tense, or lack thereof, may be used to distinguish the accounts. Pesetsky's account predicts the possibility of de re readings of PRES tense in an infinitive, whereas Wurmbrand does not. As such, my goal in this section is to provide experimental evidence in favor of Wurmbrand's account, via an investigation of the possibility of temporal de re in English propositional infinitives. Prior to doing so, I must first provide the reader with an introduction to the semantics of de se, de re and how it relates to tense in 4.2.1, and the background to the experiment in 4.2.2. I then briefly discuss the experiment in 4.2.3.

### 4.2.1 Background to temporal de re

It has been well-known since at least Castañeda (1966) that the controlled infinitival subject–PRO– is obligatorily interpreted *de se*. Evidence for this is given in (315), in which we see a contrast between overt pronouns, which allow a de re construal, and PRO which does not. The context provided brings out a de re interpretation, in which Winter is not aware that he himself is on fire, meaning that he does not bear a de se self-acquaintance relation to the man he believes to be on fire, in this case himself. Instead, he bears a different acquaintance relation; namely *the man Winter sees in the mirror*. The overt pronoun *he* in (315a) can be read de re, while PRO in (315b) cannot be:

(315) Winter is very drunk and on fire. He says the man in the mirror is on fire, not realizing that it is in fact himself.

a. Winter claimed he was on fire.

b. # Winter claimed to be on fire.

Following Chierchia (1990), I assume that the clausal complement contains a lambda abstraction operator, which binds a variable associated with the subject. This semantics makes it possible for one to bear an attitude de se towards a property just in case that property is self-ascribed. This rules out the possibility of de re interpretations.

(316) Winter claimed [λx [x to be on fire]]

I suggest that this operator necessarily binds tense in propositional infinitival clauses as well, following Heim (1994) and Abusch (1997), among others. As a result, tense also depends on the self-acquaintance relation. More specifically, SOT readings of embedded anaphoric tense, whether it is deleted or base-generated, also involves binding of the embedded tense variable by an abstraction operator. In other words, SOT tense, like PRO, is simply a variable that is abstracted over and then indirectly bound by the matrix tense. This leads to a de se interpretation with respect to the matrix attitude predicate.

(317) a. Mary claimed that she was pregnant.

b. Mary PAST$_0$ claimed λ1 [that she t$_1$-be pregnant]

I follow Heim (1994) in assuming res-movement for de re interpretations.[11] In fact, Heim originally applied res-movement to tense, and since then it has been extended to pronouns. In a de re interpretation of a pronoun, the res, *he* in (318) (=(315a)), moves out of the embedded clause to an argument position (the *res*) of the attitude verb.

[11] An alternative to Heim's semantics for de re readings of tense is presented by Percus & Sauerland (2003) involving the notion of a concept generator. For our purposes, either approach could be used.

(318) Winter [claimed he$_1$] [λ1 [$t_1$ was on fire]]

Most crucial for our purposes is that the double access interpretation has been treated as a special cases of de re (see Heim, 1994, Ogihara, 1995, Abusch, 1997, among others). Under such accounts, sentences such as (319a) are treated as involving a de re interpretation of the embedded PRES tense, rather than an indexical tense, yielding the same result; namely, that the utterance time must be included.

(319) a. Mary claimed that she is pregnant.

b. Mary [claimed PRES$_1$] λ1 [that she t$_1$-be pregnant]

Though it has long been noted in the literature that PRO needs to be read de se, this leaves open an important question. One wants to know whether infinitival tense needs to be read de se as well. If Abusch (1997) and Schlenker (2004) are right in extending the same de se restriction to tense in infinitives, then we would expect this to be the case. My goal now is to provide a foundation to experimentally test whether a de se interrpretation of tense is obligatory. This will help us to distinguish between Wurmbrand and Pesetsky's accounts.

### 4.2.2 PRES-UNDER-*WILL* CONSTRUCTIONS

We are now ready to discuss the differing predictions the accounts make. Nothing prevents a temporal de re reading under Pesetsky's account, which should in principle be available in infinitives. Infinitives in which SOT PAST is be present are theoretically and empirically identical under both accounts. This is because, for Wurmbrand, SOT PAST is just anaphoric tense, and counts as a kind of tenselessness. What we therefore need to look at is the present tense.

I believe that the two accounts can be distinguished in PRES-under-*will* constructions. Pesetsky is unclear regarding the nature of PRES in the infinitive. It is theoretically possible that it need not be SOT PRES–it could just be plain PRES. In principle, de re readings could arise with this. In this sec-

tion, I summarize the results of an experiment, showing that finite PRES-under-*will* constructions allow de re readings, as has been observed by Ogihara & Sharvit (2012) (O&S).

O&S (p. 659) note that some, but not all, speakers accept the interpretation of (320a) below, in which the embedded tense is read de re, as seen in the LF (320b):

(320) a. In 2 months, Mary will tell her mother that she is going to the Catskills tomorrow. Mary will say to her mother: "I went to the Catskills about 2 months ago."

b. Mary $\text{PRES}_1$ woll [$\text{tell}^{\text{de re}}$-$\text{PRES}_3$] her mother $\lambda 3 \lambda 1$ [she $t_3$-be-going to the Catskills]

If such a reading is allowed in a subset of speakers, then this means that this subset need not delete embedded PRES via the SOT operation. In other words, there is no SOT in the embedded clause, so PRES is interpreted de re. The possibility of de re readings in PRES-under-*will* constructions leads to the following prediction: such an interpretation should be allowed with the infinitive in (321), at least for the people noted to exist by O&S.

(321) Brian is preparing to buy a car tomorrow for his wife as a present, but he's keeping it a secret for her birthday next week, when he will tell his wife "I bought you a car last week!"

a. Next week, Brian will claim that he is buying a car for his wife. *finite*

b. Next week, Brian will claim to be buying a car for his wife. *infinitive*

Since the judgments are subtle and subject to idiolectal variation, as O&S point out, I conducted an experiment to determine whether a contrast exists among speakers who accept de re interpretations with embedded present.

### 4.2.3 Details of the Experiment

I conducted a forced-choice experiment with 600 native speakers of English. The survey was conducted on Qualtrics and participants were recruited from Prolific; a custom prescreening for native English speakers was applied to ensure that someone who is not a native speaker of English could

not take the survey. The experiment consisted of 4 baseline context-sentence pairs and 4 novel pairs at a ratio of 1 to 1, for a total of 8 context-sentence pairs. The large sample size was necessary given how few accept (320a). The goal was to isolate speakers who accepted O&S's de re interpretation in (320a), then determine whether this group preferred the finite or the infinitival form in cases like (321).

First, participants were asked if they found pairs like (320a) acceptable, as a preliminary screening to group the participants. If they answered yes, they were placed in Group A (n=76). If they answered no, they were placed in Group B (n=524). Although Group A is overall small and I found that speakers tend not to accept shifted readings in (320a), I believe that the number of speakers still confirms O&S's observation and is large enough to further test my prediction, and is able to help alleviate potential concerns regarding the attentiveness of participants.

After the preliminary question, the participant was given four context-sentence pairs, consisting of two baseline and two novel questions in the next page of the survey. This page contained 4 context-sentence pairs, consisting of 2 baseline and 2 novel questions, for which the template was as follows (the questions were randomly ordered):

(322) a. **Baseline**: 1 question regarding whether PRO needs to be read de se

b. **Baseline**: 1 question regarding whether the infinitive has a double access reading

c. **Novel**: 1 question with the de re interpretation of PRES-under-*will* with simple present

d. **Novel**: 1 question with the de re interpretation of PRES-under-*will* with a futurate

An example of one of the questions for (322a) is given below, in which the participant is asked to pick between a finite or nonfinite sentence form with a context de re pair. This sets the stage for the forced choice that the participant will have for the novel context-sentence pairs. For both groups, the prediction is that they will pick the de re form.

(323) Mary is an elderly woman with dementia. She watches a video of a high school student solving a very difficult math problem in front of all of her classmates, and the teacher congratulates that student. Mary says "that girl is very clever!" But that student is actually Mary herself, though Mary doesn't know it.

**Question**: Out of these two sentences, please pick the one which you think fits with this context more naturally.

a. Mary claimed that she was clever.

b. Mary claimed to be clever.

An example of one of the questions for (322b) is given below. This simply confirms the observation that infinitives do not have a double access reading, so most participants are expected to pick the infinitive form when the context in (324).

(324) Back in 2016, Julia informed all her family and friends of her pregnancy. She gave birth the next year. It is currently 2021.

**Question**: Out of these two sentences, please pick the one which you think fits with this context more naturally.

a. Five years ago, Julia claimed that she is pregnant.

b. Five years ago, Julia claimed to be pregnant.

An example of one of the novel context-sentence pairs ((322c)-(322d)) has already been provided for the reader in (321) above. The reader is referred to the Appendix for the full set of context-sentence pairs.

Tensed approaches to infinitives make no prediction on whether Group A would prefer the finite or infinitive form in temporal shifting contexts like (321). However, if tense in infinitives is read de se (and hence anaphoric tense), Group A should prefer the finite form over the infinitive. This

prediction was borne out: Group A preferred the finite form (63.16%, 48/76) over the infinitive (36.84%, 28/76) at (p<0.001).[12] This leads me to conclude (bolded in Table 2 that among people who have a de re interpretation of embedded PRES under *will*, the finite form is significantly preferred over the infinitive. In addition, the baseline expected results were confirmed: PRO is strongly preferred to be read de se (69.74%, 53/76) and the infinitive lacks a double access interpretation (68.42%, 52/76).

**Table 2**: Group A's results.

| Type | Finite | Infinitive | Sample size | p<0.001? |
|---|---|---|---|---|
| Lack of double access | 31.58% | 68.42% | 76 | Yes |
| De re reading of pronoun possible? | 69.74% | 30.26% | 76 | Yes |
| **De re reading of PRES-under-*will*** | **63.16%** | **36.84%** | **152** | **Yes** |

Group B, who find (320a) unacceptable, did not make a contrast (48.03% vs. 51.97%). This is because Group B, like the average native speaker of English, requires the use of SOT with embedded PRES. The only significant difference between the two groups is the presence of the de re reading of PRES-under-*will*; otherwise, both groups lack double access readings with infinitives and prefer PRO to be read de se.

**Table 3**: Group B's results.

[12] When the PRES-under-*will* with simple present (2 sample items, each participant saw one random sample item) and PRES-under-*will* with futurate contexts (2 sample items, each participant saw one random sample item) are considered in isolation, there is still a significant difference for each: 48/76 participants preferred the infinitive over the finite form (p<0.01) for the simple present context and an equal number, 48/76, participants preferred the infinitive over the finite form for the futurate context (p<0.01). In raw numbers, 24/40 participants preferred the infinitive form for the *Grace* example, 24/36 for the *Brian* example, 27/40 for the *Emily* example and 21/36 for the *Caitlin* example. See the Appendix for the relevant context-sentence pairs.

| Type | Finite | Infinitive | Sample size | p<0.001? |
|---|---|---|---|---|
| Lack of double access | 21.05% | 78.95% | 524 | Yes |
| De re reading of pronoun possible? | 73.68% | 26.32% | 524 | Yes |
| De re reading of PRES-under-*will* | 48.03% | 51.97% | 1048 | No |

The results for the baseline pairs may seem to be a bit of a confound here. It is important to point out that, although the literature points out–in relatively strong terms–that PRO "cannot" have a de re reading, and that infinitives "cannot" have double access reading, these statements must be qualified. For instance, we see that 26.32% of the participants in Group B do allow a de re reading of PRO. This is by no means a trivial subset of native speakers. The fact that such a large proportion of speakers allow judgments that contradict what has been found in the literature indicates that, for example, idiolects of English that allow a de re reading of PRO must be taken seriously. But I must leave an account of such idiolects to future research.

At the very least, the results of the novel pairs indicate that the de re interpretation of tense *mirrors* that of PRO (even though some speakers allow de re interpretations of PRO), in the subset of speakers who do accept the de re interpretation of embedded PRES with finite clauses. Further corroborating the result is that 66% (32/48) of the participants in Group B picked the finite form for both of the novel context-sentence pairs they were presented, which does not seem random. In other words, if native speakers have a preference for interpreting PRO de se, then this must also be the case for infinitival tense.

I follow Heim (1994) in analyzing infinitival tense in propositional and irrealis complements as a deleted tense variable bound by a higher λ-operator. This indicates that tense in infinitives, at least in infinitival complements, is necessarily deficient, and Wurmbrand's approach is on the right track. I will spell out a semantics for this in section 5. But now, I would like to touch upon tense in infinitival adjuncts, rather than complements, which I believe provides evidence for the empirical generalization in this chapter.

## 4.3 Tense in infinitival adjuncts

I have argued that infinitival tense is necessarily deficient, in that it cannot be PAST or PRES. But we have thus far seen the properties of tense in infinitival complements. If the empirical generalization in this chapter is correct–or, at least, not purely limited in scope to complements–we would expect it to extend to infinitival adjuncts as well. I believe this to be the case, and I will present a survey of evidence from English, Catalan, Spanish in 4.3.1, and then Japanese and Korean in 4.3.2 in favor of this claim.

### 4.3.1 Infinitival adjuncts with deficient tense

Starting with English, given that there is no raising out of many adjuncts, as they are syntactic islands, we can only look at control complements. Landau (2013) lists a variety of infinitival adjuncts with control in English (p. 221-222), of which the first is a gerund, not an infinitive: [13]

(325) a. *Temporal gerund*

Bill$_i$ called us [before/after/while/without PRO$_i$ visiting his aunt].

b. *Result clause*

Mary$_i$ grew up [PRO$_i$ to be a famous actress].

c. *Outcome/telic clause*

The ship$_i$ sank [only PRO$_i$ to be dredged up again].

d. *Goal clause*

Max$_i$ works hard [PRO$_i$ to stay out of jail].

e. *Stimulus clause*

Mary$_i$ smiled [PRO$_i$ to think what a fool she had been].

[13] The control status (whether PRO is obligatorily or non-obligatorily controlled) for rationale clauses is controversial, as Landau notes. The reader is referred to Landau (2013) for further discussion.

f. *Object purpose clause*

We bought Mary$_i$ the dog [PRO$_i$ to play with].

g. *Subject purpose clause*

She called a detective$_i$ [PRO$_i$ to investigate the affair].

h. *Rationale clause*

We$_i$ bought Mary$_j$ the dog [(in order) PRO$_{i/*j}$ to play with it].

Let's start from the top. As Landau points out, unlike the infinitives, it appears that the gerund can have its own tense specification in (325a), although only with the assistance of a preposition such as *before*, indicating that even the tense of a gerund is deficient in some sense. This can be seen further in free adjunct constructions such as in (326a)-(326b), in which a nonfinite predicative phrase functions as an adverbial subordinate clause.[14]

(326) a. Having taken out the trash, Mary decided to take a break.

b. Leaving her home in the morning, Kim reached her dorm at noon.

But our objects of investigation in this chapter are not gerundival constructions, but infinitival ones. According to Landau, all the adjunct clauses in (325) are cases of obligatory control: for instance, the controller must be the subject (usually) or an object of a clause which immediately dominates the adjunct; arbitrary and long-distance control readings are ruled out, and only sloppy readings emerge under ellipsis. But most importantly, relating it to the experiment I discussed in the section prior, PRO needs to be read de se in such cases. An example with a de re context is in (334a):

(327) Max is a sleepwalker. There is a thief on the streets who steals money from the rich and gives it to the poor. Max supports the criminal and tries to keep him out of jail by covering up his

[14] See Stump (1985) for further details on the interpretation and analysis of these constructions. He notes that it is rare for infinitives to appear in the free adjunct construction, with only one example (p. 5):

(i) To tell you the truth, I have never really thought of them that way.

leftover evidence. He does not know, however, that he is in fact unconsciously the thief–the thief persona takes over when Max is asleep.

a. # Max works hard to stay out of jail.

The de se tendency of PRO ought to mirror the tense of these adjunct clauses. And it indeed appears that the temporal interpretation of the infinitives is much more constrained than those of gerunds. As Stowell (1982) notes, the temporal interpretation of subject purpose clauses is future-oriented, while for rationale clauses it is either simultaneous or future-oriented. Stowell's judgments can be extended to the other kinds of adjunct control in Landau's list, as well. For instance, the temporal interpretation of the telic and object purpose clauses must be future-oriented, whereas the goal, result and stimulus clauses must have simultaneous interpretations.

English is not the only reported language in which adjunct infinitives are deficient in tense; Rigau (1995) has reported the same in Catalan and Spanish. She discusses temporal adjuncts constituted by an infinitive verb that follows a preposition: *before*, *after* or *in*. She argues that the adjuncts, in bold, in (328)-(329) are PPs.

(328) Todo el mundo aplaudió **al acabar el concierto**.
everybody applauded in-the to-finish the concert
'Everybody applauded when the concert was finished.' Spanish

(329) Tothom va aplaudir **en acabar el concert**.
everybody applauded in to-finish the concert
'Everybody applauded when the concert was finished.' Rigau (1995) (p. 280), Catalan

She argues that the preposition must specify the temporal interpretation of the adjunct as a whole by acting as a temporal operator–in the same manner as other operators such as *yesterday* or *tomorrow*. It is easier to see how *before* or *after* can behave as a temporal operator; *before* requires that speaking follows the choking in (330b) below, while the opposite is the case for *after*. In the case of

(330a), Rigau claims that the preposition expresses simultaneity: John's choking must take place at the same time as John's speaking.

(330) a. Juan se atragantó al tomar la palabra.
John himself choked in-the to-take the word
'John choked when he began to speak.'

b. Juan se atragantó antes de tomar la palabra.
'John choked before beginning to speak.

c. Juan se atragantó después de tomar la palabra.
'John choked after beginning to speak. Rigau (1995) (p. 290-291), Spanish

Rigau claims that the infinitival tense itself is too deficient to support a temporal interpretation on its own. A temporal operator such as a preposition is necessary. It thus appears that tense in Spanish and Catalan adjuncts is similar to that of tense in English temporal gerunds, as previously shown in (325a) above, as they also need to be supported by another temporal operator.[15] Crucially, however, both tenses are deficient. But as we will now see by looking at Japanese and Korean, there are different kinds of tense deficiencies.

### 4.3.2 Infinitival adjuncts that are entirely temporally deficient

Infinitival constructions are rarer in Japanese and Korean; in these languages, control predicates often take subjunctive clauses as complements instead. However, there is a set of constructions which have often been called coordination structures in the literature, in which the non-final "conjunct" must be untensed. I believe that the non-final "conjunct" in such constructions is in fact an infinitive or a gerund akin to a free adjunct in English. In fact, following Lee & Tonhauser (2010) (L&T), they lack tense entirely: their temporal interpretation is merely implicated.

[15] Unfortunately, Rigau does not discuss the temporal interpretation of gerundive adjuncts in Spanish or Catalan. This will have to be verified in future work.

Examples of such constructions are illustrated in Japanese and Korean in (331a)-(331b).[16] Although one has the temptation to assume that E.T.'s riding of the bike takes place prior to E.T.'s flying, in the movie, E.T. flies while riding a bike. And both (331a)-(331b) can be paired felicitously with this context, crucially without the need for any adverbs.

(331) Context: After watching the ending scene of the movie *E.T.*, Yenghi says:

a. E.T.-ka cacenke-lul tha-ko, pihayng-ul ha-ess-ta.
E.T.-NOM bike-ACC ride-and flight-ACC do-PAST-DECL
'E.T. rode a bike. And he flew.' Lee & Tonhauser (2010) (p. 314), Korean

b. E.T.-wa jitensha-ni not-te ton-da.
E.T.-TOP bike-at ride-and fly-PAST
'E.T. rode a bike and flew.' Lee & Tonhauser (2010) (p. 315), Japanese

I believe that such constructions are not in fact coordination constructions, and as such L&T's glossing in (331a)-(331b) is not correct. As Oshima (2012) points out, in grammars the verb of the non-final "conjunct" is called a gerund with the suffix, and an infinitive without. In fact, the suffix is fully optional, which L&T do not note, making it much less likely it is a genuine coordination suffix. But Oshima (2012) notes one piece of conclusive evidence that the non-final "conjunct" is not really a conjunct. This involves the Coordinate Structure Constraint (CSC), which is a type of the strong island effect. This can be seen in English below:

(332) * which professor did you divide the cake between [Caitlin and t]?

Oshima notes the following examples (333a)-(333b) in Japanese which involve movement out of the "conjunct." I have verified that this is also the case in Korean (Oshima (2012), p. 294-295).

(333) a. [Ensoku-ga chuushi-ni nari/natte $t_i$ ichiban
excursion-NOM cancellation-DAT become.INF/become.GER most
zannengat-ta] gakusei$_i$-wa Hiroshi$_i$-da.
be.disappointed-PST student-Top Hiroshi-COP.PRES

[16] In Korean, the verb in the non-final "conjunct" can optionally have tense, whereas in Japanese it cannot. In my Korean examples, the verb always lacks tense marking.

'The student who was most disappointed when the excursion was canceled is H.'

b. [sensoo-ga owari/owatte $t_i$ kakki-o torimodoshi-ta] $machi_i$
war-NOM end.INF/end.GER liveliness-ACC regain-PST city
'a city that regained its liveliness after the war ended.' Japanese

As such, I believe that these constructions are in fact free adjunct constructions, like we saw in English above. Now, the free adjunct is usually interpreted as taking place at the same time or prior to that of the main event, as in the examples from L&T below:

(334) a. Ku-nun swuswul-ul pat-(ko) cikum-un cal cinay-n-ta.
he-TOP surgery-ACC receive-(GER) now-TOP well do-NPST-DECL
'He had a surgery and now he is doing well.' Korean

b. Kare-wa shujutsu-o uke-(te) ima-wa daijoobu-da.
he-TOP surgery-ACC take-(GER) now-TOP fine-COP.NPST
'He had a surgery and now is fine.' Japanese

But there are contexts in which the event described in the free adjunct can in fact come after the main event. In (335a)-(335b) from L&T (p. 319) below, this can be done without the temporal adverbs; the first conjunct is in the future while the second conjunct is in the present:

(335) a. Uimilon hakhoi-ey ka-ko cikum-un palphyo cwunpi-lul
semantics conference-at go-GER now-TOP presentation preparation-ACC
ha-n-ta.
do-NPST-DECL
'I will go to a conference and I am preparing for the presentation now.' Korean

b. Imiron gakkai-ga at-te ima-wa happyoo-no
semantics conference-NOM exist-GER now-TOP presentation-GEN
junbi-o siteiru.
preparation-ACC do-PROG-NPST
'I will go to a conference and I am preparing for the presentation now.' Japanese

It can also be interpreted as being at the same time, as we saw in (331a)-(331b). All temporal possibilities seem to be instantiated with the free infinitival adjunct in these languages.

For L&T, the temporal interpretation of the nonfinal conjunct in such constructions is fully determined by Aktionsart and the discourse context, mirroring the interpretation of tense in truly tenseless languages such as Yucatec Maya and Kalaallisut. It is not part of the truth-conditional meaning in narrative discourse but is merely implicated.[17] Thus, even though two events in narrative discourse usually receive a sequential interpretation, such an implicature can be canceled by the right context. For instance, it is possible to cancel the contextually implied reading in (334a)-(334b) (because people usually aren't doing well before surgery) by adding that the surgery is in fact tomorrow although he is doing fine prior to the surgery.[18]

L&T argue against different proposals which assume that the free adjunct has some tense, none of which can cover the full range of facts. These analyses split into a few different classes, all of which assume some kind of a tense-like restriction. For instance, Yoon (1993, 1994, 1997), Kang (1988) and Hirata (2006) all assume that the tense of the main clause introduces a restriction on the temporal interpretation of the free adjunct, but this is challenged by the examples seen in this section. Kuno (1973), Arikawa (1992) and Ogihara (1998) all assume that gerund marker in Japanese is temporal, meaning "and then" and requires the free adjunct to precede the main event. This is challenged by examples (335a)-(335b). Finally, Fukushima (1999) proposes an answer similar to Pesetsky (2021)'s PURE: the temporal interpretation of the free adjunct is recovered via a version of the ellipsis resolution mechanism in Dalrymple (2005).[19]

I conclude with L&T that free adjuncts in Japanese and Korean are fully tenseless. The empirical scope of this chapter can therefore be extended to all infinitives, and not merely complements. But this leads to a great deal of confusion as to what we mean when we call an infinitive "tenseless,"

[17] The reader is referred to Lee & Tonhauser (2010) for the formal details on their analysis.

[18] This is evidence against the possibility that the temporal ordering may be due to the presence of a null adverb in the free adjunct. Adverbial meaning is part of the asserted content, and so cannot be canceled.

[19] Although in these cases Fukushima proposes that the presence of adverbs can supersede the ellipsis resolution mechanism, L&T point out that the adverbs are fully optional, and the temporal interpretation of the free adjunct can be recovered from the context alone.

which now needs to be clarified at an even greater level of urgency. In addition to infinitival complements, an analysis for the different kinds of temporal adjuncts that we have just seen will now be provided in the next section.

## 4.4 Analysis

Clarifying the notion of tenselessness in an infinitive can only be done via a formal semantic analysis. The goal of this section is to provide a semantics for the three different types of infinitival complements discussed by Wurmbrand & Lohninger (2019) (henceforth W&L) which syntactically are represented by different sizes: propositional (CP), future-irrealis (TP) and eventive complements (vP). These complements are distinguished by their different temporal properties, and each type of complement is analyzed as follows:

(336) a. *Propositional and future-oriented complements involve anaphoric tense*: There is a deleted tense variable bound by a higher lambda abstractor.

b. *Eventive complements involve tense sharing*: The matrix and embedded clauses share the same tense values.

I will discuss the empirical differences and theoretical similarities between propositional and future-irrealis infinitival complements in 4.4.1. Crucially, I claim that their temporal interpretation is anaphoric. I then discuss the need to distinguish between anaphoric tense and tense sharing with matrix tense in 4.4.2, and discuss the borderline case of *try* in 4.5.3. I synthesize these theoretical and empirical generalizations in 4.5.4 into the key empirical claim of this chapter: no matter the type of infinitive, they are necessarily deficient in tense, unable to bear PAST or PRES.

### 4.4.1 Propositional and future-irrealis infinitival complements

The split between these two complements is a common one in syntax, starting with Stowell (1982) on the distinction between control infinitives and ECM-infinitives. It is simple to distinguish between the two, using the adverb *tomorrow*:[20]

(337) a. * Yesterday, Mary claimed to be happy tomorrow.

b. Yesterday, Mary decided/hoped/wished/wanted to be happy tomorrow.

Unsurprisingly, even if a finite complement is possible with a future-irrealis predicate, it must still have a future meaning and cannot have a past interpretation:

(338) a. Clara decided that she would fly/will fly to Paris next week.

b. * Clara decided that she flew to Paris last year.

Unlike future-irrealis infinitives, propositional ones are interpreted as occurring simultaneously with the matrix predicate as in (339a)-(339b) or shifted into the past as in (339c)-(339d). We will

[20] There are more differences between the two kinds of complements which are not crucial to the analysis, but I include here. Although both propositional and future-irrealis of complements require an animate subject, this is not sufficient to determine whether such complements are in fact attitudinal. One test that can be used to determine whether they are attitudinal is Quine (1956)'s double vision test, which doesn't allow the substitution of a proper name which an attitude holder has a different relation to. Lois Lane in the Superman stories may be in love with Superman, because he is strong and handsome, but she may not like Clark Kent because he is nerdy and wears glasses. This means that she does not know that Superman is Clark Kent. And this has the consequence seen below:

(i) Context: Superman is Clark Kent.
a. Lois Lane decided to kiss/claimed to have kissed Superman.
b. Lois Lane decided to kiss/claimed to not have kissed Clark Kent. (can be true at the same time)

Both of these complements allow partial control readings of the embedded subject. This is expected if, following Landau (2015), partial control predicates are those which are attitudinal, which the double vision test we have just seen established:

(ii) a. Caitlin claimed to be meeting at 6.
b. Caitlin decided to meet at 6.

discuss the nature of *have*-EN infinitives in section 6 in further detail. Furthermore, propositional infinitives behave like finite clauses in that when referring to a non-generic episodic event simultaneous with the matrix time, they cannot occur in a non-progressive form, as in (339a)-(339b).

(339) a. Clara believes/claims that she is eating salad/*eats salad right now.

b. Clara believes Danny to be eating/*to eat salad right now.
Clara claims to be eating/*to eat salad right now.

c. Clara believes/claims that Danny ate salad.

d. Clara believes Danny to have eaten salad.
Clara claims to have eaten Salad.

Following Grano (2015) and contra Wurmbrand (2014b), I believe that both kinds of infinitives project tense, but crucially such a tense can only be anaphoric, interpreted in the NOW of the attitude holder. In other words, they cannot bear PAST or PRES. In this subsection, I present arguments in favor of both infinitival propositional and future-irrealis having anaphoric tense.

For Wurmbrand, only propositional complements project anaphoric tense; one reason is that the nonfinite and finite complement of *claim* appear truth-conditionally equivalent, at least when both the tense and the overt pronoun of the embedded finite clause are read de se.

(340) a. Caitlin claimed to be pregnant.

b. Caitlin claimed that she was pregnant. (under SOT reading, de se *she*)

In addition, the complement of *claim* must be stative and cannot be interpreted episodically. Such a contrast can be captured if eventive complements do not project tense at all and involve tense sharing, as I will propose in 4.4.3-4.4.4:

(341) a. * Caitlin claimed to leave right then.

b. Caitlin managed to leave right then.

By contrast, future-oriented complements do allow episodic interpretations. Wurmbrand (2014b) takes this to indicate that irrealis complements do not have anaphoric tense, and just involve tense sharing between the matrix and embedded predicates:

(342) Caitlin wanted/hoped/decided to go tomorrow.

Grano (2015) points out that the possibility arises due to the presence of the modal *woll*, and not due to the lack of anaphoric tense with future-oriented complements. First, Grano shows that anaphoric tense disallows perfective episodic eventive predicates more generally, accounting for (341a). This is because sentences like (343b) disallow SOT interpretations when an eventive predicate is involved:

(343) a. Mary said that Caitlin was happy.
SOT reading: Caitlin's happiness overlaps with Mary's saying.
Non-SOT reading: Caitlin's happiness precedes Mary's saying.

b. Mary said that Caitlin left.
#SOT reading: Caitlin's leaving overlaps with Mary's saying.
Non-SOT reading: Caitlin's leaving precedes Mary's saying.

But the presence of *woll* enables (in fact, requires) SOT, and hence anaphoric tense, readings:

(344) a. Mary said that Caitlin would leave.
SOT reading: Caitlin's leaving follows Mary's saying.

In addition to this, I believe that there is a second reason why we need to assume anaphoric tense for future-oriented predicates as well. Although the experiment demonstrated that tense needs to be read de se just for propositional complements, I would like to point out that tense can be read de se in the complement of a verb like *wish*, as well. For instance, the sentence in (345a) can still be true even if Caitlin is not aware that daylight savings has taken place and the time which she identifies as

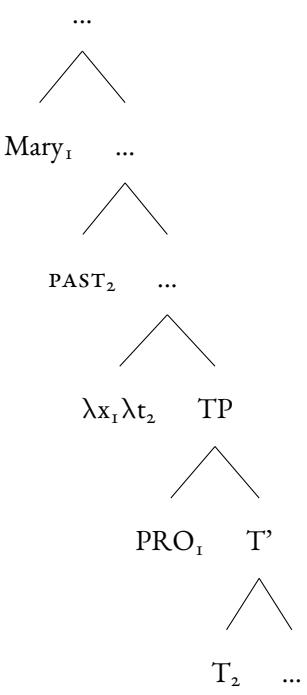
10 am is in fact 9 am. This is not possible for an eventive predicate like *manage*, however, in such a context, and pushes (345b) into unacceptability:

(345) a. Caitlin wishes to eat chocolate at 10 am.

b. # Caitlin managed to eat chocolate at 10 am.

To conclude, we have just seen that propositional and future-oriented complements can both be accounted for by assuming that they bear anaphoric tense, and the differences arise due to the modal *woll*. Let us now see how all this is captured in our semantics. I capture the obligatory de se reading of PRO (and of tense, as argued for via the experiment) via an abstraction operator in the left periphery of the embedded clause. PRO and tense are bound indirectly by their respective controllers:

(346)




The reading of simultaneous embedded tense is finite clauses is captured in terms of an abstraction operator as well, following Heim (1994) and Abusch (1997). The only semantic difference between (347a) and (347b) below is that the infinitive must have anaphoric tense whereas the embedded

finite clause need not.

(347) a. Caitlin claimed to be pregnant.

b. Caitlin claimed that she was pregnant.

Abstraction operators bind coindexed variables just in case they are of the same type. A sample semantics of the sentence *Caitlin claimed to be beautiful* is given in (348) in which the tense, in addition to PRO, is abstracted over.[21]

(348) a. $[\![\text{claim}]\!]^{w,t,g} = \lambda P_{<e,<st>>} \lambda x_e \lambda w_s . \forall <w',y> \in \textbf{claim}_{x,w}$: P(y)(w') where $\textbf{claim}_{x,w}$ = {<w',y>: what x claims in w is true w' and x identifies herself as y in w'}

b. $[\![\text{to be beautiful}]\!]^{w,t,g} = \lambda x \lambda t \lambda w$. x is beautiful in w at t

c. $[\![\text{Caitlin claimed to be beautiful}]\!]^{w,t,g} = \lambda t \lambda w$. $\forall <w',y, t'> \in \textbf{claim}_{\text{Caitlin},w,t}$: y is beautiful in w' at t'

This semantics is based on Hintikka (1969)'s semantics for attitude reports where the content of an attitude is not a set of worlds. Chierchia's semantics makes it possible for one to bear an attitude de se towards a property just in case that property is self-ascribed. The attitude predicate does not quantify merely over worlds; it quantifies over sets of *claim*-alternatives <w',y,t'> such that it is compatible with the attitude holder in w at t saying she is y in w' at t'.

This semantics will ensure that a sentence with a non de se scenario–or a sentence in which the attitude holder does not know she is referring to herself–will turn out false. This is because in the definition such as that given in (348), the attitude holder would be able to self-identify the person in the *claim*-alternative worlds as herself, and this is not possible in a de re scenario.

[21] I am not representing the matrix tense here for simplicity. In addition, I have added tense into the equation, following Abusch (1997) and Schlenker (2004); I have provided empirical evidence for this via the experiment.

[22] Before concluding, I would like to provide a semantics for the future-oriented irrealis complements. Following Abusch (2004), Wurmbrand (2014b) and Grano (2015) among many others, I posit the presence of a covert future modal *woll* with the semantics in (349a). A sentence such as *Caitlin decided to eat chocolate* has the LF in (349b), in which matrix tense is not represented:

(349) a. $[\![\text{woll}]\!]^{w,t,g} = \lambda P_{it}.\lambda t.\ \exists t'.\ t' > t\ \&\ P(t')$

b. $[\![\text{Caitlin decided to eat chocolate}]\!]^{w,t,g} = \lambda t \lambda w.\ \forall \langle y,w',t' \rangle \in \textbf{decide}_{\text{Caitlin, w, t}}$: $\exists t''.\ t'' > t'$ and y eats chocolate w' at t''

In both propositional and future-irrealis complements, then, the NOW of the attitude holder, in Abusch (1997)'s terms, is imposed as the reference time of the infinitive. The NOW is a very short time interval, getting the simultaneous interpretation in propositional infinitives. The presence of *woll* simply pushes this tense value into the future. Such a semantics does not work for all infinitival complements, however, as we will now witness.

### 4.4.2 Eventive infinitival complements

Eventive complements are best analyzed in terms of tense sharing of the matrix tense value rather than anaphoric tense. First, I verify below that they must have the same temporal reference as the

[22] A key difference between propositional and future-irrealis infinitives is that truth values can be assigned to the embedded complement in the former but not the latter:

(i) a. Caitlin claimed to be eating chocolate, which is true.
b. Caitlin wanted to eat chocolate, #which is true.

I believe that this difference can be captured in terms of the accessibility relations that is built into the semantics of each kind of predicate. One need not stipulate that future-irrealis complements belong to an entirely different class of *situations* rather than propositions, as W&L do following Ramchand & Svenonius (2014).

Here is how. Hintikka (1962) builds a semantics for *want* in which it consists of a bouletic accessibility relation, which holds between two worlds w and w' for some individual A in w iff all of A's desires in w are satisfied in w'. A truth value cannot be attributed to such complements. By contrast, a semantics for *believe* consists of a doxastic accessibility relation, which holds between two worlds w and w' for some individual A in w iff A in w identifies herself as A in w', which a truth value can be attributed to.

matrix tense, and lack the modal *woll*:[23]

(350) *Allows episodic interpretations*

a. * Mary claimed to use the restroom right then.

b. Mary managed/began/started to use the restroom right then.

(351) *No future-oriented interpretation*

a. Mary wanted to take out the trash tomorrow.

b. # Mary began/managed/started/continued to take out the trash tomorrow.

As mentioned in Chapter 3 previously, as Landau (2013) notes, the obligatory de se reading only applies to cases of PRO in which the controller's mental state is implicated by the predicate, which is not the case with eventive control predicates. In these cases below, the human controller does not entertain a de se belief:

(352) John managed to avoid the draft (because he spent that decade in a coma).

(353) Mary neglected to send the payment. Landau (2013) (p. 34)

Such predicates are all exhaustive control predicates, as can be seen in Pearson (2016)'s comprehensive list of exhaustive and partial control predicates. As such, the obligatory de se reading is unique to propositional and future-irrealis infinitival complements. Given the concordant relationship be-

[23] In addition, such complements require exhaustive control and fail the double vision test, indicating that they are not an attitudinal context.

(i) *Exhaustive control only*

a. Mary wanted to meet at 6.

b. * Mary began/managed/started/continued to meet at 6.

(ii) *Fails double vision test*
Context: Superman is Clark Kent. The following two sentences cannot both be true:

a. Lois Lane managed/began/continued to kiss Superman.

b. Lois Lane managed/began/continued to not kiss Clark Kent.

tween the obligatory de se reading of the infinitival subject and tense, we might also expect eventive infinitives to also lack a temporal de se contrast. This is the case, as seen in (354a)-(388b) below.

(354) a. Caitlin wishes to eat chocolate at 10 am.

b. # Caitlin managed to eat chocolate at 10 am.

The semantics of tense sharing will be entirely different from that of anaphoric tense. This is because eventive predicates may have inanimate subjects, or even expletive subjects:

(355) a. The key managed/began/continued to unlock the door.

b. It began to rain.

We need a new analysis. As such, I will provide a sketch of Piñón (1997)'s alternate semantics for such infinitives, which I refer the reader to for further details. As far as I am aware of, it is the only semantics in the literature for inanimate or expletive uses of predicates like *begin*.

Piñón (1997) divides eventualities into two basic sorts: *happenings* and their *boundaries*. Take for instance the happening of Caitlin eating chocolate. The beginning of that happening is the *left boundary*, whereas the ending of that happening is its *right boundary*. This notion allows for a semantics of *begin*, as defined in (356) below by Piñón (1997).

(356) $[\![\text{begin}]\!]^g = \lambda e \lambda e' \lambda P.\ \text{Boundary}(e) \ \&\ \text{Left}(e, e') \ \&\ P(e') \ \&\ \neg\exists e''(e'' < e' \ \&\ P(e'' + e'))$

*Begin* is a function from two happenings, e and e', and a predicate P from happenings to truth-values such that e is a boundary, and e is the left boundary of e', e' is an happening of type P and there is no happening e" immediately preceding it such that the sum of the two eventualities is of type P.

When we add in tense and worlds, we obtain the following semantics for *It began to rain*, where as desired the tense and world values of the matrix predicate are merely shared:

(357) It began to rain.

a. $[\![\text{rain}]\!]^{g} = \lambda w \lambda t \lambda e.\ \text{rain}(e)\ \text{in}\ w\ \text{at}\ t$

b. $[\![\text{It began to rain}]\!]^{g,t,w} = \lambda w \lambda t \exists e \exists e'(\text{Boundary}(e)\ \&\ \text{Left}(e, e')\ \&\ \text{rain}(e')\ \text{in}\ w\ \text{at}\ t\ \&$
$\neg \exists e''(e'' < e'\ \&\ \text{rain}(e'' + e')\ \text{in}\ w\ \text{at}\ t))$

To recap, propositional and future-irrealis complements both have in common an anaphoric tense value, whereas eventive complements can be shown to even not have anaphoric tense. Instead, they involve tense sharing. But what is in common between each of these cases, in my view, is that tense is deficient: it cannot be simple PAST or PRES.

### 4.4.3 Aspectual infinitival complements

There is another potential class of infinitival complements in Wurmbrand & Lohninger (2019)'s hierarchy, that can't be accounted for by either analysis I have proposed above. This contains at the very least the complement of the predicate *try*, which appears to have irrealis-eventive properties, and is thus borderline between future-oriented and eventive predicates.[24] It is thus worth discussing. Here, I propose an analysis based on Sharvit (2003) and Grano (2011)'s treatment of *try* as an aspectual morpheme, which allows us to capture its borderline properties.

*Try* patterns with the eventive infinitive rather than the propositional one in that it can have an eventive interpretation:

(358) Mary tried to use the restroom right then.

(359) * Mary claimed to use the restroom right then.

It is not future-oriented to most native speakers of English:[25]

[24] I believe that another *try*-class predicate is *pretend*. It requires an animate, volitional agent, and it also does not allow a future-oriented reading. Intuitively for me, a key difference between these two predicates is that a mental action for *pretend* is not sufficient: it must be externalized.

[25] In addition, they do not allow partial control interpretations of the embedded subject:

(i) a. Mary wanted to meet at 6.

(360) a. Mary wanted to take out the trash tomorrow.

b. # Mary tried to take out the trash tomorrow.

So far, it looks like an eventive predicate. But here are some reasons to believe it might in fact be borderline. Sharvit (2003) notes that *try* behaves like *want* in that a non-existential reading is available for indefinite NPs in their scope. *Try* behaves the same way in just this case below:

(361) a. Mary wanted to find a syntax book, but there were no syntax books around.

b. Mary tried to find a syntax book, but there were no syntax books around.

This indicates an attitudinal core to *try*, but this does not consistently obtain in all cases. *Want* consistently allows indefinite NPs in its scope to have non-existential readings, but *try* does not:

(362) a. Caitlin wanted to cut a tomato, but there were no tomatoes to cut.

b. Caitlin tried to cut a tomato, ##but there were no tomatoes to cut.

a. Mary wanted to push a cart, but there were no carts to push.

b. Mary tried to push a cart, ##but there were no carts to push.

a. Esther wanted to start a car, but there was no car to start.

b. Esther tried to start a car, ##but there was no car to start.

For Sharvit, *try* doesn't simply express an attitude of an individual towards a proposition unlike *want* or *believe*, but it also expresses an extensional action which has to have taken place in the actual world. She believes that this is akin to the progressive aspect. This allows one to capture its borderline attitudinal properties above.[26]

---

b. * Mary tried to meet at 6.

However, I have anecdotal evidence that some native speakers of English in fact do accept sentences like (360b), and the ones that do accept partial control readings with *try*, indicating that judgments with this predicate in particular are tricky.

[26] *try* does not pass the double vision test for attitudinal predicates:

Grano (2011) and Grano (2017) propose some improvements to her analysis, and I adopt his approach here. He notes that *try*-sentences need not entail an externally observable action or even a likelihood of success in completing such an action, with this acceptable sentence below. This indicates that for *trying*, a mental action is sufficient and the action need not be physical.

(363) Mary was unknowingly paralyzed and tried to raise her arm.

Grano maintains Sharvit's key intuition that *try* has an aspectual element and combines this with the idea that a mental action is sufficient for *try*. I propose a sample semantics from Grano (2017) below. $\subset_{init}$ is a relation relating an event to its mental action stage:

(364) Mary tried to open the door.

LF: $\exists e[\text{Agent}(e, m) \ \& \ \forall w' \in \text{INT}_{m,w}: \exists e'[e \subset_{init} e' \ \& \ \text{open}(e') \ \& \ \text{Agent}(e', m) \ \& \ \text{Theme}(e', d) \text{ in } w']$

There is some event e whose agent is Mary and all worlds compatible with Mary's intentions in w are worlds in which e is an initial stage of some event e' which is an opening event whose agent is Mary and whose theme is the door.

We are now armed with the knowledge needed to explain why future-oriented readings of *try* are ruled out. Notice the contrast below in which the presence of the sentence-initial adverb does not make an improvement in acceptability for the *try*-sentence.

(365) a. (Today/Yesterday,) Caitlin decided to eat chocolate tomorrow.

b. # (Today/Yesterday,) Caitlin tried to eat chocolate tomorrow.

---

(i) Context: Superman is Clark Kent. The following two sentences cannot both be true.

a. Lois Lane tried to kiss Superman.

b. Lois Lane tried to not kiss Clark Kent.

However, as mentioned, given that some native speakers of English have a future-oriented lexical entry for *try*, the prediction is that *try* for such readers would pass the double access test.

Here, I provide Grano (2017)'s solution. The contrast arises due to the presence of tense sharing, rather than anaphoric tense, in *try*-complements. Given that the time of *trying* and *eating chocolate* is identical, it is not possible for it to be both *today* and *tomorrow*. (365b) is unacceptable precisely for the same reason that a sentence such as *Today, Caitlin ate chocolate tomorrow* is unacceptable. Grano's solution based on the same semantics as in (364) is given below:

(366) # Today, Caitlin tried to eat chocolate tomorrow.

LF: $\exists e[T(e) \subseteq \text{day-of}(t^*) \ \& \ \text{Agent}(e, c) \ \& \ \forall w' \in \text{INT}_{c,w}: \exists e'[e \subset_{\text{init}} e' \ \& \ \text{open}(e') \ \& \ \text{Ag}(e', c) \ \& \ \text{Th}(e', d) \ \& \ T(e') \subseteq \text{day-after}(t^*) \text{ in } w']]$

There is an event e whose runtime is included in the day of the utterance time and whose agent is Caitlin and all worlds compatible with Caitlin's intentions in w are worlds in which e is an initial stage of an opening event whose agent is Caitlin and whose theme is the door and whose runtime is included in the day after the utterance time.

To recap, the complement of *try* may also be assumed to involve tense sharing, but it is more involved than that of predicates like *begin*, due to its borderline nature.

### 4.4.4 Three types of tenselessness

Let us see a summary of the types of tenselessness we have seen thus far in this chapter, with their relevant cases we have studied:

(367) *Three kinds of infinitival temporal deficiency*

a. *Anaphoric tense*: There is a deleted tense variable bound by a higher lambda abstractor (propositional and future-oriented infinitives).

b. *Tense sharing*: The matrix and embedded clauses share the same tense values (eventive infinitives).

c. *True tenselessness*: The clause is entirely temporally deficient, and its temporal interpretation is the result of an implicature (e.g. infinitival adjuncts in Japanese and Korean).

I have argued, following Wurmbrand (2014b) and Grano (2015), that infinitival complements may have two different tense specifications, at least in English. But crucially, what is in common between these two types of tense specification is that they are both deficient in some sense: infinitives are never attested bearing genuine PAST or PRES. In addition, infinitival tense cannot be interpreted de re, as I believe the experimental data has shown.

Tense sharing, on the other hand, is not even de se tense: such infinitival complements lack a tense node entirely, and no tense variable. They are thus even more deficient in tense. We have also discussed the temporal interpretation of adjuncts in detail, which can only be simultaneous or future-oriented in English, or mediated via prepositions in Spanish and Catalan, indicating further that this deficiency of tense in infinitives extends to adjuncts in addition to complements. A third type of temporal deficiency was seen in Japanese and Korean free adjuncts, which we saw clearly lacked tense sharing. Its temporal interpretation was determined not by tense per se however, but by Aktionsart and the discourse context, making it an implicature.

Though all of these attested possibilities may seem disparate and do have very different empirical properties, they can be unified under one empirical generalization: **infinitives cannot bear PAST or PRES**. In other words, infinitives are necessarily deficient in tense. This observation, in my view, is revealing but unsurprising under theories of infinitives in which they are truncated or deformed.[27] This can be tentatively explained by the notion of C-to-T feature inheritance previously discussed in Chapter 2. Recall that C is in fact the locus of ϕ-features, among other features, and they are not base-generated in T–this is stipulated in order to explain the difference between finite and nonfinite T, the locus of tense and agreement markings in the generative framework. For example, the nonfi-

[27] See also Müller (2020) or Pesetsky (2021).

nite complementizer *for* in English is responsible for accusative case on the embedded subject, while the finite embedded subject has nominative case, and a nonfinite complement with no complementizer has no visible subject at all:

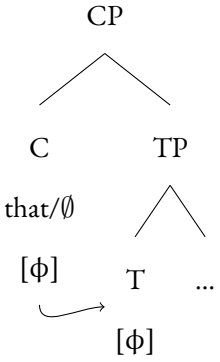
(368) a. ...that I took out the trash.

b. ...for me to take out the trash.

c. ...∅ PRO to take out the trash.

An example derivation of C-to-T feature inheritance is given below. Here, for simplicity I assume that the C-domain is not articulated, and a more detailed account is given in Chapter 2. Phi-features in the tree below are simply placeholders and it is likely there are other features being passed down to T via inheritance.

(369)




In clauses without C, T will simply not have features that weren't already base-generated with it (except for languages with inflected infinitives, for instance), leading to non-finiteness.

Here, I assume that T can only bear semantic tense if it has a more complete featural makeup. In concordance with Chapter 3, the best option is to assume a D-feature (D for definiteness) that is passed down from C is required to allow semantic tense–in other words, an independent PRES or PAST–on the infinitive. This is similar to what we have seen with the typology of pronouns in Chapter 3, in which pronouns must have a D-feature in order to bear an index. Otherwise, T is not

much more than an anaphor, leading to obligatorily de se readings of tense, in a manner identical to PRO, which is a featureless NP that is nothing more than a reference variable. This is very similar to the typology of pronouns seen in Chapter 3, in which obligatorily bound pronouns like PRO are more deficient on the hierarchy on pronouns. I must, however, leave a fully detailed account open to future research.

One apparent counterexample remains to be discussed.

## 4.5 *HAVE*-EN INFINITIVES HAVE ANAPHORIC TENSE

There is one kind of infinitival construction that appears to be a flat-out contradiction of the empirical generalization that I have proposed in this chapter. It appears that propositional infinitives with the auxiliary verb *have* and a past participle can express a shifted past reading, as seen below. It is easy to verify that the embedded time takes place prior to the matrix time, regardless of whether or not the matrix predicate is in the past or present:

(370) a. They believed/believes Mary to have gotten pregnant a month ago.

b. Mary claimed/claims to have gotten pregnant a month ago.

I have argued in this chapter that, by their very nature, infinitives are deficient in tense. One would expect this to carry onto infinitives in different languages and to different constructions within a given language. As such, the apparent possibility of shifted tense in (370a)-(370b) is a counterexample to my idea. But on the contrary, I believe that the empirical facts indicate that even infinitives *have* have are temporally deficient. In this section, I build an analysis of the infinitives in (370a)-(370b) in which the embedded tense must be anaphoric.

I discuss accounts in which infinitives with *have* have a special kind of simple PAST tense in 4.5.1, and argue, contra these approaches, it is in fact empirically advantageous to maintain the idea that

such infinitives are still tenseless in 4.5.2. 4.5.3 presents my analysis, in which I propose that infinitives with *have* merely have anaphoric tense.

### 4.5.1 The apparently special infinitival *HAVE*

In this subsection, I present accounts in which the infinitives in (370a)-(370b) are tensed: they are a special instance of simple PAST.

Landau (1999), Grano (2015) originally proposed a treatment of the infinitival *have*-EN as special, in that it is ambiguous between a perfect and a true past reading.[28] They note that on the perfect interpretation it is available even in exhaustive control structures, such as the complement of *manage*. Although it is important to point out that such a sentence is only natural with modifiers such as *before it got too cold* and very marginal otherwise:

(371) Earlier today, Mary managed to have closed the window before it got too cold.

In order to force a true past reading, they insert a time adverbial that conflicts with the matrix tense, which is possible only with the partial control predicate *claim* and not with the exhaustive control predicate *manage*:

(372) a. * Earlier today, Mary managed to have closed the window yesterday.

b. Earlier today, Mary claimed to have closed the window yesterday.

To strengthen this appeal to an exceptional use of *have*-EN, Grano (2015) provides, in his view, several additional pieces of evidence that *have*-EN in infinitives behaves similarly to the finite simple past rather than the present perfect.[29]

[28] A stipulation is required to rule out the possibility of simple past being expressed in a sentence like *They have seen her*, which cannot mean *They saw her*. Finite T must be specified for PAST or PRES, whereas an infinitive need not.

[29] I cannot provide a full and complete discussion of the evidence that he provides here. The reader is referred to Grano (2015), p. 130-132 for further details.

He notes that, for example, the present perfect comes with the presupposition that a recurrence of the event it describes is possible, as seen in (373a). This presupposition is carried onto the embedded clause in (373b), and remains awkward. Both (373a) and (373b) are ruled out because being born is something that can only happen once. By contrast, (373c) is acceptable, showing that no such restriction is present in the infinitive:

(373) a. # Mary has been born in Paris.

b. # Mary claims that she has been born in Paris.

c. Mary claims to have been born in Paris.

Grano notes that the present perfect cannot occur with certain time adverbials as demonstrated in (374a)-(374b), carrying onto the embedded clause in (374c). But the infinitive can, as in (374d):

(374) a. # The convict has escaped at 3.

b. The convict had escaped at 3.

c. # The convict claims that he has escaped at 3.

d. The convict claims to have escaped at 3.

Grano is right that there are differences between the embedded present perfect and the infinitival *have*-EN. But I believe these differences are all on the wrong track: they could arise simply from the possibility of PRES in the embedded present perfect, which is never present in the *have*-EN infinitive. In other words, these comparisons do not involve minimal pairs and are thus ill-formed: the infinitival *have*-EN does not have PRES, whereas the present perfect does. The presence of PRES leads to many differences that could be independent explanations for all of Grano's contrasts. For instance, embedded present perfect induces a lifetime effect while *have*-EN does not. (375a) is always fine, but (375b) could only have been uttered when Einstein was alive.

(375) a. Historians believe Einstein to have lived in Princeton.

b. # Historians believe that Einstein has lived in Princeton.

Due to this, I believe that one needs to compare embedded simple past with infinitival *have*-EN, which is what I will do in the next section. Once we do so, we will find fundamental differences between embedded simple past and infinitives with *have* that make these approaches more difficult to maintain.

### 4.5.2 Towards treating *HAVE*-EN infinitives as tenseless

The analysis that I propose here treats infinitival tense in propositional complements as an anaphoric tense, even ones with *have*-EN. There is no need to resort to a special simple PAST for infinitives with *have*-EN. Not only will this end up being empirically optimal and superior over past analyses, but it will also allow us to maintain our empirical generalization, without needing to posit a special exception.

The first argument in favor of this possibility is a very simple one, pointed out to me by David Pesetsky (p.c.). Notice the following contrast between (376a) which is completely unacceptable if the embedded infinitive with *have*-EN contains a mathematical truth, which are necessarily true at all times and worlds. On the other hand, (376b) has the simple past and is completely felicitous.

(376) a. # I believed 2+2 to have been 4.

b. I believed that 2+2 was 4.

The infelicitousness of (376a) is not expected by accounts where infinitival *have*-EN is treated as a simple past. The contrast seems to arise because of the properties of the perfect, which implies that the embedded eventuality in question has ended–an impossibility for mathematical truths. Notice the complete infelicitousness of both (377a) and (377b):

(377) a. # I believed that 2+2 had been 4.

b. # I believed that 2+2 has been 4.

This is one clear difference between the infinitival perfect and the simple past.

There is another empirical argument which strongly indicates that the infinitival *have*-EN is one and the same as the perfect *have*-EN. As Kiparsky (2001) notes, in matrix clauses the past perfect allows two distinct readings with point-denoting time adverbials whereas the present perfect is not acceptable at all. The two readings are represented below (from Kiparsky (2001), p. 14):

(378) a. # The convict has escaped at 3.

b. The convict had escaped at 3.

Reading 1: At 3, the convict had just finished escaping (the actual time of the escape may have been slightly earlier).

Reading 2: The convict had escaped, and the escape took place at 3.

The second reading may be easier to conceive of with the presence of the adverb *already*, such as *The convict had already escaped at 3*. The simple past only admits the second reading. This can be verified with the usage of the adverb *already* which is awkward: putting a *had* fixes it.

(379) The convict (??already) escaped at 3.

Reading: The convict had escaped, and the escape took place at 3.

This is not unique to the matrix past perfect. In fact, as Kiparsky notes, the embedded past perfect–which can undergo sequence of tense deletion and therefore has anaphoric tense–also has two interpretations. This is therefore a property of the perfect *have*-EN itself:

(380) The convict claimed that she had escaped at 3.

Reading 1: The convict claimed the following: at 3, she had just finished escaping (the actual time of the escape may have been slightly earlier).

Reading 2: The convict claimed: she had escaped, and the escape took place at 3.

The infinitival *have*-EN has the same ambiguity in readings, which is completely unexpected if it

were just a simple past. In addition, the presence of the adverb *already* is completely acceptable, much like the past perfect in (378b) above and unlike the simple past:

(381) The convict claimed to have (already) escaped at 3.

Reading 1: The convict claimed the following: at 3, she had just finished escaping (the actual time of the escape may have been slightly earlier).

Reading 2: The convict claimed: she had escaped, and the escape took place at 3.

The reason why these different readings is because *have* is ambiguous between multiple different readings, including *existential*, *universal* and *resultative* readings.[30] The existential reading in (382) is used to assert that there have been one or more instances of an event over an interval that began at some point in the past, and extends up to the reference time. By implicature, it does not occur at the reference time itself.

(382) *Existential*: Fred has visited Paris several times.

The universal reading in (383) asserts that a single contiguous event obtains over an interval that begins in some past point and extends up to and includes the reference time:

(383) *Universal*: I have known him since 1960.

The resultative reading in (384) asserts that, between some past point and the reference time, there was a change of state.

(384) *Resultative*: The police have probably caught the suspect by now.

As Kiparsky points out, the ambiguity in both (380) and (381) simply arises as a result of a two-way ambiguity between resultative (Reading 2) and universal/existential (Reading 1) readings. This is very clear evidence that infinitival *have* does not involve any kind of special simple PAST, but is merely an instantiation of one of the lexical entries of the aspect marker *have*.

[30] Kiparsky builds upon earlier work by McCawley (1971), McCoard (1978), Mittwoch (1988) and Klein (1992) among others.

### 4.5.3 The Analysis

I believe that the apparent similarities between the simple past and the perfect arise due to their very similar semantics. The semantic contribution of both is to introduce an episode which is earlier in time than the time associated with the higher predicate. I provide definitions for both below, in which I treat tense as a generalized quantifier rather than a pronoun, although nothing hinges on this. The aspect is a function from times to truth-values to times to truth-values:[31]

(385) a. $[\![\text{PAST}_i]\!]^{w,t,g} = \lambda P_{it}$: $\exists t'$. $t' < t$ & $t' \in g(i)$ & $P(t') = T$

Tenses come with an index and are mapped to a set interval of times

b. $[\![\text{have}]\!]^{w,t,g} = \lambda P_{it}.\lambda t$: $\exists t'$. $t' < t$ & $P(t') = T$

Thus, the following two sentences end up having an identical LF, if the embedded tense becomes anaphoric under SOT, to mirror the anaphoric tense in the infinitive.

(386) a. Caitlin claimed that she had been pregnant.

b. Caitlin claimed to have been pregnant.

c. LF: $\lambda w \lambda t \exists t'$: $t' < t$ & $t' \in g(i)$ & $\forall \langle y,w',t'' \rangle \in$ claim(Caitlin, w, t'): $\exists t'''$. $t''' < t''$ and y is pregnant in w' at t'''

This, together, with my analysis of tenselessness in eventive complements such as those of *manage* in terms of tense sharing allows for a straightforward solution of the puzzle noted by Grano and Landau, repeated in (387a)-(387b).

(387) a. * Earlier today, Mary managed to have closed the window yesterday.

b. Earlier today, Mary claimed to have closed the window yesterday.

[31] I abstract away from more complicated analyses of the perfect such as Nishiyama (2006)'s in which the perfect introduces an eventuality and a state. This would not affect the analysis here.

Here, I believe that the difference arises from the intensional nature of the complement of *claim* but not of *manage*. We have already discussed Grano's own explanation for why future-oriented readings of *try* are unacceptable in (366) above. As such, I believe that (387a) is unacceptable for the same reason that a sentence such as *Earlier today, Mary closed the window yesterday* is self-contradictory. Intuitively, due to the semantics of *manage*, it is apparent that in (387a) the time of Mary's managing to do X and Mary's closing the window are identical. Thus, the adverb *earlier today* and *yesterday* modify precisely the same time, and leading to a clear contradiction.

By contrast, the possibility of anaphoric tense in (387b) does allow such disparate adverbials. The infinitive does have its own tense value, but it is indirectly bound by an operator and within an intensional context. This is ultimately similar to how a contradiction is obtained in a sentence such as (388a) but not in (388b). (388a) is completely unacceptable if Caitlin's pregnancy hasn't ended, whereas (388b) is perfect. This is due to the intensional nature of the embedded complement of *claim* but not of *manage*. I believe the same thing is going on with tense.

(388) a. * Caitlin managed to get pregnant today, but she isn't pregnant now.

b. Caitlin claimed to be pregnant today, but she isn't pregnant.

Now, I am not the first to suggest that perfect infinitives are tenseless. Ogihara (1996) claims the same, although without details. He provides the following example, in which he states that the infinitive has a null-tense like meaning which the perfect pushes into the past:

(389) John promised to visit Mary on December 15th.
He also promised to have finished the assigned task by then.

Ogihara notes one piece of data that one might take to be problematic for the idea that perfect infinitives are tenseless. In (390a), the time of Mary's being innocent can be interpreted to be at the same time as Mary's claim. The same is seen in the participial clause in (390b) which is also apparently tenseless, and the main clause has present tense. It seems that *have*-EN alone can serve as a trigger for

SOT phenomena, then, and this prima facie seems easier to explain if infinitival *have* truly is simple past, following Grano, Landau and Pesetsky.

(390) a. Caitlin believes Mary to have claimed that she was innocent.

b. Having realized that she was in the wrong, Mary is now trying to change.

Ogihara takes this to be evidence that in addition to PAST, the perfect alone can also trigger SOT. As noted previously, they have a very similar semantic contribution, so this isn't implausible. To provide independent evidence for this conclusion, Ogihara notes that preterit expressions in general can trigger SOT, and not just PAST. For instance, he notes that SOT phenomena can be observed in preterit noun complements without tense marking (391a)-(391c), in which the past tense morphemes refer to a simultaneous episode as that of the noun complement (in bold):

(391) a. **Mary's earlier (claim)** that she was innocent is well-known.

b. I still recall **Mary's public announcement** that he had cancer.

c. This contradicts **Mary's (earlier) claim** that Caitlin would win the prize.

For instance, in (391b), the simultaneous regarding between the time of the announcement and the time of having cancer cannot be guaranteed just by assuming that the noun complement is in the past tense. If Mary's announcement precedes the speech time, the time of Mary's having cancer must precede the announcement time, or be simultaneous with it. This is precisely like the generic cases of SOT with verbal complements. Ogihara therefore notes that the data in (391a)-(391c) cannot be explained away simply by assuming that a past tense morpheme is interpreted as if it were unembedded. Thus, preterit expressions more generally trigger SOT phenomena, and not just PAST.[32]

[32] The reader is referred to Ogihara (1996) (p. 134) for a definition of such an SOT rule. He assumes that preterit expressions have a [+past] feature which triggers SOT. [+pres] can also trigger SOT, but [+fut] cannot. This is evidenced by the fact that the future reading of a noun complement cannot trigger SOT, as seen below. This is likely to do with the nature of future tense, which Abusch (1984) has decomposed.

(i) a. ? Caitlin expected Mary's claim that she is drunk.

## 4.6 Conclusion

This chapter has provided a formal semantic framework for the different types of infinitives that appear to be attested empirically. The framework itself was built on the crosslinguistic generalization that infinitives cannot bear PAST or PRES–in other words, they are necessarily deficient in tense. Although many authors such as Ogihara (1996) and Wurmbrand (2014b) have implied something similar, such a generalization has not yet been clearly stated in the literature, nor has it been defended from an experimental or a crosslinguistic perspective.

I have made this generalization by presenting a detailed typology of the various kinds of deficiency that infinitival constructions can have, as summarized below:

(392) *Three kinds of infinitival temporal deficiency*

a. *Anaphoric tense*: There is a deleted tense variable bound by a higher lambda abstractor.

b. *Tense sharing*: The matrix and embedded clauses share the same tense values.

c. *True tenselessness*: The clause is entirely temporally deficient, and its temporal interpretation is the result of an implicature.

In doing so, I have extended their observations to infinitival adjuncts in addition to complements. At the very least, I hope to have shed a bit of light on a notoriously vexing problem, and helped alleviate some controversy regarding the temporal interpretation of infinitives.

b. Caitlin expected that Mary will claim that she is drunk.

# 5

# Concluding Remarks

In my view, the ultimate goal of a generative syntactician is to help come to an understanding of the nature and origins of syntactic structure. In other words, syntacticians want to know more about the innate principles that guide the generation of sentences. This final section discusses the possibility of whether the empirical generalizations proposed in this dissertation might shed some light on these principles. To be more specific, my goal is to raise a purely empirical puzzle for the Strong Minimalist Thesis (SMT), according to which the only innate syntactic property is Merge. My concluding claim will be to raise the possibility that at least some of the cartographic template of the C domain is purely syntactic, and thus innate to the language faculty. This will be based on data presented previously in Chapter 2, involving the high and low ordering of complementizers crosslinguistically. I will also discuss whether what bearing this data has on a strict conception of

cartography like Cinque's (1999), which posits a universal hierarchy of functional projections.

This might seem like a controversial claim. For the most part, my generalizations don't appear to be based *purely* on syntactic principles. As we will shortly discuss further, much if not all the cartographic blueprint might be explainable in terms of semantic and pragmatic reasons that are independent of syntax. Thus most of the crosslinguistic patterns discussed in this dissertation would not shed any light on the nature of the language faculty. But in my view, the existence of high and low complementizers may not be amenable to such an explanation. In other words, the language faculty may specify two possible locations in which complementizers may be base generated and Merged, as schematized in (422) below:

(393) $\quad CP_2 > ... > CP_1$

If this is true, it raises a problem for saltationist theories of language evolution in which language evolve in just one step. Many linguists, such as Berwick (1998), Berwick & Chomsky (2011, 2016), Chomsky (2002, 2005), Hornstein (2009), Lightfoot (1991), Moro (2008), Piattelli-Palmarini (2010), Piattelli-Palmarini & Uriagereka (2004, 2011), Miyagawa (2017a) and Miyagawa et al. (2014), have proposed that language emerged suddenly, though the precise details may vary among these accounts. Under a Chomskyan hypothesis of language evolution, natural language emerged suddenly when humans gained the ability to generate recursive syntactic structures, i.e. Merge. The pieces were already in place for a single mutation granting Merge to unlock the full human capacity for language. So, the reason why the structure in (422) could be problematic if innate is because it implies that there are, at the very least, two steps to language evolution. Any kind of purely syntactic ordering restriction on Merge, as required by (422), would have to have evolved, as well.

Another topic to be discussed in this chapter is how the Minimalist Program appears to be at odds with the cartographic enterprise, which has provided the foundation of this dissertation. Although the theory of cartography proposed in this chapter (and Chapter 2 previously) is relatively

minimal in its assumptions, the theory proposed by Cinque (1999) is far richer in the hierarchy of functional projections that it assumes, which could be taken to be innate given the richness of the data and its non-coincidental ordering. But the Minimalist Program attempts to shift the burden of the vast majority of syntactic patterns to extralinguistic facts such as logical reasoning and computational efficiency, creating a tension. This chapter proposes a theory of innateness that is somewhere in between the strong conceptions of Minimalism and cartography.

This chapter is structured as follows. Section 1 presents Chomsky's (2004) definition of the SMT, together with a discussion of what it would entail and what would falsify it, in addition to a discussion of the Principles and Parameters (P&P) framework which predated the Minimalist Program. Section 2 introduces the reader to Rizzi and Cinque's framework, laying the foundation for the puzzles presented in this chapter, also discussing its consequences on a strong conception of cartography. The consequence of this is that Darwin's problem remains, given the falsity of the SMT. I provide a tentative discussion in 3 of how one might attempt to solve this problem via Progovac's (2009) gradualist approach to language evolution. Section 4 concludes.

## 5.1 The Problem of Language Evolution and Generative Grammar

This section provides a background on issues regarding language evolution and its place in generative grammar. I introduce the problem in 5.1.1 and the Principles and Parameters framework in 5.1.2, while introducing the reader to a more formal definition of the SMT in 5.1.3. 5.1.4 lays the foundation of how criticism of the SMT might look like, pinpointing particular areas of vulnerability that might arise once we start looking at more language-specific evidence.

### 5.1.1 How language evolved

Determining how language evolved is a notoriously vexing problem for multiple reasons. There is, of course, the dearth of empirical evidence: early human language has not left behind many archaeological traces. Regardless, the little evidence that is available has allowed archaeologists and paleoanthropologists to preliminarily establish the following facts about human language evolution, which ends up making the problem of language evolution even more troubling.[1] First, humanity can trace its origins to a group of anatomically modern *Homo sapiens* living in eastern or southern Africa 150,000-200,000 years ago. These humans had language, or at the very least were linguistically capable: for instance, engravings on red-ochre in South Africa provide evidence for symbolic and abstract thought.[2]

By contrast, it appears that the Neanderthals did not have such capacity for symbolic thinking; they were present in Europe even as recently as 40,000 years ago. As Pagel (2013) points out, art, sculptures, musical instruments and specialized tools made by *Homo sapiens* in Europe had become very common at that point. But there is no such evidence of similar creations by Neanderthals–in fact, it appears that they did not even sew their own clothes, instead merely draping themselves with skin. It appears, then, that language must have evolved 150,000-200,000 years ago, together with the first population of *Homo sapiens*.

It is hard to reconcile this with the complexity of language. To see why, let us start with Chomsky's (1980) P&P framework, which will soon be presented in further detail. In P&P, differences between languages were captured via parametrizing a finite set of permissible perturbations. For example, it is well known that a language like Turkish is classified as head-final (at least for the most part), whereas a language like English is classified head-initial. One would have the parameter head-initial vs. head-final to account for this difference. Thus, all syntactic possibilities across languages

[1] My discussion here of the archaeological evidence is based on Pagel (2017).
[2] See Henshilwood et al. (2002) and Henshilwood & Dubreuil (2009) for further discussion.

might be accounted for in terms of different parametric values. Syntax, then, ends up looking quite similar to the Periodic Table, like atoms combining into many possible different molecules, as Baker (2002) has suggested.

Now, generative linguists commonly accept that linguistic capacity is due to the *faculty of language*, or *universal grammar* (UG), which is innate to all human beings. In other words, there is an innate system of mechanisms and principles that are unique to humans which is used for language acquisition. Chomsky (2000b) calls this innate system a "language organ": for generative linguists, it is the object of study in the same way that biologists study literal organs like the heart or the lungs.

But the conjunction of the fact that language is innate together with the P&P framework would entail a paradox: namely that it is impossible for so many parameters, potentially in the hundreds, or even thousands, to have evolved. There are two reasons for this: most pressingly, such parameters could not have evolved in a mere 150,000-200,000 years, which, as has been known since Darwin (1859), is a very short amount of time for evolutionary change. Significant change often takes millions of years. And it is also hard to imagine that such parameters could have exerted a strong enough evolutionary pressure to lead to "fruitful sex" in the words of Lightfoot (1991) .

By the early 1990s, due to the problems just mentioned above, Chomsky and other linguists had reasonably questioned the amount of computational principles and parameters in UG. The most optimal solution would be to assume that UG reduces to the absolute simplest computational system–perhaps nothing more than the recursive, structure-building operation Merge–which has been called the SMT. The SMT has been defined in many different ways in the literature.[3] But more generally, one could view the SMT as claiming that all of the properties of human language syntax can be derived from three things:

(394) a. the syntactic operation Merge

[3] I will focus on a definition provided by Chomsky (2004) in the upcoming section.

b. interface conditions (involving semantic and phonetic restrictions)

c. principles of "efficient computation"

Under this way of thinking about UG, Merge is the only linguistically proprietary entity. Chomsky (2020) points out that this radical conclusion seems paradoxical: properties like the linear order of words and copy deletion have nothing to do with language per se. These simply arise from interface conditions and principles of efficient computation, both of which are language-independent. The main attraction of the SMT is that it provides an immediate solution of Darwin's problem. That is, it makes it conceivable for language to have evolved suddenly, as the result of a single mutation, which endowed the operation Merge onto a single individual 150,000-200,000 years ago. This mutation could have, indeed, led to "fruitful sex," given the great advantages in communication that possessors of the mutation would have had.[4]

If Merge is the only linguistically proprietary entity, though, then one might wonder how crosslinguistic similarities and differences, especially those discussed in the dissertation, could be captured. As we will discuss in great detail shortly, a Chomskyan explanation of such patterns would require that they be explained in terms of interface conditions, or by principles of computational efficiency. But I do not believe that interface conditions are sufficient to explain *all* crosslinguistic patterns. To be more specific, I will argue that the positioning of high and low complementizers is linguistically proprietary, because it is a purely syntactic property.

Although the SMT has been questioned a great deal already in the literature, this dissertation stands out in that it goes beyond merely questioning it: it provides a specific instance in which the SMT might go astray.[5] Although I believe that the guiding philosophy of the Minimalist Program is

[4]However, as Lewontin (1998) notes, it is also plausible that in a species lacking linguistic competence a very likely scenario is that individuals who obtained linguistic capability might instead be ostracized from their community or even killed.

[5]See Satık (2022c) for an additional and fully independent argument against the SMT based on a crosslinguistic pattern, in which I argue for the existence of macroparameters in the sense of Baker (2008) . The SMT entails that all parameters that lead to crosslinguistic variation are attributed to the differences in the features

right, a "Weak" Minimalist Thesis may be needed to account for the crosslinguistic patterns that we will see in this chapter.

### 5.1.2 Principles and Parameters

Linguistic variation is ubiquitous. Every aspect of language, including syntax and phonology, seems to vary across languages. Under the terminology of Chomsky (1986) , the linguistic variants which are cultural entities–in the sense that anyone who reads this paper is an English speaker, for instance– are E-languages. However, individuals who speak the cultural entity we call *English* each have their own way of internalizing the set of rules and systems that characterize it. For instance, while some speakers may permit weak crossover constructions (*Who$_i$ does her$_i$ father love?*), others may not. Under Chomsky's terminology, each speaker has their own I-language, and variation is found in both E- and I-languages.

Linguistic theory has been driven by the search for language universals–properties which all languages have in common. There have been two paths which linguists have taken in this search. Under the Greenberg (1963) approach to language universals, language typologists catalog the structural features of languages to find common patterns across them. Greenberg's original sample had 30 languages; the *World Atlas of Language Structures* currently reports data from a total of 2662 languages.

More relevant for our purposes is the second path, inspired by the work of Noam Chomsky, who has consistently argued that humans have a biological predisposition for acquiring language. The *poverty of stimulus* argument, though controversial, is exceedingly simple. It is difficult to reconcile

of lexical items. Such parameters are called microparameters. According to Baker, there are parameters within the general principles that shape natural language syntax; in other words, microparameters alone are not sufficient to account for crosslinguistic variation. Baker's (2008) crosslinguistic evidence, based on a survey of case and agreement patterns 108 languages, provides evidence in favor of the existence of such macroparameters. Such macroparameters may also be proprietary, in addition to Merge–even if macroparameters can be reduced to microparameters. I refer the reader to Satık (2022c) for further details.

the fact that languages are extremely complex together with the observation that children pick it up very quickly with little instruction needed.

This indicates the presence of some kind of innate cognitive bias shared by all humans, which *constrains* the hypothesis space in which the learning of languages takes place. One way of characterizing this bias is to constrain the possible grammar that a language can have. Given that, by definition, such constraints must be universal, UG ought to manifest as structural crosslinguistic universals. This chapter takes for granted that UG exists, though as we will see, generative linguists might disagree on what UG consists of.

Given that UG raises constraints on the set of possible I-languages, this raises an immediate problem. On one hand, we have very robust constraints on what languages can look like. On the other, we witness a great deal of structural crosslinguistic variation that seems hard to accommodate with the existence of UG. As such, Chomsky (1981) developed the aforementioned P&P framework to reconcile UG together with linguistic variation. First, UG has principles which provide constraints on possible grammars; second, parameters specify the degree to which these possible grammars can vary. Both principles and parameters are innate, admittedly increasing the complexity of the innate capacity for language and raising Darwin's problem for the evolution of language. How could such principles and parameters have evolved?

### 5.1.3 The Strong Minimalist Thesis

Indeed, as Berwick & Chomsky (2016) (B&C) point out, any theory of UG, at a bare minimum, has to meet the condition of evolvability. It becomes more and more difficult to meet that condition as we stipulate the presence of additional computational mechanisms like principles and parameters that are innate to all humans. According to Berwick and Chomsky, the only way to meet this burden is via stipulating that syntax itself is simple, and that it evolved as the result of a single mutation. For them, the only serious way to approach the problem of language evolution is to assume that syn-

tax is nothing more than the single and optimal syntactic operation Merge, allowing for recursive sentence structure. This is the simple idea behind the SMT.[6]

Chomsky (2000a) provides a similar definition of the SMT as follows: *language is an optimal solution to legibility conditions*. This follows the assumption, defended in detail by B&C, that the generative process is optimal from the perspective of efficient computation. Language keeps to Merge, which is the simplest possible recursive operation that is capable of satisfying interface conditions while being efficient. B&C compare language to snowflakes, which is shaped by the laws of nature. By contrast, language is shaped by the interfaces and principles of efficient computation.

Each derivation, at its conclusion, is accessed by the phonological and semantic interfaces for further evaluation. The phonological interface is instantiated by a sensorimotor system for externalization, such as production or parsing. It might be responsible for, among other things, the deletion of Copies in a syntactic derivation. The semantic interface, on the other hand, is instantiated by a conceptual-intentional system for "thought," namely inference, planning and interpretation, among other things. Conditions on representations such as Case theory, binding theory, control theory, θ-Criterion might all be accounted for via this system. These systems are, however, language external, because they are not a part of UG.

We are now ready to present the more formal definition of the SMT by Chomsky (2004) . Suppose that the faculty of language has a genetically determined initial state $S_0$. $S_0$, which is UG, determines all the possible states that a particular language L can be. The goal of the minimalist is to reduce the number of elements present in $S_0$. From the perspective of language acquisition, we are initially concerned with the following categories (395a)-(395c):

(395) a. unexplained elements of $S_0$

b. interface conditions (the principled part of $S_0$)

[6] See Freidin (2021) for a survey on the various presentations of the SMT by Chomsky.

c. principles of efficient computation

Chomsky (2004) defines the SMT as the claim that there are no unexplained elements of $S_0$: (395a) is empty. Although Merge is the linguistically proprietary operation, it is an explained element rather than an unexplained one, according to Chomsky: it "comes for free" simply because it is the simplest possible operation that accounts for the recursion in human language. Case, agreement, binding theory, the deletion of copies, and all other operations and theories taken to be a part of syntax all should be reduced to either (395b) or (395c), according to Chomsky.

For instance, Chomsky's own theory of the operation Agree holds that a probe P deletes its uninterpretable features by valuing them with the interpretable features of goal G. This seems to be an operation in syntax proper. One's natural inclination is to suppose that, like Merge, it is a part of UG. Why should uninterpretable features, and Agree, exist at all? Chomsky proposes that these are in fact part of the optimal mechanism in order to account for displacement phenomena in syntax, and so can be reduced to (395b)-(395c). The reduction of other phenomena such as control and binding, among other things, is also supposed to proceed along these lines. But one might take any aspect of language description to be a serious challenge for the SMT, given that it is not very well-worked out.

At present, however, Chomsky and other Minimalists grant that they are not able to offer formal definitions of computational efficiency.

However, for the purposes of this chapter, I will put aside such issues. Instead, my goal here is to focus on language-specific puzzles that might arise for the SMT, which as far as I am aware is thus far novel in the literature. My hope is that this will lead to further fruitful discussions on the role of the SMT in syntactic theory.

### 5.1.4 Puzzles for the SMT

Thus far, it seems there has been little discussion in the literature regarding what the hypothetical truth of the SMT would entail.[7] The first entailment is that the SMT commits one to Borer's (1984) conjecture, which is defined as follows:

(396) The Borer Conjecture

All parameters of variation are attributable to differences in the features of particular items in the lexicon.

Here is why. There is no doubt that there is crosslinguistic syntactic variation. If it truly is the case that there is nothing more to syntax proper than Merge, then it alone cannot account for the vast amount of variation that is attested. Nor is it possible to say that different languages have different principles of efficient computation. Therefore, all variation can only be as a result of the different features present in items of the lexicon. As such, Chomsky (1995) incorporates a more specific version of this conjecture into his Minimalist Program, which has been referred to as the Borer-Chomsky Conjecture by Baker (2008) . Given that there are no syntactically proprietary elements apart from Merge, all variation can only be due to the presence of features visible in the two interfaces: the conceptual-intentional and sensorimotor systems. Chomsky stresses that Logical Form (LF) and Phonetic Form (PF) are not the same thing as these systems respectively.

Preminger (2020) mentions a second entailment of the SMT, independent of the Borer-Chomsky Conjecture.[8] It also commits one to the following conclusion: if there is any cause for Merge apply

[7] The very fact that phonological variation exists might be taken to refute the SMT. However, my goal in this chapter is to focus on syntactic phenomena, and I leave this for future work.

[8] Preminger also claims that the SMT appears to commit one to (a non-trivial version of) the Sapir-Whorf hypothesis. Preminger uses an example of syntactic variation between English and Kaqchikel to illustrate his point: in Kaqchikel, the subject of a transitive clause cannot be targeted for focalization, relativization or wh-interrogation, whereas it can in English:

(i) It was the cat who licked the child.

or not apply, and this cause is not explainable by reference to the interface conditions (395b) or principles of efficient computation (395c), then it must also be a linguistically proprietary entity, which would violate (395a), given that it would be an unexplained element of $S_0$. This will end up forming the basis of the objection based on cartography in the forthcoming section. If Merge can apply in a very specific, cartographic order, this further indicates the existence of more unexplained elements; it is exceedingly unlikely for (395a) to be empty.

Before moving on, I want to point out one potential point of contention. As just noted, Minimalists grant that the notions in (395b) and (395c) lack a formal and falsifiable definition. Therefore, how can we know for certain that the upcoming empirical cases I will present cannot be accounted for in terms of interface conditions and/or principles of computational efficiency, without knowing their precise definitions?

This does nothing more than to highlight the problem–the SMT is not falsifiable. At this point, when presented with empirical paradigms, our best option is to take Chomsky and other Minimalists at their word, and rule out explanations involving processes of computation and interface conditions via the process of elimination. Changing the definition of "interface conditions" or "principles of computational efficiency" when presented with novel empirical data has the risk of rendering them trivial.

## 5.2 Complementizers and Cartography

My goal in this section is to explore my hypothesis that the structure in (397) below is an innate part of syntax:

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According to Preminger, under the SMT, one has to conclude that differences between English and Kaqchikel speakers arise due to different conceptual-intentional content, and hence have different thought processes. He attempts to rule out the possibility that such differences arise due to the sensorimotor interface; however, given my lack of focus on issues of phonology in this chapter, I refer the reader to Preminger (2020) for more details.

(397) CP2 > ... > CP1

Under my account, the labels C2 and C1 do not have any semantic presuppositions; either may involve an irrealis or subjunctive complementizer, or a declarative/indicative complementizer, unless there are independent restrictions (for example, whether the clause is truncated/nonfinite or untruncated/finite). I will propose that assuming the innateness of this structure solves more problems than it raises, at least from a purely crosslinguistic perspective. I begin with an introduction to cartography in 5.2.1, presenting the puzzle based on the data from Chapter 2 in 5.2.2 and conclude the section with a more detailed discussion on the semantics of complementizers in 5.2.3.

### 5.2.1 Introduction to Cartography

The puzzles presented in this chapter come from the cartographic enterprise in modern syntax; in particular, I show that it is plausible for there to be at least some purely syntactic, ordering-based restrictions on Merge that cannot be reduced to interface conditions or principles of efficient computation. I will raise the possibility that at least some of Rizzi's (1997) cartographic blueprint of the C domain is purely syntactic, and is therefore an unexplained element as in (395a). But as we will see, the same set of data is also puzzling for a very rich conception of cartography which consists of many finely ordered functional projections, which leads me to proposing a "middle ground" approach which incorporates both the insights of the Minimalists on language evolution and the crosslinguistic evidence that cartographers have amassed since the inception of the cartographic enterprise.

Cinque & Rizzi (2009) note that there prima facie may be tension between Minimalism and cartography, if cartographic blueprints truly are innate. This appears to contradict the SMT. But they claim that there is no inherent conflict between the two viewpoints: because Minimalism studies the mechanism by which syntactic structure is created–via Merge–whereas cartographers study the

ordering in the maps that are created, though there is disagreement as to the nature of these maps that I hope to elucidate.

It is unclear what the right order of projections is in either Cinque or Rizzi's cartographic frameworks, but Cinque & Rizzi still think that this does not alter the fact that cartography is a relevant question for modern syntactic theory. Let's start by looking at Cinque's (1999) theory of the fine ordering of adverbs, although the focus of the puzzle presented in this chapter will not be adverbs, but instead the ordering of complementizers under Rizzi's conception of the split C-domain.

Cinque seeks to account for a crosslinguistic pattern regarding the ordering of adverbs that can appear in a sentence. If there are multiple adverbs in a sentence, for the most part, they have to obey the ordering in (398) (from Cinque (1999), p. 34).

(398) frankly > fortunately > allegedly > probably > once/then > perhaps > wisely > usually > already > no longer > always > completely > well

An example of this can be seen in English. Below, we have a sentence with two adverbs: *any longer* and *always*, and both appear before the verb. What we find is that the adverb *any longer* must precede the adverb *always*:[9]

(399) a. John doesn't any longer always win his games.

b. * John doesn't always any longer win his games.

Cinque tests Norwegian, Bosnian, Hebrew, Chinese, Albanian and Malagasy in addition to Italian and English. He finds that the ordering in (398) is maintained in each language. Of course, for such fine ordering to be attested in all of these languages would be a remarkable coincidence–it appears that there are some general cognitive constraints from which these patterns derive. Cinque argues

[9] There is one little catch with this data. Notice that the sentence *John doesn't always win his games any longer* is acceptable, in which *always* appears to precede *any longer*. This is also possible in Italian, according to Cinque, but only if *any longer* is emphasized. Without emphasis, it is not possible. As Cinque notes, appearances are deceiving: one could suppose that it involves movement of the adverb from its initial position.

in favor of the existence of many and finely ordered functional projections within each clause, into which adverbs can be inserted.[10] The full clausal hierarchies are shown in (400) below:

(400) Hierarchy of functional projections:

$\text{Mood}_{\text{speech act}} > \text{Mood}_{\text{evaluative}} > \text{Mood}_{\text{evidential}} > \text{Mod}_{\text{epistemic}} > \text{T(Past)} > \text{T(Future)} > \text{Mood}_{\text{irrealis}} > \text{Asp}_{\text{habitual}} > \text{T(Anterior)} > \text{Asp}_{\text{perfect}} > \text{Asp}_{\text{retrospective}} > \text{Asp}_{\text{durative}} > \text{Asp}_{\text{progressive}} > \text{Asp}_{\text{prospective}} / \text{Mod}_{\text{root}} > \text{Voice} > \text{Asp}_{\text{celerative}} > \text{Asp}_{\text{completive}} > \text{Asp}_{\text{(semel)repetitive}} > \text{Asp}_{\text{iterative}}$ (Cinque (1999), p. 76)

Note in particular the relatively low ordering of $\text{Mood}_{\text{irrealis}}$ relative to $\text{Mood}_{\text{speech act}}$, which will be relevant for the upcoming discussion, as subjunctive complementizers mark complement clauses in the irrealis mood with a future tense, while indicative or declarative complementizers mark clauses in the declarative mood.

Now, if these functional projections truly are innate, then they would be an unexplained element in UG, contradicting the SMT. But this is exceedingly unlikely: Chomsky et al. (2019) notes that taking this theory at face value would be unable to minimally meet the conditions of evolability and acquirability.[11] How could such fine ordering between adverbs like *any longer* and *always* have evolved? People even rarely use them in the same sentence. Based on such concerns, linguists such as Ernst (2002) have provided purely semantic explanations of Cinque's hierarchy. This can be fortuitously used by adherents of the SMT to account for (398) in terms of interface conditions. In other words, the empirical ordering in (398) and its theoretical counterpart in (400) could be explained via semantic or pragmatic reasons that are independent of syntax. I concur, and this does not raise any puzzles for the SMT.

[10] The first to argue in favor of this was Alexiadou (1997).
[11] See also Bobaljik (1999) for problems for Cinque's hierarchy.

### 5.2.2 The split C-domain

But let us move onto the cartography of the C domain. Chapter 2 has presented extensive evidence for the idea that there exist two kinds of complementizers: high, which by definition precedes all topics and focus-marked elements in the left periphery, and low, which follow them. To recap, here is a basic piece of evidence for this contrast. Rizzi (1997) provides empirical evidence for two different kinds of complementizers. In Italian, for example, we see in (401) below that it is impossible to place topics in a position to the left of the high complementizer *che*, but it is possible to place topics to its right.

(401) a. Credo che, il tuo libro, loro lo apprezzerebbero molto.
I.think that[+fin] the your book them it will.appreciate much
'I think that they will appreciate your book very much.'

b. * Credo, il tuo libro, che loro lo apprezzerebbero molto. Rizzi (1997) (p. 288), Italian

This contrasts with the behavior of the low complementizer *di* (which Rizzi calls a nonfinite complementizer), which only allows one to place topics to its left in (??).

(402) a. Credo, il tuo libro, di apprezzar-lo molto.
I.think the your book that[-fin] appreciate-it much
'I think that they will appreciate your book very much.'

b. * Credo di, il tuo libro, apprezzar-lo molto. Rizzi (1997) (p. 288), Italian

There is considerable crosslinguistic evidence that the distinction between high vs. low complenentizers is not unique to Italian. The data presented in Chapter 2 is summarized in (403) below; the reader may check section 2.1.2 in particular for all of the relevant data. The reader will notice that many of the presented complementizers are distinguished by indicative (realis) vs. subjunctive (irrealis) mood, which is of crucial relevance for the puzzles I will present in this section.

(403) a. **High indicative complementizers:** English *that*, Bangla *je*, Welsh *mai*, Italian *che*, Icelandic *að*, Romanian *că*

b. **Low indicative complementizers**: Irish *go*, Welsh *fe*, Welsh *mi*, Welsh *y*, Welsh *a*

c. **High subjunctive/irrealis complementizers**: Romanian *ca*

d. **Low subjunctive/irrealis complementizers**: Romanian *să*

e. **Other high complementizers**: Icelandic relative complementizer *sem*, Lubukusu *-li*

f. **Other low complementizers**: Lubukusu *mbo*, Icelandic *að*, Italian *di*

(403a) above is not an exhaustive list of all the indicative high complementizers seen in this dissertation; it is probable that the vast majority of the high complementizers that have been presented belong to this class. And although we saw evidence that Bangla *je* and English *that* are base-generated in a low position, for the purposes of this list only their surface position is of relevance. But regardless of whether one buys the generative enterprise, there really does appear to be two kinds of complementizers–one which necessarily precedes topics, and one which necessarily follows them.

The initial puzzle for the SMT is, in fact, exceedingly simple. Thanks to Preminger's observation, we noted previously that any kind of ordering on Merge that is innate would contradict the SMT, because it would be an unexplained element in UG. I granted, for the sake of argument, that all of Cinque's hierarchy could be reduced to semantic/pragmatic explanations, following Ernst (2002). I will even grant that much of Rizzi's hierarchy could be reduced to semantic/pragmatic explanations. Rizzi (2013) provides a possible explanation of the crosslinguistic asymmetry between the ordering of topic–which can be reiterated in many languages–and left-peripheral focus, which cannot. But I am not so certain that all of Rizzi's hierarchy can be reduced in such a manner.

Recall Preminger's point that any restriction on Merge would itself be an unexplained element in UG. Why must *that* or *che* in Italian be Merged *after* all topics? Why must *di* in Italian be Merged before all topics in the left periphery? A complementizer by definition simply marks a clause as the subject or object of a sentence. [12] Let us start by considering the possibility that the ordering of

[12] Though Heim & Kratzer(1998) treats the complementizer as semantically vacuous, There has been a

high and low complementizers might be semantically derivable. This is the most natural hypothesis: given that a high complementizer like *that* usually occurs with complements in the indicative mood, we would expect its ordering to arise from precisely this semantics. But there are two reasons to believe that this may not be on the right track.

The first reason is, of course, the fact that both high and low indicative complementizers exist as seen in (403a)-(403b) above, indicating that this ordering of complementizers does not depend on semantics. In some languages, the finite complementizer can (or must, depending on one's analysis) be base-generated in the low complementizer position C1, which is often the position for irrealis, nonfinite complementizers crosslinguistically. As mentioned in Chapter 2 previously, Hsu (2015) argues that the finite complementizer *je* in Bangla can occur either in C2° or C1°. Although *je* usually behaves as a high complementizer as we would expect in English, it can also precede non-focused definite objects, as in (404):

(404) Jon [chatro du-to-ke je dadubhai dekh-eche] bol-lo
John student 2-CL-ACC that grandfather see-PERF say-PST
'John said that grandfather saw the two students.' Hsu (2015) (p. 4), Bangla

This indicates that the position of *je* does not arise *solely* from the propositional semantics of the embedded clause. If it were, the Strong Minimalist might expect it to be limited to the high position, but it is not. As a matter of fact, following Hsu (2015)'s analysis, it must occur in both positions, because it is base-generated in C1 and raises to C2: *je* in Bangla must always occupy the low position at some point in the derivation. Under the SMT, *why* must *je* be base-generated in C1, if it is a declarative complementizer? This seems to be difficult to explain purely by reference to semantic hierarchies; this ordering is simply too free to be amenable to an SMT-style explanation. My account, which assumes that some syntactic structure is fully innate, explains the Bangla data very straightforwardly. It does not assume that either complementizer position has any semantic

recent program on the semantics of complementizers initiated by Kratzer (2006) which does provide them with meaning. Whether this affects my argument will be discussed in 5.2.3.

requirement, which it appears the Strong Minimalist has to, to get the right ordering.

To further drive this point, we can repeat the Welsh example seen previously in Chapter 2 in (405a)-(405b) below, which contains both a high and low indicative complementizer, *mai* and *a* respectively. (405a) shows that the complementizer *mai* is high, as it cannot be preceded by a topic. It seems difficult to derive the ordering of *mai* and *a* from their semantics alone, given that they both serve the same function; namely, marking a complement clause in the indicative mood, though one marks the start of the left periphery and the other marks its end.

(405) a. Dywedias i **mai** fel arfer y dynion **a** fuasai'n gwerthu'r ci.
said I COMP as usual the men COMP would.ASP sell-the dog
'I said that, as usual, it's the men who would sell the dog.'

b. * Dywedias i fel arfer **mai** y dynion **a** fuasai'n gwerthu'r ci.
said I as usual COMP the men COMP would.ASP sell-the dog Welsh

Thus, indicative complementizers can be both high and low. The same puzzle can be seen when we look at irrealis complementizers crosslinguistically, as (403c)-(403d) demonstrate, though the data is not yet complete. Here, I present additional data not previously shown in Chapter 2, involving the high subjunctive complementizer *čtoby* in Russian and the low irrealis complementizer *for* that occurs in English infinitives.

In Russian, the phonetic form of a high complementizer can vary depending on the meaning of the clause that it marks. I will show two things: first, high complementizers can be used to mark both realis and irrealis embedded clauses in Russian. Second, different languages like English may instead require the irrealis complementizer to be low instead. These two facts together indicate that the position of the complementizer is not semantically derivable; if the Borer-Chomsky Conjecture was on the right track, we might expect it to be limited to one position (high or low). But this does not seem to be the case.

In Russian, the complementizer *čto* is used to mark indicative embedded clauses, just like *that* in

English, while *čtoby* is used to mark subjunctive and irrealis finite embedded clauses. An example of *čtoby* in use is given below:

(406) Ivan xočet čtoby Maša pročitala/čitala [Vojnu i Mir]
Ivan wants that.SUBJ Maša read.PST.PERF/.PST.IMPERF War and Peace
'Ivan wants for Masha to read War and Peace.' Antonenko (2008) (p. 1), Russian

Like *čto*, *čtoby* appears to be a high complementizer. A topic may not precede it, but it is significantly preferable for a topic to follow it:

(407) * Ivan xočet [Vojnu i Mir] čtoby Maša pročitala/čitala *t*
Ivan wants War and Peace that.SUBJ Maša read.PST.PERF/.PST.IMPERF
(Intended reading) 'Ivan wants for Masha to read War and Peace.'

(408) Ivan xočet čtoby [Vojnu i Mir] Maša pročitala/čitala *t*
Ivan wants that.SUBJ War and Peace Maša read.PST.PERF/.PST.IMPERF
'Ivan wants for Masha to read War and Peace.' Russian

Given the possibility of scrambling in Russian, however, this test is not perfect. Though whether of Russian is a true scrambling language on par with Japanese is controversial, if Bošković (2004) is right, (413b) may involve movement to a VP-internal topic position, and not one to the left periphery. But there is another reason for believing that *čtoby* is a high complementizer, located in CP2 and not CP1. As mentioned in Chapter 2, *čtoby* is completely ruled out from infinitival complements in Russian, as in (409), indicating that it has a different distribution from English *for*:

(409) * Ja xoču [čtoby byt' zdes'].
I want COMP.SUBJ be.INF here Russian

The fact that the same position, C2°, can be taken up by both a subjunctive and an indicative complementizer in Russian indicates that the position is not semantically derivable.

In languages like English, the low complementizer *for* has an irrealis semantics. As in Chapter 2, I follow Adger (2007) in assuming that *for* is a low complementizer in FinP because it does not allow topics to its left or right:

(410) * I propose, [these books]$_i$, for John to read $t_i$

(411) * I propose for, [these books]$_i$, John to read $t_i$

Now considering the semantics of the clauses *for* can mark, as Pesetsky (2021) points out, a *for*-infinitive can have an irrealis or generic use, but not a factual one:

(412) a. For it to rain would be helpful. irrealis

b. For it to rain is always helpful. generic

c. # For it to rain was helpful last night. factual

(413a)-(413b) summarizes the preceding discussion, and the new data is added to part of (403) (marked in bold) in (413c)-(413d) below.

(413) a. English: The position of the irrealis complementizer appears to be in C1°

b. Russian: The position of the irrealis complementizer appears to be in C2°

c. **High subjunctive/irrealis complementizers**: Romanian *ca*, **Russian *čtoby***

d. **Low subjunctive/irrealis complementizers**: Romanian *să*, **English *for***

Thus languages may vary as to where the irrealis complementizer is marked: unlike other cartographic orderings, there is no requirement for irrealis complementizers to be high or low. This is further reason to believe that such an ordering may not be semantically derivable, unlike other orderings in the left periphery. Under my account, it is possible for C1 or C2 to have any kind of semantics given the innateness of their positions, so this freedom is expected. But this level of freedom in positioning is puzzling for the Strong Minimalist. My goal here has not been to raise full-fledged counterarguments for the SMT: given its unfalsifiability, I do not take this to be possible. But I want to provide the kinds of puzzles that a Strong Minimalist would have to address for the SMT to be able to compete with my hypothesis.

This data is perhaps even more relevant in regards to Cinque's (1999)'s cartographic approach, repeated (but abridged) in (414) below, but this time with the relevant functional projections in bold. According to Cinque, the subjunctive may be understood as a combination of T(Future) and $\text{Mood}_{\text{irrealis}}$, while the indicative or declarative mood is a type of speech act mood, necessarily higher than subjunctive marking, as shown in (414).

(414) Abridged hierarchy of functional projections:

$\textbf{Mood}_{\textbf{speech act}} > \text{Mood}_{\text{evaluative}} > \text{Mood}_{\text{evidential}} > \text{Mod}_{\text{epistemic}} > \text{T(Past)} > \textbf{T(Future)} > \textbf{Mood}_{\textbf{irrealis}}$ (Cinque (1999), p. 76)

We might thus expect all subjunctive complementizers to at the very least be lower than indicative complementizers. But the freedom of the positioning of complementizers–regardless of the moods that they mark–indicates that this is not the case. It is possible for indicative complementizers to be located at the bottom of the C domain, while it is also possible for subjunctive complementizers to be located at the top. At the very least, this indicates that the functional projections in the C-domain are not so finely ordered.

Do any of the projections in (414) belong to the C-domain, or are they all in the T-domain? Cinque does not identify $\text{Mood}_{\text{speech act}}$ as Rizzi's ForceP/my CP2, assuming that adverbs like *frankly*, *honestly* and *sincerely* are located in the specifier position of this projection. For instance, we find it is possible for *sincerely* to follow a subject with no separation by a pause, suggesting that the subject is located in Spec,TP, and as such *sincerely* must be in the T-domain.

(415) I sincerely hope you take out the trash.

All of Cinque's functional projections and empirical findings, then, do not reach into the C-domain. But it would be remarkably damaging to Cinque's project of finding a finely-ordered hierarchy of functional projections if his reasoning was limited to *only* the T-domain. If Cinque is right, it would be very surprising to note that while the functional projections in the T-domain are finely ordered,

those in the C-domain are relatively free. The relative freedom and so-called recursivity of TopicP in the C-domain is already one piece of evidence which indicates that, though there might be some kind of functional projections in the C-domain, it is not so constrained. While it isn't impossible for the T-domain to have many more finely ordered functional projections of course, but it does show the limits of Cinque's project, and whether the reasoning might go too far. This, I believe, indicates the need for a "middle ground" position between cartography and Minimalism, as I have presented here.

### 5.2.3 The semantics of complementizers

The conclusion that the position of a complementizer cannot be derived from its semantics might be premature. A recent program initiated by Kratzer (2006) on the semantics of complementation does provide complementizers with their own semantics. To see whether it might provide a way of deriving the ordering of complementizers via their semantics, I will discuss it here. This program was originally driven by Kratzer's observation that, if an attitude verb like *believe* takes propositional complements as in (416a), this cannot be extended when it takes a content nominal as an object in (416b).[13]

(416) a. Mary believes that Caitlin is pregnant.

b. Mary believes the rumor that Caitlin is pregnant.

The content nominal in (416b) is a description of an abstract object (the *rumor*). Kratzer takes such content nominals to be predicates of abstract objects that carry content, as in (417) below, where the subscript $x_c$ is used to indicate an abstract object:

(417) $[\![\text{rumor}]\!] = \lambda x_c.\ \text{rumor}(x_c)$

[13] See 4.4.1 for the traditional semantics of complement clauses involving doxastic alternatives.

A verb like *believe* cannot itself take a clausal complement but the content nominal is able to. Kratzer then proposes that clauses headed by *that* introduce quantification over worlds which are compatible with a content argument. The complementizer is given a semantics in (418) below, in which it selects for a proposition and it returns a description of an abstract object that carries content. The proposition is true just in case it is true in the worlds compatible with the content argument.

(418) $[\![\text{that}]\!]^{w,g} = \lambda P \lambda x_c.\ \forall w'\ (\text{compatible}(x_c)(w') \rightarrow P(w'))$

The CP and the content noun NP compose via intersection, making the CP an adjunct to the content argument:

(419) $[\![\text{the rumor that Caitlin is pregnant}]\!]^{w,g} = \lambda x_c.\ \text{rumor}(x_c)\ \&\ \forall w'\ (\text{compatible}(x_c)(w') \rightarrow \text{pregnant}(\text{Caitlin})(w'))$

The advantage of this semantics is that it allows for a single lexical entry for *believe* to account both (416a)-(416b). This account has been further developed by Moulton (2009, 2015), Bogal-Allbritten (2016), Elliott (2017), Bassi & Bondarenko (2020) and Bondarenko (2022) among others. There are reasons to believe that there is another *that* with a slightly different semantics, as well. Moulton (2009), for instance, suggests that a certain class of complementation verbs (which he dubs *wager*-class verbs) involve abstract events rather than objects. This is due to the fact that *wager*-class verbs do not select content nouns, as demonstrated below:

(420) a. * She said the rumor that Jesus will return again.

b. * She thought the belief that Caitlin was pregnant.

c. * I didn't wager the claim that the argument has nothing to do with probability.

All of this indicates that complementizers may not be semantically vacuous after all. But does this mean that the puzzle for the Strong Minimalist has been alleviated? I do not think so, because the semantics of the complementizers presented above do not contain, or have any reference to, the rest

of the left periphery. The semantics of *that*, for instance, does not require the complement clause to be propositional. For example, while the semantic notion of Topic may indeed be a subset of Focus, there is simply no relationship between the notion of an abstract object/event and the rest of the left periphery. Indeed, Kratzer's program was driven by concerns that have no relevance to the cartographic enterprise, so this is not surprising.

Might we instead look at the sensorimotor interface? It is difficult to imagine that the position of topics and focalized elements relative to complementizers matters in the phonological interface. Suppose, for the sake of argument, that one stipulated there was a phonological reason as to why *that* does not allow topics to its left. But in colloquial English, *that* allows topics to its left in certain cases, as demonstrated in (421a)-(421b) from Haegeman (2012) (p. 89) below.[14] These examples involve double complementizer constructions in English with two instantiations of *that*.[15] She assumes that adjuncts such as *when they arrived* are located in Spec,TopicP:

(421) a. She maintained **that** when they arrived **that** they would be welcomed.

b. He reminds me **that** in the days of Lloyd George **that** business leaders were frequently buying their way in.

And there does not seem to be reason to think that such complementizers play a role in principles of efficient computation. The fact that there are restrictions on *where* different complementizers must appear seems to contradict the SMT, given that they must be strictly ordered. At the very least, there appears to be some purely syntactic truth to Rizzi's cartographical blueprint. Indeed, my observation on the impossibility of high complementizers with infinitives further drives this point forward. Given that high complementizers are blocked from being Merged with an infinitive, this is further evidence in favor of ordering restrictions on Merge.

[14] But not in all dialects of colloquial English, as mentioned in Chapter 2.

[15] Because *that* never behaves as a low complementizer alone in English, it appears that *that* in FinP can only be licensed if *that* is also realized in ForceP.

All of the observations thus far have been theory-independent, in that they are purely empirical observations. *Why* should any of this be the case? As Preminger notes, anything that prevents Merge from applying is linguistically proprietary. This seems to imply the presence of unexplained elements in UG that force the position in which topics and focalized elements can be Merged with respect to complementizers. To conclude, there appear to be at least a small set of cartographic generalizations which are not amenable to a Chomsky-style reduction. There may indeed be an innate blueprint that is a part of UG. In my view, it is precisely the following structure that is innate:

(422) $CP_2 > ... > CP_1$

## 5.3 Towards a Gradualist Analysis of Language Evolution

I have proposed that it is possible for UG to carry a rudimentary blueprint of the C domain, specifying the position of high and low complementizers. If I am right, then I must confess that we are facing a fiendishly difficult problem. How could such a linguistically proprietary blueprint have evolved, in addition to Merge? It is unlikely that all of these syntactic constraints evolved saltationally–that is, a large and sudden mutational change from one generation to the next. We need more innate building blocks, as Haspelmath (2020) would suggest, and I also suggest in Satık (2022a) .

In order to maintain our hypothesis that language is innate–that UG does exist–it is necessary to consider an alternative to B&C's saltationist approach to language evolution. Many researchers have proposed gradualist accounts of language evolution, even in syntax.[16] To see how syntactic constraints on deriving movement constraints in the generative grammar framework, let us consider how Progovac (2009) derives islandhood under a gradualist account of language evolution.

[16] Apart from Progovac, some examples are Givón (1979, 2002, 2009) , Pinker & Bloom (1990), Newmeyer (2005), Jackendoff (1999, 2002), Culicover & Jackendoff (2005), Tallerman (2014), Heine & Kuteva (2007), Hurford (2007, 2012), Gil (2017) and Progovac (2009, 2016, 2019) among others. For a helpful survey of the field of language evolution, the reader is referred to Progovac (2019).

The seminal dissertation by Ross (1967) notes the existence of *islands*: these are defined as syntactic environments which do not allow movement out of them. Note that there is a clear difference in acceptability between (423a)-(423b) below. A classical example of an island is the coordination structure in (423b):

(423) a. What did Mary eat ham with <what>?

b. *What did Mary eat ham and <what>?

The existence of islands is puzzling from an evolutionary perspective. How could constraints on movement have led to "fruitful sex," in the words of Lightfoot (1991)? Why would a grammar with island constraints be selected over a grammar without islands? Of course, concerns such as these were the original kind of justification for B&C's saltationist approach.

Progovac (2009) suggests that islandhood constraints could have evolved gradually. Taking movement itself as an exceptional operation, she argues that islandhood is in fact the default state of syntax. Progovac makes the observation that movement itself is only available out of a subset of complements, forming a natural class. But the set of islands do not form one, because islands are things like conjuncts and adjuncts, among other things. According to Progovac, movement evolved from a proto-syntax that only had small clauses and one-word utterances. Subordination and movement evolved due to the need to embed multiple viewpoints within each other (for instance, to make attitude reports about someone else's viewpoints or thoughts). Adjunction and coordination were not sufficient enough for this purpose, as the example in (424c) illustrates. Only (424c) allows a person's knowledge about someone else to be reported:

(424) a. [As you know], [as Mary knows], he is a linguist.

b. He is a linguist, [and you know it,] [and Mary knows it].

c. You know [that Mary knows [that he is a linguist]].

We now have a gradualist account of islandhood–the need to be able to embed multiple viewpoints does seem important, given that it vastly increases the expressive power of language. But can such a gradualist theory be extended to a blueprint of the left periphery? This seems to be difficult, to say the least. And the reason it is so difficult is that the evolution of a left peripheral blueprint does not seem to be useful for the purposes of reproduction. But the goal of this chapter is not to show *how* such a blueprint could have evolved. My goal is more modest: I have only sought to merely show that there are unexplained elements of the language faculty.

But here are some remarks as to how the left periphery could have evolved. The starting point for any gradualist theory of evolution is that linguistic properties evolved as the result of a "feedback loop" between adaptive cultural and biological changes. It is easier to see how the evolution of topics, foci and other left-peripheral elements could be seen as more advantageous. The evolution of the left periphery could have been driven by the cultural need for speakers to disambiguate their utterances by marking a topicalized or a focalized element in a given sentence, which has clear communicative benefits.[17]

But this is only half of the story, given that I have not yet said anything about high or low complementizers. One possibility is that there is some truth to Chomsky's notion of computational efficiency, in that principles of computational mechanism require for languages to have positions for (potentially overt) heads that mark the start of the left periphery (CP1) and its end (CP2). This leaves open many questions, of course, but my goal here has been to provide a sketch of how such an approach could play out.

[17] The ordering of elements *within* the left periphery does not proceed along these lines; the ordering of topics and foci relative to each other could arise by the aforementioned Chomskyan interface principles, and not via evolution, as discussed in the preceding section.

## 5.4 Concluding Remarks

The fundamental goal of this chapter has been to suggest a middle ground approach between strong conceptions of Minimalism and cartography. I have done so by presenting a novel puzzle for the Strong Minimalist Thesis based purely on crosslinguistic evidence. The existence of a purely syntactic phenomenon, that is attested from language to language, would imply that Merge is not the only linguistically proprietary element present in the language faculty of humans. If the SMT is right, there can be no purely syntactic cause that makes Merge apply in a certain order. Furthermore, I have shown that the ordering of the high and low complementizers (whether or not they mark clauses that are in the indicative or subjunctive mood) is very free, which is at odds with a strong conception of the cartographic approach.

Admittedly, this might end up opening a more severe problem than the ones it solves. How could unexplained elements of the language faculty, in Chomsky's words, have evolved, in addition to the structure generating and recursive operation Merge? At the very least, my hope is to have helped to provide puzzles for a specific saltationist account of language evolution by Berwick & Chomsky (2016), which my hypothesis is able to account for straightforwardly. On the other hand, my hypothesis may require assuming that language evolved gradually in multiple evolutionary steps.

But this does not mean there is anything wrong with the generative framework. My goal here is not to reject the Minimalist Program. On the contrary, it would be unwise to discard the philosophy driving the Minimalist Program in its entirety, given that it is driven by reasonable evolutionary concerns. But I believe that a "Weak Minimalist Thesis" may be the right way forward for syntactic theory, and my hope is to have provided a respectable alternative here. Generativists have much more in common than disagreements: "Weak" Minimalists like myself and adherents of the SMT both agree that humans have an innate capacity for language. By adopting a "middle ground" approach between strong Minimalism and strong cartography, we need not give up the insights of lin-

guists who take Darwin's problem seriously, and nor do we need to give up the impressive crosslinguistic discoveries that cartographers have made.

Finally, I would like to emphasize that crosslinguistic patterns such as the ones discussed in this dissertation strongly indicate that comparative syntax may provide novel insight into the nature of the language faculty.[18] If there are patterns across languages that are deep and not coincidental, one has to ask whether they can be explained effectively via interface conditions or principles of efficiency. If they cannot, then one, as a last resort, may wonder whether aspects of the analysis might be a part of the innate human capacity for learning language.

To conclude, comparative syntax has the potential to make a major mark on our understanding of the human mind. Careful and detailed research into crosslinguistic phenomena that uncovers novel generalizations can help pave a path for cognitive science as a whole.

[18] See also Satık (2022c) for an independent argument against the SMT based on case and agreement patterns in Baker's (2008) survey of 108 languages.

# A

# Appendix

## A.1 Part A: Unincluded data in the crosslinguistic survey of the infinitival left periphery

Chapter 2 of the dissertation includes languages for which I have complete data regarding the infinitival left periphery. There are several languages with incomplete data (due either to my inability to find a native speaker consultant or due to a lack of data in the literature), or even statements in the literature without illustrative data. These might include extinct languages, as well. I am leaving it to future research to fill in the gaps.

### A.1.1 Old Norse

Further, although it appears to no longer be attested in Germanic today, Faarlund ((2015)) claims that arguments can precede both the infinitival marker and the verb in Old Norse. As in languages like Icelandic, *at* appears to be the phonetic form for both the infinitival marker and finite complementizer in Old Norse and Old Swedish.

(425) ek hafða nú ætlat [sex skip ór landi]$_i$ at hafa t$_i$
I had now intended six ships from country to have
'I had now intended to take six ships out of the country.' Old Norse

### A.1.2 Old Swedish

Kalm ((2016)) illustrates the same pattern we saw in Old Norse in Old Swedish:

(426) þa ær han skyldugher han at ola
then is he obliged him to oil
'Then he is obliged to oil him.' Old Swedish

Both Old Norse and Old Swedish appear to obey the ISG.

### A.1.3 Norwegian

Wheelock ((2015)) reports that Norwegian does not have wh-infinitives:

(427) * Det er uklart hva å gjøre
it is unclear what to do.INF
'It is unclear what to do.' Norwegian

Faarlund ((2015)) points out that argument preposing to a position before the infinitival marker, as in (425), is not allowed in Norwegian.

### A.1.4 Danish

Wheelock ((2015)) reports that Danish does not have wh-infinitives:

(428) * Han har glemt hvad at købe
He has forgotten what to buy.INF
'He has forgotten what to buy.' Danish

### A.1.5 European Portuguese

Villalba ((2009)) and Barbosa ((2001)) report that Spanish and European Portuguese respectively pattern with French, rather than Italian or Catalan, in not allowing CLLD within infinitives while having wh-infinitives. They do not provide illustrative examples.

### A.1.6 Bangla

Dasgupta ((1982)) reports that Bangla, another Indo-Aryan language, patterns with Hindi in that it lacks wh-infinitives.

(429) * je rosikota die sobayke hamsate sey rosikota
which joke with everyone.ACC laugh.CAUS.INF that joke
(Intended reading) 'the joke with which to make everybody laugh' Bangla

According to Hsu ((2015)) , the finite complementizer *je* in Bangla can occur in either ForceP (my CP2) or FinP (my CP1), indicating further that it is genuinely a TP language. It cannot occur in infinitives.

### A.1.7 Ukrainian

Ukrainian appears to pattern with Russian infinitives. (430a) is the baseline example, (430b) shows an example with licit topicalization within the infinitive. (430c) shows an example with contrastive

focus within the infinitive. (430d) involves a *why* within the infinitive, which was borderline according to the consultant. (430e) shows that the subjunctive complementizer is also ruled out from argumental infinitives, same as Russian.

(430) a. Ja choču [buty tut].
I want be.INF here
b. Ja choču [tut buty].
I want here be.INF
c. Ja choču [tut$_i$ buty (a ne tam)].
I want here be.INF and not there
d. ?? Ja spytav Ivana navishco bihty
I asked Ivan.ACC why run.INF
e. * Ja choču [shcob buty tut].
I want COMP.SUBJ be.INF here
Ukrainian

### A.1.8 Jordanian Arabic

A particularly interesting case of a language that appears to have a finiteness contrast despite not having traditional infinitives is in Jordanian Arabic. Al-Aqarbeh ((2011)) argues that finite complements are those which project a C domain, and nonfinite complements are those which do not project a C domain. Two illustrative examples are given, in which the complement clause cannot have a complementizer or an embedded topicalized element:

(431) a. ʕali bid-uh (*innu) il-banaat yi-lʕab-an.
Ali want-3SG.M (*that) the-girls 3-play-PLF
'Ali wants the girls to play.'

b. * ʕali bid-uh il-ghurfah il-banaat yi-naththif-an-ha.
Ali want-3SG.M the-room the-girls 3-clean-PLF-it
'Ali wants the girls to clean the room.'
Jordanian Arabic

On the other hand, a complementizer and embedded topicalized elements may appear with propositional complement clauses. According to Al-Aqarbeh ((2011)), nonfinite complements cannot have propositional semantics, at least in Arabic. This relates the presence of the C domain to finiteness in Jordanian Arabic.

## A.2 Part B: Details of the experiment

### A.2.1 Instructions

The survey takers were given instructions at the start of the survey. They were asked to pick the most natural sounding sentences from two options, and given the following examples:

(432) I asked my wife what time it is.

a. Natural option: What time is it?

b. Unnatural option: What time it is?

(433) John and Mary are school kids. John complains to a school teacher that Mary teased him.

a. Natural option: John said that Mary teased him.

b. Unnatural option: John said that Mary teased himself.

They were then asked to not think too deeply about the questions.

### A.2.2 Preliminary Questions

After the survey taker read the instructions, they needed to be split into the right group: whether they accepted Ogihara & Sharvit (2012)'s de re interpretation of PRES-under-PRES, or not. This was done by asking them to answer "yes" or "no" for one of the following questions. Each survey taker only saw one of these questions. The results of the experiment do not include these questions.

(434) John is preparing to go on a trip to Hawaii tomorrow, but he is keeping it a secret until the trip is completed. So, in two months, he is going to tell everyone that he had gone on a trip to Hawaii.

**Question**: Do you believe that this sentence is an acceptable way of describing this context?

a. In two months from now, John will claim that he is going to Hawaii tomorrow.

(435) Mary is preparing to give birth in the next few days, but she is keeping it a secret for a year because of her country's one child policy–she already has one child. Next year, once her country relaxes its restrictions, she is going to tell her family and friends that she had given birth.

**Question**: Do you believe that this sentence is an acceptable way of describing this context?

a. Next year, Mary will tell her family and friends that she is giving birth soon.

The survey taker was then taken to the next page of the survey, in which they were given 4 context-sentence pairs, consisting of 2 baseline and 2 novel questions. The template for the next page of the experiment was as follows (the questions were randomly ordered):

(436) a. 1 question regarding whether PRO needs to be read de se

b. 1 question regarding whether the infinitive has a double access reading

c. 1 question with the de re interpretation of PRES-under-*will* with simple present

d. 1 question with the de re interpretation of PRES-under-*will* with a futurate

### A.2.3 Baseline: Does PRO need to be read obligatorily de se?

The survey taker was given one of the following questions. This is one of the baseline questions in order to ensure that PRO needs to be read de se after all and the claim that has been made in the literature is correct.

(437) Mary is an elderly woman with dementia. She watches a video of a high school student solving a very difficult math problem in front of all of her classmates, and the teacher

congratulates that student. Mary says "that girl is very clever!" But that student is actually Mary herself, though Mary doesn't know it.

**Question**: Out of these two sentences, please pick the one which you think fits with this context more naturally.

a. Mary claimed that she was clever.

b. Mary claimed to be clever.

(438) At a party, John gets so drunk that he can't even feel pain. He accidentally lights himself on fire while trying to light a cigarette. He sees a man who he thinks is someone else in the mirror and says "that guy is on fire!" but he doesn't realize that it is himself.

**Question**: Out of these two sentences, please pick the one which you think fits with this context more naturally.

a. John claimed that he was on fire.

b. John claimed to be on fire.

### A.2.4 Baseline: Does the infinitive have a double access reading?

The survey taker was given one of the following questions. This is one of the baseline questions in order to ensure that the double access reading is not present with infinitives, and present with finite clauses.

(439) Back in 2016, Julia informed all her family and friends of her pregnancy. She gave birth the next year. It is currently 2021.

**Question**: Out of these two sentences, please pick the one which you think fits with this context more naturally.

a. Five years ago, Julia claimed that she is pregnant.

b. Five years ago, Julia claimed to be pregnant.

(440) A week ago, Dick caught the flu. He told his workplace that he was sick and couldn't make it to work. He is no longer ill.

**Question**: Out of these two sentences, please pick the one which you think fits with this context more naturally.

a. A week ago, Dick claimed that he is sick

b. A week ago, Dick claimed to be sick.

### A.2.5 Novel: pres-under-*will* with simple present

We now move onto the questions that were the object of investigation in the survey. The survey taker was presented with one of the two following context-sentence pairs:

(441) It is currently 2021, and Emily is pregnant. She will give birth in December of 2021. She refuses to inform anyone of her pregnancy until the start of 2022, but she will definitely tell everyone "I was pregnant in 2021!" once 2021 is over.

**Question**: Out of these two sentences, please pick the one which you think fits with this context more naturally.

a. Next year, Emily will claim that she is pregnant.

b. Next year, Emily will claim to be pregnant.

(442) Caitlin hasn't eaten all day because she has an essay due, so she's very hungry. But in an hour, she will finally get to eat with her friends. Right after she is done eating, going to say "Wow, I was starving!"

**Question**: Out of these two sentences, please pick the one which you think fits with this context more naturally.

a. In an hour, Caitlin will claim that she is starving.

b. In an hour, Caitlin will claim to be starving.

### A.2.6 Novel: pres-under-*will* with futurates

The survey taker was presented with one of the two following context-sentence pairs:

(443) Brian is preparing to buy a car tomorrow for his wife as a present, but he's keeping it a secret for her birthday next week. In a week, he will tell his wife "I bought you a car last week!"

**Question**: Out of these two sentences, please pick the one which you think fits with this context more naturally.

a. Next week, Brian will claim that he is buying a car for his wife.

b. Next week, Brian will claim to be buying a car for his wife.

(444) Grace is preparing to go on a trip to Hawaii tomorrow, but she is keeping it a secret until the trip is completed. So, in two months, she will tell her friends "I went to Hawaii two months ago!" once she returns.

**Question**: Out of these two sentences, please pick the one which you think fits with this context more naturally.

a. In two months from now, Grace will claim that she is going to Hawaii.

b. In two months from now, Grace will claim to be going to Hawaii.

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