

An Amphichronic Analysis of Modals of Necessity in Cuban Spanish

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Abstract

The present study is an analysis of two innovative uses of grammatical forms in the future domain of expression in Cuban Spanish. These are the past prospective construction *iba a*, which is acquiring uses as a hypothetical marker, and the obligation construction *tener que*, which is acquiring uses as a future marker. Two naturally-occurring examples of these phenomena are exemplified below.

- (1) [Context: Yuleidys is calling a bed and breakfast to confirm a reservation on behalf of her brother. She says:]
 - a. Estoy llamando por mi hermano que **tiene que** quedarse en tu casa.
‘I’m calling on behalf of my brother who **is going to** stay in your house.’
 - b. Expected interpretation: ‘I’m calling on behalf of my brother who **has to** stay in your house.’

- (2) [Context: Odaisy is discussing her young son’s eating preferences. The only thing he is willing to consume for breakfast are crackers and juice. There have been recent shortages and crackers are no longer available in the stores:]
 - a. Qué bueno que todavía hay jugo. Si no, **iba a** pasarla mal.
‘It’s good that there is still juice. If not, he **would have** a hard time.’
 - b. Expected interpretation: ‘It’s good that there is still juice. If not, he **was gonna have** a hard time.’

The present study will take an amphichronic semantic approach to the relevant phenomena. An ‘amphichronic’ approach has roots in grammaticalization theory (Bybee et al., 1994; Traugott &

Dasher, 2001) and is closely related to the emerging field of diachronic semantics (Deo, 2015a). This approach uses historical corpus analysis and experimental data to develop an account of the meaning of the innovative expressions, incorporating both synchronic and diachronic perspectives. Using the tools of formal semantics, this approach seeks to develop a precise definition of the meaning of the grammatical phenomena under study at each relevant stage in their history.

The principle semantic contribution of the present work is a constraint on the Kratzerian ordering source, such that all propositions in an ordering source are biconditional generalizations. I further constrain the ordering source by proposing that there are two principle categories of generalizations: UNIVERSAL GENERALIZATIONS and ACTION-ORIENTED PREFERENCES. It is from these two categories and a subsetting of these categories called an environmental state that all modal necessity meanings for the grammatical elements under study can be derived.

To test the theoretical analysis, I conducted semantic interviews with Spanish speakers in Cuba (n=44), presenting speakers with pairs of target sentences in controlled contexts. Each pair of sentences contained an innovative form and its canonical counterpart. Acceptability ratings from speakers confirmed that *tener que* is recruited into the future domain to mark (reasonably) absolute statements about the future. In particular, qualitative data suggests that Cuban Speakers are recruiting *tener que* as a conventional way to express future statements based on the characteristic behavior of an agent.

A historical variationist corpus analysis (Tagliamonte, 2012) of *ir a* revealed that, when both semantic and morphosyntactic factors were taken into account, the evolution of the motion construction *ir* ‘to go’ + *a* ‘in order to’ into the Spanish Periphrastic Future did not consist of an INTENTION stage of meaning—a conclusion that runs contrary to the hypotheses of prior research. Rather, when the construction was undergoing reanalysis in the 17th century, presumed settledness (cf. Kaufmann, 2005) accounts for non-motion readings of the construction. From this data, I propose that the motion construction was recruited in the future domain as an ENVIRONMENTAL STATE future construction. Through an acceptability judgment task, I demonstrate that Cuban speakers are recruiting *iba a*—the past form of the Periphrastic Future—into the hypothetical domain in

order to express a sub-class of hypothetical meanings that I characterize as environmental state readings: expressions of premeditated choices and choices that are constrained by external factors.

Taken together these analyses suggest that the future domain of meaning is, in fact, bifurcated into two readings: (1) generalization future and (2) environmental state. The innovations studied in this dissertation show that speakers are sensitive to this distinction when recruiting new grammatical material into the future and hypothetical domains of meaning.

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No dissertation is written alone. So many have supported me in my personal and academic development through graduate school that it is hard to know where to begin. It makes sense, I suppose, to begin with Terrell A. Morgan who has been a steadfast fount of guidance since I first arrived to Columbus. As I explored every facet of the broad landscape that is the field of linguistics, Terrell did not fail to guide me to the most interesting questions before me. As an adviser, he opened the door to diverse opportunities throughout graduate school that have made me into the researcher and teacher that I am today. I have been told by some of Terrell's former students that I remind them of him, and I cannot imagine a higher compliment.

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Beyond the members of my committee, many professors have had a major influence on the way that I think about language and approach linguistic problems. While I cannot possibly describe

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Vita

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Fields of Study

Major Field: Spanish & Portuguese

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Chapter 1

Introduction

1.1 Introduction

Some of the most fascinating avenues for linguistic research begin with a simple question: *What did you just say?* Such was the case for the two grammatical constructions whose unexpected use form the basis of this dissertation. I overheard both of these uses in conversations with native speakers of Cuban Spanish, and the work to get to the bottom of how these constructions are used and why they are even possible to begin with has turned out to yield a dissertation-sized analysis.

Here are the two sentences that started it all:

(3) [Context: Yuleidys is calling a bed and breakfast to confirm a reservation on behalf of her brother. She says:]

a. Est-oy llam-ando por mi hermano que **tiene que** quedar=se en tu
be-1s call-PROG for my brother COMP *tener que.PRES.3SG* stay=REFL.3SG in your
casa.
house

‘I’m calling on behalf of my brother who **is going to** stay in your house.’

b. Expected interpretation: ‘I’m calling on behalf of my brother who **has to** stay in your house.’

(4) [Context: Odaisy is discussing her young son’s eating preferences. The only thing he is willing to consume for breakfast are crackers and juice. There have been recent shortages

and crackers are no longer available in the stores:]

- a. Qué bueno que todavía hay jugo. Si no, **iba a** pasar=la
how good COMP still there.be.PRS juice if NEG *ir a*.PST.IPFV.3S PASS.INF=.3SG.F
mal.
badly

‘It’s good that there is still juice. If not, he **would have** a hard time.’

- b. Expected interpretation: ‘It’s good that there is still juice. If not, he **was gonna have** a hard time.’

In Spanish, *tener que* is most widely used as an obligation construction, which makes an utterance like (3) a paradoxical, if not rude, way to address the owner of a bed and breakfast. After hearing this utterance, I quickly followed up and confirmed that the intended interpretation of *tener que* in (3) was that of future and not of obligation.

The second construction, *iba a*, is a past prospective construction. The Spanish Periphrastic future is composed of the motion verb *ir* ‘to go,’ the destination or goal preposition *a* ‘to,’ and a verb in the infinitive form. Parallel to the often-called *be going to* future in English, the Spanish Periphrastic future can be used to talk about events and states that are posterior to a past moment when the auxiliary *ir* is inflected with past (imperfective) morphology. However, in (4) this past prospective interpretation is clearly not what was intended. Instead, the intended interpretation is that of a hypothetical conditional sentence.

These uses of *tener que* and *iba a*, while unexpected for speakers of most varieties of Spanish, are not at all uncommon among speakers of Cuban Spanish. And perhaps most importantly, when taking a historical perspective on grammar, these uses are not at all surprising. This can be found in two canonical expressions of future and hypothetical meaning in Spanish itself.

A more normative formulation of the utterances above is shown in (5).

(5) a. *Synthetic Future*¹

Est-oy llam-ando por mi hermano que se quedar-á en tu casa.
be-1s call-PROG for my brother COMP REFL.3SG **stay-FUT.3SG** in your house

‘I’m calling on behalf of my brother who **will** stay in your house.’

b. *Conditional*

Qué bueno que todavía hay jugo. Si no, la pasar-ía mal.
how good COMP still there.be.PRS juice if NEG 3SG.F PASS-COND.3SG badly

‘It’s good that there is still juice. If not, he **would have** a hard time.’

Qué bueno que todavía hay jugo. Si no, la pasaría mal.

These verbal paradigms evolved from an obligation construction in Latin: infinitive + *habere* ‘have.’ First, the construction evolved into a prospective marker where present tense inflection of the auxiliary yielded future readings and past (imperfective) inflection gave past prospective readings (Benveniste, 1968; Company Company, 1985/1986; Pharies, 2007, among others). Following the reanalysis of the obligation marker as a prospective construction, the past prospective formulation of this construction (i.e. *habere* conjugated in the Imperfect) eventually gained hypothetical uses (Harris, 1971, 1986). And of course, the past prospective readings of the Conditional were never fully lost as seen in examples like the following:

- (6) Juan me dij-o que **dir-ía** que sí.
Juan DAT.1SG say-PST.PFV.3SG COMP **say-COND.3SG** COMP yes.
‘Juan told me that **he would say** yes.’

Over time, phonological reduction of the auxiliary *habere* resulted in the Synthetic Future and Conditional verbal paradigms that are found in Spanish today.² These paradigms are documented in the earliest Spanish texts dated as early as the tenth century (Lyons, 1978), but their origin is clear: the Synthetic Future evolved from an obligation construction, and the Conditional evolved

¹As I will discuss in detail below, this form is arguably not the default form of future expression in Spanish; however, I present it here to highlight its historical relationship with the incipient future uses of *tener que* in Cuban Spanish.

²Pharies (2007) cites the following patterns of reduction: habeo > e, habes > as, habet > a, habemus > auemos > emos, habetis > auedes > eis, habent > an, habebam > ía, habebas > ías, habebat > ía, habebamus > íamos, habebatis > íais, habebant > ían.

from a past prospective construction. And, in fact, these patterns of grammatical evolution have been widely observed cross-linguistically and have been extensively studied by researchers who are dedicated to documenting and explaining these kinds of changes (Bybee et al., 1994; Dahl, 2000; Heine & Kuteva, 2002; Hopper & Traugott, 2003, among others)

So in one sense, the story ends here. While utterances like (3) and (4) may sound odd to speakers of most varieties Spanish, historical study of language shows us that—exaggerating slightly—it is only a matter of time before *tener que* becomes a future construction and *iba a* becomes a hypothetical construction in Spanish.³ There are forces of cognition and communication that act on these constructions and yield the innovations that we are finding in Cuban Spanish.

But, of course, the story does not end here at all. While the patterns of change are clear in the languages of the world, the reasons underlying these changes are not. In fact, there are two entire (sub)fields of linguistics that are dedicated to not only documenting these patterns of change but for discovering why these patterns exist. The first that I will discuss is the field of grammaticalization, and the second is the emerging field of diachronic semantics.

It is with these two fields of research that the present dissertation will dialogue. Through the study of *tener que* and *iba a* in Cuban Spanish, I aim to contribute to these bodies of research and advance what we know about the evolution of constructions like these. In order to resolve the questions that emerge along the way, I will develop a semantic framework that sheds light on broader questions of natural language semantics and pragmatics.

I will call my analysis an “amphichronic semantic” approach as a nod to Kiparsky (2006) who argues for an amphichronic program in the field of phonology. Such a program conceives of idealized stages or goal-posts toward which language evolution progresses, and these stages can be described in formal linguistic terms. Crucially, such an approach acknowledges that these goal-posts are related diachronically. As I will use the term here, an amphichronic program puts an emphasis on developing a theoretical account of these stages, but takes the diachronic facts as an essential element that such an account must explain.

³As I will explain in more detail below, when these changes occur it is necessary for *tener que* to lose obligation readings, but it is not necessary for *iba a* to lose past prospective readings.

1.2 “Amphichronic” semantics and why it matters

In order to understand what I mean by amphichronic semantics, it is important to step back and consider how the study of the evolution of grammatical systems has developed in the field of linguistics. The term grammaticalization was coined by Meillet (1912) who argued that there are only two processes by which grammatical material is created: paradigmatic analogy and “the passage of an autonomous word to the role of a grammatical element” (p. 131).⁴ But, of course, the basic ideas presented by Meillet were in development before his 1912 article. As observed by Lehmann (1995), thinkers such as Étienne Bonnot de Condillac and John Horne Tooke in the eighteenth century were writing about the transformation of words like nouns and verbs into grammatical affixes and prepositions.

In the nineteenth and twentieth centuries researchers of language began to develop theories such as agglutination theory (Bopp, 1816) and coalescence theory (Jespersen, 1922) in which they sought to provide systematic descriptions of the stages through which lexical material evolves into grammatical material. It was during this time that an explanation began to emerge for why linguistic material develops in this way: there is a fundamental tension between economy of expression and expressive exhaustivity. It is the tension between these two forces that puts into motion a cycle of grammatical change, described by Meillet (1912):

Languages thus follow a sort of spiral development; they recruit accessory words to obtain a strong form of expression; these words weaken, degrade and fall to the level of simple grammatical tools; new or different words are recruited for expression; the weakening begins again, and this continues without end.⁵ (pp. 140-141)

These basic ideas persist to this day, and their influence will be clear on the present approach. Lehmann (1995) attributes the development of these ideas to two largely independent linguistic traditions: Indo-European historical linguistics and language typology. He highlights the absence

⁴Original text: ‘le passage d’un mot autonome au rôle d’élément grammatical.’

⁵Original text: ‘Les langues suivent ainsi une sorte de développement en spirale; elles ajoutent de mots accessoires pour obtenir une expression intense; ces mots s’affaiblissent, se dégradent et tombent au niveau de simple outils grammaticaux; on ajout de nouveaux mots ou des mot différents en vue de l’expression; l’affaiblissement recommence, et ainsi sans fin.’

of structural linguistic perspectives from this body of work, noting that structuralist approaches dealt with discrete, static phenomena; whereas, the other two traditions focused on “processes and continuous phenomena, and thus could easily accommodate grammaticalization as a process which creates such phenomena” (p. 8). Interestingly, this division continues to this day, where stochastic approaches to the study of grammar, such as variationist sociolinguistics, tend to represent a greater share of the research on grammaticalization phenomena. I am in agreement with Lehmann (1995) when he argues that formal and usage-based perspectives on grammaticalization are not irreconcilable, and in fact, in the present dissertation I will take advantages of the tools used by both perspectives to inform my proposal.

More recent work has sought to build on the foundational observations made in prior literature and develop a theory of grammaticalization, seeking to provide principled explanations for the evolution of grammatical material. One seminal work in this body of literature is Bybee et al. (1994), in which the authors analyzed grammaticalization phenomena in genetically and geographically diverse languages in order to sustain claims about cross-linguistic generalizations. In this work, they seek to develop a predictive theory of grammaticalization in which they work to move beyond a description of observed phenomena and towards generalizations about the evolution of grammatical systems.

Here I will focus on four of their hypotheses—grouping two of these together—for a theory of grammaticalization:

- (7) a. Universal pathways
- b. Unidirectionality
- c. Semantic retention and Source determination

One of the most fascinating facts about language change is the observation that the meaning of grammatical forms evolves in predictable ways cross-linguistically. The hypothesis that grew out of this observation is that there are universal grammaticalization ‘pathways’ or ‘clines’ along which grammatical material evolves. It is important to note that by “universal,” Bybee et al. (1994) do not insist that these pathways describe patterns of change that always hold in any case whatsoever.

They are deliberate about calling these pathways universal tendencies.

This hypothesis follows a rich body of literature that observes that not only can grammaticalization be described as the phenomenon whereby lexical material become grammatical material, but also that cross-linguistically lexical items with *certain* meanings evolve into grammatical items with *certain* meanings (Heine & Reh, 1984; Bybee & Dahl, 1989; Heine et al., 1991, among others). Bybee et al. (1994) also observe this robustly in their data set. Their explanation for this empirical observation is that something about the way that the human mind works underlies the patterns that researchers observe. “We attribute the fact that certain grammaticization paths are common in diverse genetic and areal groups to the existence of common cognitive and communicative patterns underlying the use of language.” (p. 15)

Furthermore, they propose that there may be characteristics about the meanings themselves that explain the emergence of universal pathways in the data.

Not only are paths similar cross-linguistically, but paths from different sources tend to converge as grammatical meaning grows more general and abstract in later stages of grammaticization. Thus the most general of grammatical meanings are very common cross-linguistically and very similar even if they developed from different sources; that is, many languages have a general past, perfective, present, imperfective, or future whose functions are very similar. (p. 15)

The suggestion that later meanings are more general versions of prior meanings has been taken seriously in subsequent research. Diachronic semantics is one area of research that has fruitfully adopted this hypothesis as an explanatory basis of why universal pathways have the structure that they do. For example, Condoravdi & Deo (2014) argue that RESULTATIVE \gg PERFECT \gg PERFECTIVE grammaticalization pathway is facilitated because earlier categories of expression are sub-meanings of later categories. That is, resultative is a sub-meaning of perfect, and perfect is a submeaning of perfective. The way that they define the meaning of expression—as is standard in the formal semantic literature—is by the circumstances in which an expression can be uttered truthfully. In other words, the set of circumstances in which a sentence with perfect aspect is true is a subset of the set of circumstances in which the same sentence but with perfective aspect is true.

This approach is also taken in (Deo, 2015b) to explain the universal pattern by which progres-

sive constructions evolve into markers of imperfective, and it is the approach that I will adopt here. In defining the meanings of grammatical forms at different stages, I will pay special attention to the subset relationships that hold between categories of meaning. This is to say that an important explanation for the existence of universal pathways is that there is a logical relationship between the meanings in the cline. Related to the proposal that universal pathways exist due to a logical relationship between meanings in a pathway is the second hypothesis of unidirectionality.

Not only do there appear to be cross-linguistically stable relationships between meanings, but the evolution of grammatical material appears to move in a single direction, ruling out trajectories in the reverse. This is the hypothesis of unidirectionality, which claims that grammaticalization proceeds in a single direction.

Of the three hypotheses mentioned here, unidirectionality has been the most widely-contested in the literature (Haspelmath, 1999; Geurts, 2000; Haspelmath, 2000; Campbell, 2000; Janda, 2000; Heine, 2003, and many others). I would like to suggest here that much of the bad rap that unidirectionality has gotten is due to the certain ways in which the hypothesis is reported.

On a strong interpretation, linguistic material can only become ‘more grammatical’ (and not less grammatical) over time or in successive stages of history. What it means for material to become more grammatical is often interpreted to include changes like phonetic erosion, increase in syntactic scope, and ‘obligatorification’ (Lehmann, 1995; Tabor & Traugott, 1998)—often called ‘formal changes’—in addition to a generalization in meaning.

With respect to such an interpretation, so-called ‘lateral conversions’ (Campbell & Janda, 2000; Joseph, 2005) in languages, whereby reanalysis of grammatical material does not accompany any other signs of further grammaticalization, pose a serious problem to this strong interpretation of unidirectionality. Similarly, the reduction in innovative uses of forms also constitute counter-evidence to unidirectionality. This can be seen, for example, in varieties of Spanish where perfective uses of the Present Perfect construction are almost non-existent, as in Mexico (Schwenter & Torres Cacoullos, 2008), or where the use of the Present Perfect construction is on a trajectory of reduction more generally, as in Argentina (Westmoreland, 1988; Rodriguez Louro, 2009).

I would like to suggest that such an interpretation of unidirectionality was not part of the original hypothesis. Bybee et al. (1994) provide the following example to illustrate their claim, “Futures may arise from movement constructions, desideratives, and obligation markers...but do not later re-evolve into markers of desire, obligation, or movement in space” (p. 13). Their point was that there is something about (the meaning of) motion constructions that asymmetrically allows for reinterpretation as a future construction. That is, their description of unidirectionality is focused on the meaning changes that grammatical elements undergo, not other phenomena such as the propagation of a certain change through a society (i.e. the ‘actualization problem’ presented by Labov, 1972a).

I want to be clear: this dissertation is not an attempt to settle these debates or try to define what phenomena ‘count as’ grammaticalization (or even if grammaticalization exists (see Joseph, 2004). I make this point to be clear about how I am understanding the concept of unidirectionality. I take unidirectionality to be a description of a cross-linguistic tendency whereby verbs of motion, for example, acquire uses as a future construction, but obligation-derived futures do not acquire uses as verbs of motion. And this phenomenon requires an explanation.

An additional layer of complexity to add to this story is that, as suggested by Viti (2015), what is referred to as ‘grammaticalization’ may consist of two distinct phenomena: one in which lexical material becomes grammatical material and another in which grammatical material becomes ‘more grammatical.’ We might represent the LOCATION \gg PROGRESSIVE \gg IMPERFECTIVE pathway as in Figure 1.1 below.

Shown in this diagram are two distinct relationships between meanings on a grammaticalization pathway. In one case, a construction with the lexical meaning⁶ of location is recruited as a progressive construction. In the other case, the meaning of progressive generalizes from a construction that marks events-in-progress to an imperfective construction, which is compatible with habitual, continuous, and futurate interpretations. As these two kinds of change relate to unidi-

⁶The term ‘lexical’ in this case, of course, is not entirely without controversy. It has been observed that some lexical meanings seem more general, abstract, or even grammatical than others, and it is items with these more general meanings that are recruited as grammatical material.

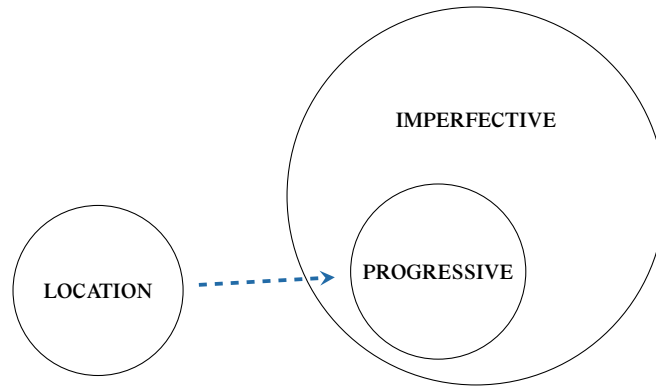


Figure 1.1: A visual depiction of two kinds of meaning change

rectionality, each requires a different kind of explanation. In particular, because the second type of change constitutes a generalization (vs. a reanalysis of meaning domain), the grammaticalized construction maintains uses that are associated with prior stages of meaning (e.g. imperfective constructions can be used to talk about events in progress).

As an attempt to account for the tendency by which meanings generalize over time (and not the other way around), Haspelmath (2000) proposes the existence of a *MAXIM OF EXTRAVAGANCE*, whereby (at least certain) speakers overuse innovative forms of expression for social purposes or to be emphatic. The overuse of innovative forms then leads to their generalization. Sociolinguistic explanations, of course, have played a fundamental role in the study of language change (Labov, 1972a,b; Eckert, 2000, among many others), but it is nevertheless important to be clear about what it means that an innovative form is ‘emphatic,’ and what it is about overuse that leads to a generalization of meaning (see Kiparsky & Condoravdi, 2004; Schwenter, 2006 for discussion of so-called emphatic negation). I will draw on this basic premise in the explanation of certain stages of the evolution of the grammatical elements under study here.

The final hypothesis that I will consider from Bybee et al. (1994) is that of semantic retention (discussed earlier in Bybee & Pagliuca, 1987) and source determination, which are discussed much less frequently in the literature on grammaticalization. The hypothesis of semantic retention is born out of the observation that certain characteristics of a lexical element’s meaning are retained in later stages. A principle example used to illustrate this phenomenon is that of English *will*,

which evolved from an expression of desire and maintains a use as an expression of willingness:

- (8) a. Will you call me a cab?
b. Will he call me a cab? (Bybee et al., 1994:p. 16)

I will treat this approach to semantic retention as distinct from the observation that forms undergoing grammaticalization do not immediately lose older meanings (e.g. English *be going to* can express both motion and future meanings). The semantic retention picture painted in Bybee et al. (1994) is that the original lexical meaning flavors subsequent grammatical meaning. In my study of Cuban Spanish, I will argue that obligation constructions—like expressions of desire—evolve into future constructions that are compatible with the willingness readings exemplified in (8). I will argue that the willingness readings arise in DISPOSITION constructions, which evolve from modal constructions that reflect the action-oriented preferences of an agent—something that expressions of desire share with expressions of obligation. While this observation contradicts the story that English *will* has willingness readings due to semantic retention (if this were the case, it is not clear why obligation-derived futures should have these same readings), what I will propose is consistent with another hypothesis of Bybee et al. (1994): source determination. This hypothesis arises from the observation that the meaning of a lexical item determines its trajectory in the grammaticalization process. I will thus be arguing that motion-derived futures and modal-derived futures undergo different stages of change in the grammaticalization process, and that these distinct pathways account for apparent semantic retention. This claim does not oppose the hypothesis of semantic retention outright, but rather remains steady in the insistence that we need principled explanations for the changes that are observed in the evolution of grammatical systems.

Now shifting to another essential branch of work in the study of grammaticalization, no review of this phenomenon would be complete without consideration of the pioneering work of Elizabeth Traugott. There are two concepts from her work that I would like to highlight, as these have greatly influenced the way that researchers think about language change. These are SUBJECTIFICATION and the CONVENTIONALIZATION OF INVITED INFERENCES.

Traugott observed that, broadly speaking, newer meanings are more subjective than older

meanings, arguing that over time grammatical forms relate to the speaker and her beliefs (Traugott, 1982; Hopper & Traugott, 2003). In later extensions of this concept, she has argued that subjective grammatical forms acquire intersubjective—that is, relating to the addressee—meanings over time (Traugott & Dasher, 2001; Traugott, 2010). She uses the terms SUBJECTIFICATION and INTERSUBJECTIFICATION to refer to the mechanisms that drive the interpretation of grammatical forms toward increasingly subjective and later intersubjective uses.⁷ In fact, she proposes that grammatical expressions can be organized along a cline:

(9) non-/less subjective » subjective » intersubjective (Traugott & Dasher, 2001:p. 225)

Two of the key examples that feature in discussions of subjectification include the following:

- (10) a. The evolution of English *be going to*, which began as a motion construction, describing movement *of* a subject and later developed uses as a future marker, describing the speaker's predictions *about* a subject. That is, an assertion with a future construction is taken to be a statement that invokes and in some way emphasizes the beliefs of a speaker in a way that a description of motion does not.
- b. Epistemic modals—modals about the knowledge and belief of the speaker—evolve from verbs of desire, as in the case of English *will*. In this case, epistemic modals are more subjective than expressions of desire because a speaker has direct (i.e. objective) access to her desires, but she does not have direct access to the truth of the modalized claim.

In the present analysis, I will reflect on subjectification and its utility in explaining the phenomena under discussion. In literature on grammaticalization, the processes of subjectification and intersubjectification are often treated as explanations of change in their own right; that is, they are considered to be universal communicative and/or cognitive processes that influence the use

⁷It is important to note that in some literature on modality, the definitions of these terms are different than those understood by Traugott. Nuyts (2005) uses the following conceptualization of subjectivity and intersubjectivity: “subjective if the issuer presents it as being strictly his/her own responsibility; it is intersubjective if (s)he indicates that (s)he shares it with a wider group of people, possibly including the hearer” (p.14).

and interpretation of grammatical forms.⁸ I will take a different approach here and will show that ‘weakening’ and subjectification are essentially indistinguishable in the evolution of *tener que* in Cuban Spanish. That is, I will consider subjectification to be a result of an independent process of weakening instead of the cause.

The second major concept that has emerged from the work of Traugott and colleagues is the mechanism of reanalysis that has been called the conventionalization of invited inferences (formerly, the conventionalization of implicatures) (Traugott, 1999; Traugott & Dasher, 2001). Also called the Invited Inferencing Theory of Semantic Change (IITSC), this model describes the process by which conversational implicatures acquire social salience, becoming generalized (conversational) implicatures, and eventually become encoded in the semantics of the form. The theory is deeply rooted in the principle that grammatical and semantic changes arise in use (i.e. grammars do not evolve independently of speakers), so it incorporates both observations about meanings at different stages in the process of change as well as processes such as metaphorization, metonymy, subjectification, and intersubjectification that allow inferences to arise in the first place.

For example, Traugott & Dasher (2001) characterize the evolution of the English *be going to* future construction in terms of the conventionalization of invited inferences. The key inference in the utterance of an expression of motion is that “motion toward something takes time (i.e. is imperfective), and one will arrive there only at some time later than the motion starts” (p. 83). The authors argue that the spatial dimension is “bleached” from the semantics of the *be going to* construction as the temporal inference is strengthened. The strengthening of this temporal inference leads to the reanalysis of the meaning of the motion construction as an “imminent future” (per Traugott and Dasher’s analysis), resulting in a polysemous construction that has both motion and (non-motion) future readings.

In response to literature on the conventionalization of invited inferences, researchers have observed that it is necessary to develop justifications for why the polysemy holds in some languages

⁸It is important to highlight that Traugott (2010) says, “Neither subjectification nor intersubjectification entails grammaticalization” (p. 6). In saying this she takes grammaticalization to include both the functional and formal changes that occur in the evolution of grammatical material.

(such as English, French, and Spanish) but not others (such as German). Furthermore, semantic reanalysis involves not only a reinterpretation of the meaning of an expression but—in the case of lexical to grammatical change—a reinterpretation of the (morpho)syntactic properties of an expression. For example, the ungrammaticality of (11) shows us that the future *be going to* construction has been recruited into a morphosyntactic paradigm that does not select noun phrases (or determiner phrases) as an argument.

(11) *I am *gonna* the store.

Eckardt (2006) set out to address these questions by incorporating the tools of formal semantic analysis into a study of the diachronic trajectory of grammatical elements. She proposes that reanalysis can be thought of as ‘semantic algebra’ through which language users ‘solve’ for the meaning and morphosyntactic properties of a construction. She provides the following example to illustrate how language users might reinterpret the meaning of a motion expression (e.g. *is going to*) as a marker of “imminent intention:”

(12) ‘Joe’ + PRESENT + x + ‘see a doctor’
= ‘Joe holds the determined intention to see a doctor soon’

The reanalysis process involves, solving for the meaning of x given listeners’ knowledge of the inferred meaning of the sentence and the meaning of the parts that do not undergo reanalysis. In other words, this semantic algebra describes formally what the “conventionalization of invited inferences” describes intuitively. One of the conclusions that Eckardt makes based on this model of reanalysis is that the process of reanalysis does not occur after a single interaction; rather, listeners must be exposed to the invited inference multiple times in order to zero in on the linguistic material whose meaning changes.

Studying the diachrony of English *be going to*, she follows Traugott and Dasher (2001) in interpreting the temporal inference of the motion construction as “imminent future.” Eckardt argues that the conventional association of imminent future meaning with the *be going to* construction arose first in the context of theater, where audience members could not discern whether *going* was

intended to represent a true description of motion or rather corresponded to statements of intention on the part of the speaker. This led to the conventional implicature associated with the *be going to* such that the speaker had an intention whose realization was imminent. The semanticization of the implicature required language users to perform ‘semantic algebra’ to reinterpret the meaning of the *be going to* construction.⁹

Eckardt’s work set the stage for the treatment of grammaticalization phenomena by researchers of formal semantics. Questions about the dynamics of the meaning change of grammatical elements in terms of formal semantics has grown into the field of diachronic semantics. Recent research has focused on developing systematic accounts of the processes through which the meaning of grammatical forms change over time. Deo (2015b) describes a model of the cyclical process of the evolution of grammars in terms of the PROGRESSIVE \gg IMPERFECTIVE pathway:

- | | | |
|------|---|------------------|
| (13) | a. X_{IMPF} | ZERO-PROG |
| | b. $(Y_{\text{PROG}}), X_{\text{IMPF}}$ | emergent-PROG |
| | c. $Y_{\text{PROG}}, X_{\text{IMPF}}$ | categorical-PROG |
| | d. Y_{IMPF} | generalized-PROG |

RECRUITMENT describes the transition between the zero-PROG and emergent-PROG stages where speakers in a speech community reanalyze existing material, making it available for use in a new

⁹Taking the sentence ‘Horatio is going to visit a friend,’ as an example, Eckardt (2006:p. 119) suggests the following definition of the imminence inference:

$$(i) (R = S \wedge \exists e'(\text{IMMINENT}(R, e') \wedge R < \tau(e') \wedge \exists y(\text{FRIEND}(y, \text{HORATIO}) \wedge \text{VISIT}(\text{HORATIO}, y, e'))))$$

She argues that a listener, interpreting the relevant utterance as a sentence in the present tense, will reasonably assume the following meanings for the material in the utterance that is not *be going to*:

$$(ii) \llbracket \text{visit a friend} \rrbracket = \lambda z \lambda e' (\exists y (\text{FRIEND}(y, z) \wedge \text{VISIT}(z, y, e')))$$

$$(iii) \llbracket \text{Horatio} \rrbracket = \text{HORATIO}$$

$$(iv) \llbracket \text{PRESENT} \rrbracket = (R = S)$$

Through the ‘semantic algebra’ process, language users calculate that the meaning of the *be going to* construction is the following:

$$(v) \llbracket \text{be going to} \rrbracket = \lambda P \lambda x. \exists e (R < \tau(e) \wedge \text{IMMINENT}(R, e) \wedge P(x, e))$$

Notably, the newly calculating meaning of *be going to* accounts for both its meaning and the compositional properties of the aspectual construction.

semantic domain. CATEGORICALIZATION follows, in which the innovative form of expression becomes the obligatory form of expression in certain contexts. Finally, GENERALIZATION describes the process whereby the innovative form generalizes in meaning, and the older form falls out of use.

In a overview article, Deo (2015a:p. 182) outlines a core set of questions that theories of semantic change should consider:

- (14) a. What is the semantic content corresponding to the functional expressions that constitute the input to or the output of a grammaticalization path?
- b. What is the logical relation between the meanings of these expressions such that a “path” may exist between them?
- c. What are the necessary and sufficient conditions for the recruitment of lexical material to generate functional material?
- d. What factors of usage and grammar are involved in categorialization and generalization of innovated functional material in a given linguistic system?
- e. Is the reduction in inventory (i.e., loss) spontaneous, is it a concomitant of generalization or can it be both?

It is important to observe in this agenda that both formal semantic perspectives and usage-based perspectives are considered essential for a complete understanding of the diachronic trajectory of the meaning of grammatical elements. The existence of universal grammaticalization pathways forces us to ask about both the relationships between the meanings on a pathway—to which the tools of formal semantics can contribute greatly—and about the forces that drive the the evolution of grammatical elements along these pathways—about which usage-based methods and theories have much to say.

I want to caution, however, against the creation of a false dichotomy. Formal semantics is not only suited to address questions about the meaning of grammatical elements at different stages, and usage-based methodologies are not only concerned with dynamic questions. This is found in the analysis of Bybee & Beckner (2015), for example, who characterize the stages of meaning in

grammaticalization pathways as ‘attractors’ in a dynamic system, which they describe as “mathematical abstractions” (p. 184). Borrowing from a metaphor given by Lorenz (1993), they compare linguistic attractors to a flag blowing in the wind that is never fully extended nor completely collapsed, yet the flag approximates each of these states repeatedly. Within a usage-based linguistics perspective, they argue that there is justification to define stages of meaning in a diachronic pathway. My point here is that I do not maintain that either ‘formal’ or ‘functional’ approaches to language change are superior; both bodies of work provide important insights about the evolution of grammatical systems, and I will draw on the ideas and methodologies of both perspectives on the path to understanding the phenomena under study here.

As the title of this dissertation states, I will be taking an ‘amphichronic’ approach to the study of modals of necessity in Cuban Spanish. I use this term to highlight my focus on the stages of meaning along which *tener que* and *iba a* are evolving and have evolved. I will attend to possible explanations for the forces that drive the evolution of these constructions, but a great deal of my focus will be on obtaining a clear synchronic picture of these constructions in Cuban Spanish. This synchronic emphasis notwithstanding, I will consider the diachronic picture to be an essential constraint on the definition of the meanings expressed by the forms under study. Therefore, I will strive to produce a theoretical picture that captures the diachronic facts as well as the synchronic facts. In my theoretical account, I will also strive to define the meaning of grammatical elements at different stages such that there are plausible cognitive and/or communicative forces that move the constructions under study along the grammaticalization pathway.

1.3 The evolution of the future and modality in Spanish

I begin this section with a reflection on the title of this dissertation, which claims to be a study of modals of necessity in Cuban Spanish, yet I am studying two grammatical forms that are closely associated with the future domain of meaning. There has been considerable debate in the literature concerning the proper characterization of future constructions: some authors insist that future

constructions are a tense; other insist that future constructions are modals (see Portner, 2009 for a review).

I will assume that future constructions are fundamentally modal. When saying this, I do not assume that future constructions are *modals*, to be understood as a paradigm like that which exists in Germanic languages, containing *must*, *might*, and others. In assuming that future constructions are modal, I mean that these constructions assert that certain entailment relationships exist between facts in the world. This is something that I will discuss in more detail below as well as in subsequent chapters. I will not enter here into additional evidence supporting a modal analysis of future constructions, but even considering the phenomena under study, there is strong reason to believe this to be the case. In the case of *tener que* an obligation construction evolves into a future construction, and *iba a* is a past prospective (i.e. a future in the past) construction that evolves into a hypothetical construction. Obligation and hypothetical meanings are prototypical examples of modal constructions, and in Cuban Spanish we find examples of future constructions that both ‘come from’ and ‘go to’ the modal domain, suggesting that the modality is there all along. It should become clear below that under a precise enough conception of modality, the assumption that future constructions are modal is not problematic. It is for this reason that I make the claim that the present study concerns modals of necessity in Cuban Spanish.

With this clarification in hand, I now turn a bit of background on the grammaticalization of future constructions and, in particular, on the historical background of the future in Spanish. It has been generally accepted in literature on the evolution of grammatical elements in the future domain of meaning that certain lexical sources grammaticalize first as markers of INTENTION before becoming available for expression of the more general future meaning: PREDICTION (e.g. Bybee & Pagliuca, 1987; Heine, 1995; Hilpert, 2007, but see Dahl, 2000 for exceptions). One of the most recognized lexical source items in this trajectory is the class of movement verbs. The movement verb ‘to go’ (and its equivalent forms in other languages) has evolved into *be going to* future construction in English, the Periphrastic Future in Spanish and other Romance languages, as well as in the case of future constructions in Cocama, Atchin, Mano, Bari, and many others (Bybee

et al., 1994).

The grammaticalization pathway of the future offered by Bybee et al. (1994) is the following:

(15) grammatical/lexical source >> INTENTION >> PREDICTION

Note in this cline that the meaning “prediction” is often treated as a synonym of “future” meaning. Bybee et al. (1994) define future in the following way: “the situation takes place after the moment of speech; the speaker *predicts* that the situation in the proposition will hold” (p. 316, emphasis added). As described in the conceptual framework of grammaticalization described above, grammatical elements ‘acquire’ meanings along a grammaticalization pathway and lose older meanings when other changes, such as phonological reduction, take place. This conflicts with accounts that hold that later meanings in a grammaticalization pathway constitute generalizations of meanings at previous stages, especially when the two stages are within the same meaning domain. When I define meanings, I will assume that to some extent the meanings along a cline are embedded within one another. This means that I would characterize the final stage of the pathway above as FUTURE, a more general category of meaning that includes both intention and prediction.

In contemporary Spanish, there are three grammatical forms that are compatible with future-oriented interpretations: the Synthetic Future, the Periphrastic Future, and the Simple Present. These are illustrated in the constructed examples below:

- (16) a. Synthetic Future: ‘**Iré** a la tienda a las 3.’
‘**I will go** to the store at 3.’
- b. Periphrastic Future: ‘**Voy a ir** a la tienda a las 3.’
‘**I am gonna go** to the store at 3.’
- c. Simple Present: ‘**Voy** a la tienda a las 3.’
‘**I’m going** to the store at 3.’

The Synthetic Future is the oldest future construction. As I mentioned in §1.1, it is widely accepted in the historical literature that the Synthetic Future evolved from the base construction in Latin: infinitive + *habere* (‘to have’). In the first century CE, obligation and necessity readings of

this construction are found in the writings of Cicero. There is general agreement among researchers that the first uses of the infinitive + *habere* construction as a future construction are found in the writings of Tertuliano in the third century CE (Company Company, 1985/1986).

By the earliest (Medieval) Spanish texts, the construction had been phonologically reduced and existed in a Synthetic form (*lo cantaré*) and Analytic form (*cantar lo hé*). While the Synthetic and Analytic forms differ in terms of syntactic structure and morphosyntactic conditioning, both were incompatible with obligation readings at this time in history (Company Company, 1985/1986; Aaron, 2006). In contemporary Spanish, the Analytic form of expression has fallen out of use, leaving only the Synthetic Future. While there is general agreement that this construction was used to express obligation and eventually gained future readings, there does exist disagreement in the literature about the process of change which took place.

Most authors sustain that this construction grammaticalized into a marker of OBLIGATION (much like the construction ‘have to’ can indicate obligation in English) before coming into use as a future construction. This position is taken by Bybee et al. (1994) who propose the following grammaticalization pathway for Latin infinitive + *habere*:

(17) POSSESSION >> OBLIGATION >> INTENTION >> PREDICTION

Dissenting opinions include that of Benveniste (1968) who claims that the infinitive + *habere* construction grammaticalized to express PREDESTINATION as a precursor to its interpretation as a future construction. This is a view that I will take seriously in my study of the obligation construction *tener que* in Cuban Spanish. Bybee et al. (1994) maintain that even if predestination replaces obligation in the grammaticalization pathway, intention was still a precursor to prediction meaning. I will argue that this does not appear to be the case. As a preview, I will argue that in early stages, (non-obligation) future-oriented uses of *tener que* are licensed in contexts that invoke absolute generalizations. It appears that this is much closer to what Benveniste claimed by characterizing early future uses of infinitive + *habere* as ‘predestination.’

The second future construction is the *ir a* Periphrastic Future which is transparently a future that has grammaticalized from a motion construction. Aaron’s work (2006; 2014) has studied the

evolution of the Spanish Periphrastic Future extensively, using variation analysis methodology. In her research, she observes that early on in the grammaticalization of the Periphrastic Future, animate and first-person subjects favor the use of the Periphrastic Future over the Synthetic Future. Aaron takes this data to confirm Bybee and colleague's generalization that intention is a stage that precedes prediction in the grammaticalization pathway of this construction. This is represented in the following cline:

(18) MOTION >> INTENTION >> PREDICTION

Aaron (2006) estimates that the motion construction, *ir a* 'go to' + infinitive, was reanalyzed as a future construction during the 17th century. But despite its rather recent entry into the future domain, some researchers have claimed that the Periphrastic Future has become the default future in some varieties of Spanish (e.g. Orozco, 2005).

Something to draw out at this point is that the name 'Periphrastic Future' is a bit of a misnomer. As in English, when the auxiliary *ir* is conjugated in the present tense (as in (16b) above), the resulting interpretation is future, but when the auxiliary is conjugated in the past, as is the case of *iba a*, the canonical interpretation is that of past prospective. The *ir a* construction may thus be more appropriately termed the Spanish Prospective Construction. To avoid confusion, I will use the term Periphrastic Future only to refer to cases in which the auxiliary in the *ir a* construction is conjugated in the present tense.

Finally, regarding the Simple Present, I will not be incorporating a study of this form into the present dissertation because because it does not behave like the Synthetic Future and the Periphrastic Future. The clearest evidence of this is that future markers that have overt morphology obligatorily shift the time of evaluation forward (cf. Condoravdi, 2001). For eventive predicates (i.e. when the infinitive is a verb that denotes an event instead of a state) the only possible reading for the Periphrastic Future is one in which the event occurs in the future. For the Synthetic Future there are two readings: either that the event occurs in the future or the speaker is making an inference about a generalization in the present. In the case of the Simple Present, there is no obligatory future (or modal in the case of the Synthetic form) shifting. Consider the examples in (16). 'Go' is

an eventive verb, so while the Simple Present sentence allows a generic present interpretation ('I go to the store at three'), the other two forms do not.

The forward-shifting nature of the explicit future grams explains why the futurate interpretations of the Simple Present most often are accompanied by a future-oriented adverb. This is not the case for the other two forms: the future-oriented meaning is inherent in the Synthetic Future and Periphrastic Future constructions. Furthermore, it has been observed (e.g. Copley, 2014) that the Simple Present shows a near-categorical preference for intention (vs. prediction) readings. What this all means is that although the Simple Present is compatible with future readings, I will be setting it aside from the present analysis because it is not a future construction in the same sense as the Periphrastic Future and Synthetic Future.

With this historical overview in place, I would like to draw out the fact that the Synthetic Future and Periphrastic Future are derived from different lexical sources. As I discussed in §1.2, one of the hypotheses grammaticalization theory that I will dialogue with is that of Semantic Retention (and Source Determination). What I will be arguing is that source of the future construction impacts how it is used in later stages. That is, motion constructions grammaticalize into the future domain differently than obligation constructions, and this affects their meaning (i.e. "future" construction is not specific enough). As a result of this fact, in order to understand the behavior of *iba a* in Cuban Spanish today, I will conduct a historical analysis of the *ir a* prospective construction in Spanish, using variationist methodology. Although previous literature has conducted studies of this kind (e.g. Aaron, 2006, 2014), there are some methodological adjustments that I will make in order to test the future grammaticalization pathway (shown in 15) as a falsifiable hypothesis of the study. I will show that the particular process that motion construction underwent in the process of evolving into a future construction helps us understand its meaning now. This in turn helps us understand how and why *iba a* is being recruited as a hypothetical construction in Cuban Spanish.

Because *tener que* is an incipient future construction in Cuban Spanish, I will not need the same depth of historical analysis to understand its recruitment in the future domain; however, I will rely on insights uncovered in existing literature when relevant. Perhaps the most important

diachronic fact that relates to *tener que* is that, while there are other obligation expressions in Spanish, currently *tener que* is the most widely used—a status in the domain of obligation that it acquired within the last century (Bauman, 2013). The other modals of necessity with which *tener que* competes are *haber de* and *deber*. I present the strength and flavor of these expressions in Table 1.1 below.

Expression	Flavor	Strength
<i>tener que</i>	epistemic, deontic	strong
<i>haber de</i>	epistemic, deontic	strong, weak
<i>deber</i>	epistemic, deontic	strong, weak

Table 1.1: Modals of necessity in Spanish

Shown in this table, the crucial distinction between *tener que* and the other expressions is that *tener que* is only compatible with strong necessity readings. Relatedly, Blas Arroyo (2018) found that over the last five centuries *tener que* has been specialized as a modal that expresses unavoidable obligations. As will become clear in my discussion of *tener que* in chapter 4, the specialization of *tener que* as a modal of strong necessity (vis-à-vis the other necessity modals in Spanish) is important for understanding why *tener que* is undergoing recruitment into the future domain in Cuban Spanish.

1.4 Formal Semantic Background

1.4.1 Primer for truth-conditional semantics

One of the essential tools in an amphichronic semantic account of grammatical phenomena is, of course, formal semantics and pragmatics. The analyses that have been developed in this body of literature provide precise characterizations of meanings, and it is this level of precision that is necessary for understanding how meanings relate to one another at different stages of a grammaticalization path.

It is my hope in this dissertation to create a formal semantic and pragmatic account that is accessible to non-specialists in semantics, while still leveraging the level of detail that is necessary

in a formal semantic analysis. To accomplish an accessible account, I will take two steps: first, when I provide formal characterizations of meanings, I will provide figures, descriptions of the formalism in prose, or both. While some details—especially details regarding how the meaning of a particular grammatical form composes with other meanings—are inevitably lost in diagrams and prose explanations, my aim is that the essential ideas and intuitions are nevertheless clear. Second, in this section, I will give a formal semantics ‘primer’ where I review some aspects of semantic theory that are generally taken for granted in the semantics literature. Importantly, I will use this primer to make explicit some of the assumptions that I am making about the formal tools that I will use in this dissertation.

The first concept to tackle is that of a PROPOSITION. On an intuitive level, a proposition is the idea that is conveyed by a sentence. Taking one step toward a more formal characterization of a proposition, it is an idea that can be judged as true or false. For example, the sentence in (19) expresses a proposition that is obviously false in the actual world.

(19) James owns a Lamborghini Veneno.

But even though this sentence is false, it is not meaningless because we can still imagine what would need to be the case in order for this sentence to be judged as true: I would need to have in my possession a car that satisfies the build specifications of a Lamborghini Veneno, and this would need to be true while you, dear reader, are reading (19). These make up the TRUTH-CONDITIONS of the sentence in (19), and one way to define the meaning of sentence is in terms of its truth conditions.

There are (at least) two shortcomings of prose descriptions of the truth-conditions of sentences as in the previous paragraph. First, describing the meaning of a sentence in this way generates unwieldy paragraph-long descriptions of the meaning of a sentence and makes it difficult to compare the meaning of any two sentences. Second, a beautiful puzzle in semantics is how speakers can extract meaning from completely novel sentences. In other words, we want an explanation of how the pieces of a sentence come together to yield a proposition. When we know what the pieces mean and how they are combined to yield more complex meanings, we can account for the fact that a never-before uttered sentence is meaningful to human speakers.

For these reasons, semanticists have borrowed from formal and mathematical languages like first-order logic and lambda calculus in order to give concise, decomposable definitions of the meanings of sentences.

$$(20) \quad \llbracket (19) \rrbracket = \exists x : \text{LAMBORGHINIVENENO}(x) \wedge \text{OWN}(\text{James}, x)$$

What this formula says is that in order for (19) to be true¹⁰ there must exist (\exists) an object (x) such that ($:$) the object is a Lamborghini Veneno and (\wedge) James owns the object. In order for the sentence to be true, each condition (separated by \wedge) must be true. Notice here that the formalism is rather humble; it does not define, for example, what is required in order for an object to be a Lamborghini Veneno.¹¹

One notable omission from the definition given above in (20) is time. In the prose description of the truth conditions of (19), I stated that in order for the sentence to be true, it must be true at the time of reading (or at the time of speech in a conversation) because the present tense form of the verb *is* tells us that the sentence is uttered with respect to the present.

In order to be able to work with tense, I will draw on another tool that has been developed in the field of semantics, which is the TYPED EVENTUALITY (Parsons, 1990; Gordon & Hobbs, 2017). The origin of the eventuality is the Davidsonian EVENT. Davidson observed that human speakers conceive of events as a kind of object, which we find in sentences like the following, adapted from Davidson (1967:p. 82).

(21) Susan: “I crossed the Channel in fifteen hours.”

Karen: “Good grief, that was slow.”

Susan: “But I swam.”

Karen: “Good grief, that was fast.”

¹⁰Kratzer & Heim (1998) note that ‘ $\llbracket (19) \rrbracket =$ ’ is a short hand for ‘ $\llbracket (19) \rrbracket = 1$ iff...’ In other words, the sentence ‘James owns a Lamborghini Veneno’ is true if and only if certain conditions hold.

¹¹Formal semanticists often approach this by saying that $\text{LAMBORGHINIVENENO}(x)$ is true if x is in the set of things that are Lamborghinis Venenos. This, of course, does not answer the question of what it means for an object to be a Lamborghini Veneno; however, using sets may not be too far-fetched since one important way that people make sense of the world is by categorizing it.

In this dialogue, Davidson argues that the word *that* in Karen’s responses refer to a ‘crossing’ by Susan and a ‘swimming’ by Susan, respectively. Furthermore, the adjectives *slow* and *fast* do not modify Susan, but rather the event of Susan crossing and the event of Susan swimming. This line of argumentation was developed into what is today referred as neo-Davidsonian semantics. Under this approach definitions of the truth conditions of sentence include the event variable e as well as predicates which define the semantic roles of participants in the event (Dowty, 1991).

$$(22) \quad \llbracket (19) \rrbracket = \exists e, x : \text{LAMBORGHINI} \text{VENENO}(x) \wedge \text{OWN}(e) \wedge \text{AGENT}(e, \text{James}) \wedge \text{THEME}(e, x)$$

What this says is that the sentence in (19) is true if there exists an event e and an object x such that (it is true that) the object x is a Lamborghini Veneno and the event e is an ‘owning’ and the agent of that event is James and the theme of that event is the object x .

So far so good, but we still need a way to represent *when* this event is taking place. To do so, it is necessary to point out that ‘owning’ is not really much of an event; it is really a state, and this matters when thinking about tense. A number of authors have observed that events and states interact with time markers differently (Dowty, 1986; Kamp & Reyle, 1993; Partee, 1984). Verbs that introduce events tend to advance narration; whereas, verbs that introduce states do not. Partee (1984) illustrates this in the following example:

$$(23) \quad \begin{array}{cccccc} e_1 & e_2 & e_3 & s_1 & e_4 & \\ \text{John got up, went to the window, and raised the blind. It was light out. He pulled the blind} & & & & & \\ \text{down and went back to bed. He wasn't ready to face the day. He was too depressed.} & & & & & \\ e_5 & s_2 & & s_3 & & \end{array} \quad (\text{p. 253})$$

Notably, while the events are understood to occur sequentially (i.e. John got up *then* went to the window), the states seem to be running in the background. That is, it was light out when John got up and when he pulled the blind back down. One way that this is discussed in the literature today is to say that event and states are two *types* of *eventualities* (Kamp & Reyle, 1993; see Gordon & Hobbs, 2017 for discussion of possible events), a terminological choice that I will adapt here.

In order to represent tense in the truth conditions of a sentence, the run-time of the eventuality needs to relate to the time of utterance. But because states and events have the differing behaviors

illustrated about in (23), they hold different relationships with respect to the time of utterance. Therefore, there are four pieces that need to be added to the description of truth conditions. The first piece is a variable that represent the time of utterance: i_u . The variable i is used to represent time intervals, and I will assume that i_u is coextensive with the actual time of speech for spoken utterances.¹² The second piece is an operator that gives us the run-time of an eventuality; for this I will use τ . Finally, the relationship between the run-time of the eventuality and the time of utterance can either be that of overlap (represented as \circ) in the case of states or containment (represented as \sqsubseteq) in the case of events. In other words, a present tense sentence describing a state is true if the run-time of the state overlaps the time of utterance. For present tense sentences describing events, the sentence is true if the run-time of the event is contained within the time of utterance. Because it is unusual for events to be short enough to be contained within the speech interval, additional operators (like the PROGRESSIVE aspectual operator) are employed by speakers to discuss ongoing events. This is something I will discuss in more detail in Chapter 3. For the time being, a complete definition (for the present purposes) of the truth conditions of the sentence in (19) can now be formulated.

$$(24) \quad \llbracket (19) \rrbracket = \exists e, x : \text{LAMBORGHINI} \text{VENENO}(x) \wedge \text{OWN}(e) \wedge \text{AGENT}(e, \text{James}) \wedge \text{THEME}(e, x) \wedge \tau(e) \circ i_u$$

In prose, this says that the sentence ‘James owns a Lamborghini Veneno’ is true in the moment of utterance if there is a state e and object x such that x is a Lamborghini Veneno and e is an ‘owning’ state and the agent of e is James and the theme of the state is x and the run-time of the state e overlaps with the interval of utterance i_u . To return to the central point: to know the meaning of sentence (19) is to know that this sentence is true when the conditions described in (24) are fulfilled. On one level, we can say that the proposition expressed by sentence (19) is defined in

¹²In making this decision, I am taking a theoretical stance with respect to whether to represent utterance time as a temporally-extensive interval or a moment. In making this decision here, I am suggesting that present tense can be used to describe events whose run-time is contained within the interval of speech. For cases like sports-announcer reports (*He passes the ball to Messi*) and performatives (*I pronounce you married*), rather than treating them as exceptional instances, we can view them as instances in which the run-time of the event is either co-extensive with or contained within the utterance time. In doing so, we do not need to propose that there are special cases in which time is telescoped in the interpretation of tense (e.g. Smith, 2010). It is not clear in a telescoping analysis why there is such consistency in the kinds of examples that yield this behavior.

(24), but there is one more piece to add.

When humans talk to one another, we make statements not only about things that are true about the actual world, but also about alternative possibilities for the state of affairs. For example, we can make meaning of the following sentence (and judge whether or not it is true) even though it is about a hypothetical set of affairs:

(25) If James were a multi-millionaire, he would own a Lamborghini Veneno.

One of the most important tools that semanticists have used to account for the interpretation of such sentences is the concept of POSSIBLE WORLDS (see Kripke, 1963; Lewis, 1986 for early accounts). Intuitively, a possible world is a way that the universe could be from the beginning of time (if there was a beginning) and extending endlessly into the future. Distinct possible worlds can be virtually indistinguishable—in one world my next inbreath will last 1870 microseconds, in another world my inbreath will last 1869 microseconds—or worlds may be drastically different—there is a possible world in which the human race never existed. The restrictions on possible worlds are determined only by the human imagination.¹³ It is important to note that a “possible world” is not necessarily a candidate for the actual world. There are possible worlds in which unicorns exist, but such possibilities are entirely imaginary; nevertheless, we have the cognitive capacity to reason about such worlds, and that is precisely the point. When interpreting the meaning of sentences, we are not only concerned with what is true in the actual world, so we need a tool that will allow us to represent this in the interpretation of sentences.

In a possible worlds semantics, the definition of a proposition looks quite a bit different. The most basic definition of a proposition is that it is the set of worlds in which a proposition is true. In the definitions below the variables w, w', w'' , etc. belong to the domain of worlds \mathcal{W} . A proposition is, therefore, true in a world if the world is a member of the set that defines the proposition. I will address this circularity in a moment, but I provide a definition of (19) in a possible worlds framework below. Here the meaning of the sentence is a set of worlds.

¹³In fact, this may not be the case. There is debate about whether possible worlds are existing alternate realities (which may be beyond our ability to imagine) or are mental objects that are restricted by the limits of human cognition (see discussion in Portner, 2009). This is an interesting question, but settling it is not relevant for the current analysis.

$$(26) \quad \llbracket (19) \rrbracket = \{w \mid \exists e, x : \text{LAMBORGHINI} \text{VENENO}(x, w) \wedge \text{OWN}(e, w) \wedge \text{AGENT}(e, \text{James}) \wedge \text{THEME}(e, x)\}$$

What this says is that the meaning of the sentence in (19) is true in the set of worlds where ($\{w \mid \dots\}$) there exists an object x and an event e such that x is a Lamborghini Veneno in these worlds and e is an ‘owning’ state in those worlds and James owns the Lamborghini. Returning for a moment to the circular definition of a proposition, we might imagine that there is a Supreme Judge (called a VALUATION FUNCTION in semantics) that reads a sentence like (19) and sorts all possible worlds into two sets: one in which the sentence is true and one in which the sentence is false. The proposition expressed by this sentence is defined by the set of worlds that have been sorted into the ‘true’ set.

Perhaps more concretely, we might imagine that it is our duty to educate an extraterrestrial being about the meaning of common phrases. In order to teach our visitor the meaning of the sentence, ‘The girl is happy,’ we could show him a number of short video clips or images that convey this idea until he is able to generalize about the meaning of the sentence. We could then continue onto other sentences in the same manner. In this way, propositional content can be conceived of as a collection of examples that share defining features.¹⁴ The point here is that while the definition of a proposition is defined circularly, it is still meaningful.

Notably absent from this account is time. Integrating an account of time in a possible world semantics can be quite complex, but it is valuable when creating an account of future-oriented modals, which is the focus of this dissertation. To do this, I will follow Kaufmann et al. (2006) in introducing a set of ordered moments \mathcal{T} , where the variables t, t', t'' , etc. are members of this domain.¹⁵ The authors take all possible worlds to be aligned along the same temporal dimension, and I will make the same assumption. In other words, if ‘right now’ is t_0 in w_1 , it is also t_0 in w_{735} . As Dowty (1979) argues, the alignment of the temporal domain in distinct possible worlds

¹⁴It is worth noting that researchers of natural language have also explored the observation that there is often gradience in the prototypicality of different instances of a proposition, where certain examples are clearly better examples of a proposition than other. See Zou et al. (2009) for an example of the use of fuzzy set theory to model these kinds of meaning.

¹⁵The authors do not explicitly refer to times as moments; however, this can be inferred from Kaufmann (2005) who defines a time interval as “an uninterrupted sequence of indices with a constant world coordinate” (p. 242). He distinguishes between individual indices and intervals, representing the latter as a set of indices.

is evident is expressions like, “If I were in New York right now, I would do such-and-such” and “John might have arrived on Thursday, but he also might arrive tomorrow” (p. 153).

By adding the temporal domain, propositions can be evaluated at world-time pairs (represented $\langle w, t \rangle$), which are also called INDICES OF EVALUATION.¹⁶ That is, under this view a proposition is no longer conceived as a set of worlds, but rather as a set of world-time pairs. This allows event descriptions and state descriptions to be evaluated at a specific world and time.¹⁷ But as I defined above in (24), truth of present tense sentences is evaluated with respect to the speech interval, so it is useful to have intervals in addition to world-time pairs. Since world-time pairs are momentary slices of what is happening in a possible world, an interval can be defined as (following Kaufmann, 2005) a continuous series of world-time pairs. The ordering relation $<$ is the temporal precedence relation that holds between indices. This relation is only defined between two indices that share a world coordinate.

$$(27) \quad i = \{\langle w, t \rangle \mid \forall t : t' < t < t''\}$$

An interval precedence relation $<$ can be defined as follows:

$$(28) \quad i < j \text{ iff } \langle w, t \rangle \in i \wedge \langle w, t' \rangle \in j \rightarrow \langle w, t \rangle < \langle w, t' \rangle$$

What this says is that i precedes j if every world-time pair in i is before every world-time pair in j . The definition of a world is a maximal set of indices. That is, it is the set of world-time pairs for every moment in the domain of times (with a constant world coordinate):

$$(29) \quad w = \{\langle w, t \rangle \mid \forall t \in \mathcal{T}\}$$

Because it is useful to talk about the truth of propositions at intervals and worlds, I will define a proposition as a set of *sets of indices* s . Some propositions—such as propositions which describe

¹⁶Ultimately, I will be understanding ‘indices of evaluation’ slightly differently. I will conceive of an index of evaluation as a set of world-time pairs. Under this view, $\langle w, t \rangle$ does not represent an ‘index of evaluation’ but rather a ‘world-time pair.’

¹⁷The result of taking this perspective is, in fact, an analysis that has a lot in common with situation semantics (Kratzer, 2012). In this framework, propositions are characterized as sets of situations, and worlds are characterized as maximal situations. In order to implement a notion of tense and aspect in a model that contains instantaneous indices of evaluation, I will draw on some assumptions made in situation semantics.

states—can be verified at a single instant and therefore contain sets of indices that can be as small as a single member. Other propositions—such as propositions which describe events—contain sets of indices that necessarily have multiple members because they can only be evaluated at intervals. I assume that events cannot be evaluated at individual indices because their realization can only be verified by a change in a state of affairs. For example, to verify a swimming event, an observer needs access to a series of movements made by a swimmer. More discussion of the verification of long enough intervals can be found in Hinrichs (1985) and Cipria & Roberts (2000). Finally, some propositions contain only sets of worlds (i.e. maximal sets of indices).

A single world-time pair can be characterized as the full set of propositions that are true at that index. I will call this set of propositions the *STATE OF AFFAIRS* that is the case at a moment in a world. Because I take times to be instantaneous, only descriptions of states and descriptions of events that are embedded under aspectual operators can be included in a state of affairs.¹⁸

I will define propositions by using a verification function V , which takes a proposition p and a set of indices s and returns a value of ‘true’ if s is a member of the proposition. I will abbreviate this as $p(s)$:

$$(30) \quad V(p)(s) = p(s) = 1 \text{ iff } s \in p$$

Recall that s can be as small as a single instant ($\{\langle w, t \rangle\}$), it may be an interval (i), or it may be as large as a world (w). So we can talk about the truth of a proposition at an instant, an interval, and/or a world.

I will take the meaning of a tensed proposition to be a set of worlds in which a proposition is instantiated at a time relative to the time of speech. In other words, tense gives a proposition a ‘temporal’ address (relative to the time of utterance) and offers a set of worlds in which the proposition is true at that temporal location.

$$(31) \quad \text{PRES}(p) : \{w \mid \exists s : s \subset w : \tau(s) \subseteq \tau(i_u) \wedge p(s)\}$$

$$(32) \quad \text{PAST}(p) : \{w \mid \exists s : s \subset w : \tau(s) < \tau(i_u) \wedge p(s)\}$$

¹⁸Technically speaking, predicates of states and times can be evaluated at an index. This includes negated propositions.

What the definition of present says is that an utterance in the present tense corresponds to a set of possible worlds in which there is an instant or an interval s that is part of the world's history, and the run time of s is contained within the run time of the interval of speech. This instant or interval s is an element of p (i.e. p is true in s). In other words, a present tense sentence asserts that a proposition p is true during speech time. A past tense utterance asserts that a proposition is true before speech time.

As I said above, descriptions of events that are embedded under aspectual operators can be members of states of affairs because they can be true of single instants. I define PERFECT, PROGRESSIVE, and IMPERFECTIVE aspectual operators (i.e. meanings) below. Notice that these operators take an untensed proposition and return an untensed proposition (a set of sets of indices).

The definitions of progressive and imperfective draw significantly on the analyses presented in Deo (2009, 2015b); I refer the reader to that research for details. The precise definitions of these aspectual operators will not be relevant for the analysis here.

(33) a. **Perfect**

$$\text{PERF}(p) : \{s \mid \exists s' : s' < s \wedge p(s')\}$$

b. **Progressive**

$$\text{PROG}(p) : \{s \mid \forall w' \in \text{Inr}(s) : \exists s' : \tau(s) \subseteq \tau(s') \wedge s' \subseteq p\}$$

c. **Imperfective**

$$\text{IMPF}(p) : \{s \mid \forall w' \in \text{Inr}(s) : \exists s' : \tau(s) \subseteq \tau(s') \wedge \forall k \in \mathcal{R}_{s'}^c : \exists s'' \subseteq k : p(s'')$$

I will reiterate that because all of these propositions are descriptions of times, they can be true of an instant, and therefore, they can form part of a state of affairs. At an instant t , an event may be realized prior to that instant (perfect), in progress (progressive), or a habit (imperfective). Making the distinction between instant and interval will be helpful in making clear statements about sets of circumstances that hold at different times. I now turn to the formal work on modality, work which will be essential for understanding the phenomena under study.

1.4.2 Formal semantic approaches to modality

Formal approaches to modality rest on the pioneering work of Angelika Kratzer whose insights about the meaning of modal expressions laid the foundation for what is known today as Kratzerian modal semantics. One of the preliminary clarifications about this framework is that it does not restrict itself to the analysis of ‘modals’ as a (morpho)syntactic paradigm in Germanic languages. In Kratzer’s early work (Kratzer, 1977, 1981b, 1986), she observes that there are many kinds of modal expressions, including the analysis of modal adjectives such as ‘probable’ and ‘doable,’ modal nouns such as ‘probability’ and ‘necessity’ and other types of expressions under the purview of her analysis. Kratzerian modal semantics has been applied to diverse phenomena, including analyses of the progressive and imperfective aspect (Dowty, 1979; Cipria & Roberts, 2000; Deo, 2009) and verbal mood (Portner, 2018). I mention this to emphasize that using a modal framework of analysis to characterize the meaning of future constructions does not require that these constructions behave like ‘modals’ in other ways, making morphosyntactic arguments that oppose a modal analysis of future constructions (e.g. Kamp & Reyle, 1993 with respect to English *will*) irrelevant to the present discussion.

Kratzerian modal semantics can be summarized as follows: modalized sentences communicate what is possible or necessary given a background of information or a set of ideals. The two major elements to the meaning of a modal are modal strength and modal flavor. Generally speaking, the two main strengths of modals are possibility and necessity.¹⁹ Modal flavor refers to the different kinds of readings that a single modal expression can have. For example, consider the different readings of the necessity modal *must* in English drawn from the Corpus of Contemporary American English (Davies, 2017):

(34) Epistemic: I can’t get over hearing Irv talk so much. Gladys **must** have put a spell on him.

(Title: *One of Ours*; Author: Willa Cather)

(35) Teleological: States **must** do something to prevent Medicaid from taking over their budgets

¹⁹There is, in fact, a great amount of variety in languages of the world with respect to modal strength. Research that has focused on understudied languages, in particular, has suggested additional modal strengths such as “upper-end degree necessity” (see Kratzer, 2012 for a review).

entirely.

(Title: “A Private Sector Healthcare Solution That We Can Smile About”; Source: Forbes;
Author: Sally Pipes)

(36) Deontic: I **must** follow God’s will for our family and prioritize best to obey Him.

(Title: “Prioritizing When You Home Educate”; Source: City Chick in the Country)

(37) Circumstantial: We shed as we pick up, like travelers who **must** carry everything in their arms, and what we let fall will be picked up by those behind.

(Title: “Do You Think About ‘Self-Curation’?”; Source: The Happiness Project; Author: Gretchen Rubin)

While all of these sentences use the modal *must*, the reading varies significantly. In (34) it is clear that the speaker is intending to communicate an inference; whereas, in (36) the blog writer intends to communicate a moral obligation. Kratzer’s solution for the diversity of expression associated with modals is that there is a contextually given CONVERSATIONAL BACKGROUND with respect to which these sentences are interpreted. This background is a set of propositions of a certain kind.²⁰ In the epistemic reading exemplified in (34), the conversational background is the set of propositions that are known by the speaker. Under the deontic reading exemplified in (36), the modal background is taken to be a set of moral or ethical rules or ideals.

In a Kratzerian modal semantics, modal operators are quantifiers over sets of possible worlds. Necessity modals are universal quantifiers, and possibility modals are existential quantifiers. The domain of quantification (i.e. *which* set of possible worlds is quantified over) is the intersection of the propositions that is provided by the conversational background. To be precise, I will use the term MODAL BASE to refer to the set of propositions that is provided by the conversational background, and I will refer to the intersection of these propositions as the ‘modal base worlds.’

Another way that semanticists talk about modal base and modal base worlds is in terms of an ACCESSIBILITY RELATION, which is a function whose input is a world (and sometimes a time)

²⁰Technically speaking, a conversational background is a function from worlds to sets of propositions. This function is provided by the context in a Kratzerian analysis.

and whose output is a set of possible worlds. An epistemic accessibility relation, for example, can take as its input the actual world and return the set of worlds that are consistent with an agent’s knowledge in the actual world. Notice the similarity here between a modal base and the Stalnakerian context set, where the context set is the set of worlds that are consistent with the facts that conversation participants take for granted (i.e. the Common Ground).

I will talk about modal base worlds in both terms, sometimes referring to worlds that are ‘consistent with a set of facts’ and other times discussing worlds that are ‘accessed’ from a particular world and time. However it is that we arrive at this set of worlds, a modal operator says that a proposition is either true in all of the modal base worlds (i.e. modal necessity) or it is true in at least one of these worlds (i.e. modal possibility).

There are many ways in the literature that the truth conditions of modalized sentences are formulated. I present two versions below. Note that α represents a linguistic expression that may include phonological material before “must.”

- (38) a. $\text{MUST}_{\text{Epist}} : \lambda P \lambda w \lambda t. \forall w' : w' \in \text{MB}_{\text{Epist}_a}(w, t) : P(w', t)$
 b. $\llbracket \text{must } \alpha \rrbracket =$
 $\{w \mid \{w' \mid w' \text{ is an epistemic alternative of agent } a \text{ in world } w\} \subseteq \llbracket \alpha \rrbracket \}$

The lambda expressions in (38a) indicate that in order for *must* to be meaningful, it requires a predicate P , a world w , and a time t . When provided with those, it says that in all worlds w' that could be the actual world according to the knowledge of agent a in world w at time t , the predicate P holds at time t . The set denotation in (38b) says that the meaning of a sentence that contains *must* is a set of worlds in which, given a ’s knowledge in those worlds, the proposition expressed by α is necessarily the case. That is, the epistemically accessible worlds of a in w are a subset of the proposition expressed by α .²¹

In the first formulation in (38a), I use the small caps *MUST* to represent a modal operator. In this dissertation, I will use operators to represent cognitively salient categories of meaning. Some

²¹This is logically equivalent to saying that the proposition expressed by α are true in all epistemically accessible worlds.

grammatical forms can actually be represented as a number of operators ‘packaged together.’ For example, the construction *iba a* may be described as a composition of a past tense operator, an imperfective aspectual operator, and a prospective operator:

$$(39) \quad \llbracket \text{iba a } \alpha \rrbracket = \text{PAST}(\text{IMPF}(\text{PROSP}(\llbracket \alpha \rrbracket)))$$

Past, imperfective, and prospective, of course, are categories of meaning that are associated with diverse constructions cross-linguistically. In one sense, it can be said that the formulation in (39) is the form-meaning pair that defines the *iba a* construction in Spanish. As a note, I will follow the modal semantic tradition of using the term PREJACENT to refer to the proposition that is embedded under the modal operator. In (38), the prejacent is *p*; in (35) the prejacent can be paraphrased ‘States do something.’

There is one final tool to add to this story. One of the most important contributions of Kratzer’s work was the notion of the ordering source. The notion of the ordering source is an extension of the work on ordering semantics presented in Lewis (1981). Kratzer proposed the ordering source as a solution to account for (deontic) human reasoning about non-ideal circumstances. The main problem with the modal system presented thus far is that a deontic modal base can only tell us about what happens in ideal worlds. Consider the following set of ideals:

- (40) *OS* is a set of ideals:
- a. *p*: There is no robbery.
 - b. *q*: If there is robbery, the thief returns what is stolen.

Because the possible worlds in the modal base are consistent with all of the propositions in the conversational background, we cannot use a deontic modal base to tell us what to do in worlds (like our own) where robbery does occur. But intuitions are clear: when robbery does occur, it is better for the thief to return what is stolen than to keep what is stolen.

What an ordering source (a set of propositions denoted by *A*) does is that it induces a preorder (represented by \leq_A) on the domain of worlds, according to the following definition, presented in Kratzer (2012):

(41) For all worlds w and $z \in \mathcal{W}$: $w \leq_A z$ iff $\{p : p \in A \text{ and } z \in p\} \subseteq \{p : p \in A \text{ and } w \in p\}$.

What this says is that the world w is at least as good as world z if and only if all ordering source propositions that are true in z are also true in w . According to this definition of an ordering, w is better in z if there are propositions in the ordering source that are true in w but not in z . One thing to note is that, perhaps unintuitively, better worlds are placed to the left of the relation. This is a consequence of the definition of the preorder relation $<$, which should not be read as ‘is less than’ but rather than ‘is better than’ in English prose. Consider the illustration in Figure 1. This diagram illustrates the ordering that the ideals in (40) induce on the domain of possible worlds \mathcal{W} . The circles represent sets of possible worlds, and the arrows represent increasing goodness according to the ordering relation.

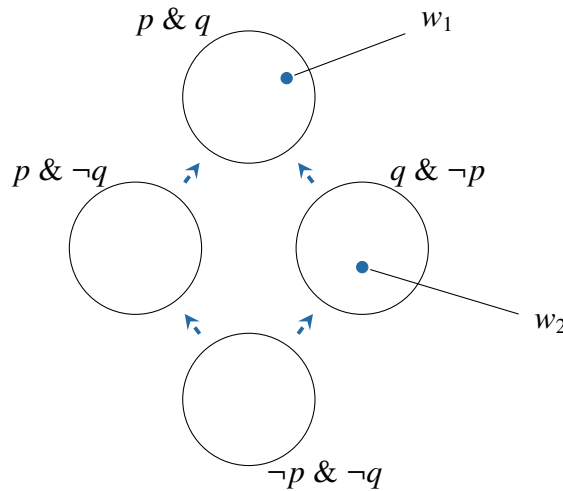


Figure 1.2: A visual depiction of an ordering on the domain of worlds induced by the set of propositions OS

The set of worlds in $p \& q$ are those possible worlds in which no robbery occurs. Recall that q is also fulfilled in these worlds because all thieves in these world (of which there are none) return what is stolen. According to the ordering source OS —in (40)—these are the ideal worlds. The set $p \& \neg q$ is empty because there are no worlds in which there is no robbery and in which it is false that thieves return what they stole. The worst set of worlds according to this ordering, of course, is $\neg p$ and $\neg q$ where there is robbery and where thieves do not return what they stole.

We can suppose that there is a world w_1 in which there is no robbery and that there is a world w_2 in which there is robbery but where all thieves return what they steal. According to the definition of the ordering relation, $w_1 \leq_{OS} w_2$. This is represented in Figure 1.2 where w_1 is in a set of worlds that is ordered above the set of worlds that contains w_2 . That is all of the propositions in OS that are true in w_2 are true in w_1 , but not vice versa.

Now, let's consider a circumstance in which Jean Valjean has just stolen some silver candlesticks. For simplicity, let us suppose that this is the only relevant circumstance, so our modal base $MB_{Valjean}$ is equivalent to the single proposition that can be paraphrased, 'Jean Valjean has stolen silver candlesticks.' In this modal base, there are worlds in which Jean Valjean returns the candlesticks, and there are worlds in which he does not. To represent this visually, I will 'dye' the worlds in $MB_{Valjean}$ orange:

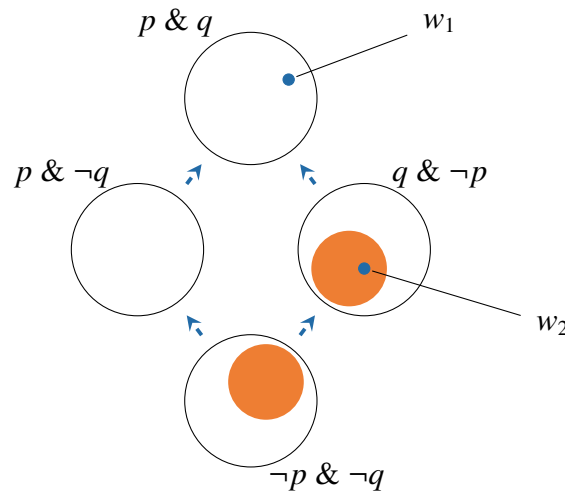


Figure 1.3: The worlds in which Jean Valjean has stolen, visualized in the ordering of \mathcal{W} by OS

According to our intuitions, given a circumstances in which Jean Valjean has stolen the candlesticks, our response given what is morally expected is, 'Jean Valjean must return the candlesticks.' Equipped with the notion of an ordering source, we can now define the meaning of this sentence.

$$(42) \quad \llbracket \text{Jean Valjean must return the candlesticks} \rrbracket = \\ \{w \mid \{w' \mid w' \in MB_{Valjean} \text{ and there is no } w'' \text{ such that } w'' <_{OS} w'\} \subseteq \llbracket \text{Jean Valjean returns} \\ \text{the candlesticks} \rrbracket \}$$

What this says is that the modal base (i.e. all worlds that are consistent with the circumstances of Jean Valjean stealing the candlesticks) is split up according the ordering source into multiple sets. One of these sets—the orange set of worlds in $q \ \& \ \neg p$ —contains ‘relatively ideal’ worlds: worlds for which there are no better worlds. That is, there are no modal base worlds in which both p and q are true, so the worlds in which only q are the best given the circumstances.²² In all of the worlds in this best set of worlds, Jean Valjean returns the candlesticks.

What the ordering source analysis allows us to do is talk about what are ideal outcomes in non-ideal circumstances. While according to the ordering source in (40), the best case scenario is that no one ever steals, the ordering source is still instructive in cases in which people do steal. This ‘calculation’ can not be performed with a modal base alone, and because of this, ordering sources have become fundamental to formal semantic approaches to modality. In this dissertation, my main theoretical focus will, in fact, be about the ordering source.

1.5 The agenda

In order to be able to understand the phenomena that I presented in the introduction, my first step will be to present a historical corpus analysis to understand the Periphrastic Future in Spanish. In this analysis, I will combine the tools of variation analysis with a systematic categorization of the meanings expressed by the forms under study in order to reflect on the grammaticalization pathways that have been proposed for future constructions. I will argue that INTENTION is not a proper step in the grammaticalization pathway but that there are principled reasons that statistical corpus analysis would yield this conclusion. Instead, I will argue that early futurate uses of the *ir a* construction lead to the innovation of a future construction that presupposes settledness by invoking a particular kind of modal background called an environmental state.

²²In reality, it is a bit more complicated than this. There can be multiple sets of mutually incompatible best worlds. If this is the case, a modalized statement says that the prejacent holds in all of these worlds. In addition, this definition assumes that there is a best set of worlds. This is not necessarily the case; for example, there may be an infinite sequence of ever-better worlds. For simplicity (following Portner, 1998 and von Stechow, 1999) I will assume that there is a best set of worlds, making the “limit assumption.”

In Chapter 3, I will set out to develop a more systematic characterization of the ordering source. I will argue that the propositions in an ordering source are generalizations that are built up from biconditional relationships among propositions. In doing so, I will develop a characterization of two main kinds of generalization backgrounds from which orderings sources draw propositions: universal generalizations and action-oriented generalizations. I will also define an environmental state as a subset of a generalization background, allowing speakers to invoke generalizations that are only active during certain periods of time.

In Chapter 4, I present an experiment that I conducted in Matanzas, Cuba to test the use of *tener que* in this variety. Using an appropriateness judgment task and the qualitative descriptions offered by informants, I develop an account of the evolution of obligation constructions into epistemic constructions, which evolve into future constructions. In this data, I observe that speakers distinguish between future-oriented *tener que* and the canonical Periphrastic Future, showing greater acceptability of *tener que* when absolute generalizations are invoked.

Finally, in Chapter 5, I address the evolution of the Spanish Prospective Construction through an experiment which I conducted alongside my study of *tener que*. In this chapter, I show that the environmental state reading of the Periphrastic Future—which can be traced back to the circumstances of its grammaticalization from a motion verb—is recruited into the hypothetical domain through the use of the Past Prospective Construction.

The research in this dissertation will advance both our understanding of modal semantics as well as the evolution of the future grammatical domain in language. It is important to highlight that this dissertation was not written in order: the theoretical picture presented in Chapter 3 is greatly informed by the data and analysis in other chapters, and the analysis in these chapters flows out of the theory presented in Chapter 3. In other words, while the dissertation presents the ideas in order, the process of creating them was iterative, and therefore the chapters really rest on one another.

Chapter 2

The Spanish Periphrastic Future: A variationist corpus analysis

2.1 Introduction

As I discussed in the previous chapter, a study of the history of the grammaticalization of the Spanish Periphrastic Future can be greatly informative in understanding how and why *iba a* is changing in Cuban Spanish today. The central observation that I would like to bring out in this chapter is that the Periphrastic Future grammaticalized from *futurate* uses of the motion construction *ir* ‘to go’ + *a* ‘to’ + *infinitive*, which originally was only compatible with readings in which subjects physically moved in order to accomplish a task. As discussed in Kaufmann (2005), *futurate* uses of present tense markers are licensed when the proposition asserted by a sentence is *presumed settled*. One way to understand settledness, or rather the presumption of settledness, is that a proposition is presumed settled when it is taken to be objectively true. It is difficult to make such claims about the future because there are so many ways that our expectations can be interrupted; humans are not omniscient, so we are generally unable to speak objectively about the future.

As I will show, the *futurate* uses of the Periphrastic Future were most common in expressions of intention; that is, the motion construction became a conventional way to voice plans. Crucially,

I will argue that under certain conditions agents can presume settledness when they have a plan because they are able to actively respond to events that could potentially interrupt their plan. However, plans also presuppose that an agent's intention will be effective. This is an idea that I will return to in the conclusion of this chapter.

Something that I will be exploring through the analysis in this chapter is whether it is appropriate to consider INTENTION a stage in the grammaticalization pathway of the Periphrastic Future. This matters because a proper understanding of the future grammaticalization cline will help us understand how prospective *ir a* is used today. Despite the relative consensus that intention is an initial stage in the grammaticalization of future constructions, I propose that there is reason to question the strength of the data that has been brought to settle this question. There are two principle drawbacks in the literature that has claimed an intention stage in the grammaticalization of future constructions: either the authors provide qualitative assessments of the meanings expressed by incipient future constructions using very small sets of data, or they provide large-scale accounts of future constructions but analyze meaning by proxy. I will discuss the latter case in more detail below, but the important point is that while a stage of intention makes logical sense as lexical material grammaticalizes to mark future, given the nature of prior research, it is unclear if intention constitutes a proper stage in the grammaticalization process. When I say "proper stage" in the grammaticalization process, I mean that there is reason to suspect that the Periphrastic Future was never an intention construction.

Prior research strongly suggests that intentions or intentionality are somehow involved in the evolution of future constructions, but I would like to understand precisely how this is the case. In order to answer this question, I will analyze the Periphrastic Future construction in Spanish, derived from the movement verb *ir*, 'to go.' The methodological approach that I will use is the variationist method (Tagliamonte, 2012), comparing the distribution of the Periphrastic future to that of the older Synthetic Future. Variation analysis been used by a number of authors to study grammaticalization phenomena (e.g. Schwenter & Torres Cacoulllos, 2008; Torres Cacoulllos, 2012), but something that will distinguish the present analysis from most previous studies of this type is that

I will code for meaning.

Variationist researchers generally avoid coding for meaning in order to maintain objectivity in the coding process. However, coding for meaning has precedent in variation analysis. Blas Arroyo (2018), for example, coded for modal meanings in order to understand the evolution of obligation modals in Spanish. Fortunately, to code for meaning, we do not need to be mind-readers in order to know—or at least have a good idea of—what speakers mean when they speak (otherwise, the entire linguistic enterprise would be for naught). As I will show below, it is possible to systematically categorize tokens into different classes of meaning by using clearly defined criteria in the coding process.

It is important to mention the converse problem: in corpus studies that do not take morphosyntactic factors into account, it is possible that observations about the meaning of constructions are actually due to morphosyntactic constraints. For example, consider the possibility that a motion construction in a language evolves first into a first-person future construction. Most first-person future sentences express intention, so a corpus study that neglected morphosyntactic constraints could conclude incorrectly that the construction had evolved into an intention construction when in fact, its use was conditioned by the person of the subject. The advantage of variation analysis is that it allows us to consider and code for both morphosyntactic and semantic factors in the same statistical model, which can help us to see the whole picture and better understand the process of change. In the sections that follow, I will present an extensive characterization of the coding process and its justification. Then I will present the results of the variation analysis and discuss their significance for an understanding of the meaning of *ir a*.

2.2 Methods of Coding

2.2.1 Token selection: The envelope of variation

The data that I used for this analysis comes from the Genre/ Historical Corpus of the Corpus del español (Davies, 2001). The Genre/ Historical corpus contains 100 million words from more than

20,000 texts and transcripts dated from the 1200s to the 1900s. Based on previous accounts, such as Aaron (2006), which have suggested that the Periphrastic Future came into use in the 17th century, I gathered data from four centuries: the 1600s – 1900s. Since Variation Analysis aims to study the distribution of two forms with the same meaning, I chose to begin token collection at the early stages of grammaticalization but not before. Here, I am not interested in the relative distribution of the Synthetic Future and expressions of motion, so I collected tokens starting when the Periphrastic Future came into use.

Extracting tokens of the Synthetic Future was straightforward: for each century I collected a random sample of 100 tokens and discarded any tokens which had been misdated in the corpus or which were corrupted in some way (e.g. tokens in which the text had been clearly cut off).

Selecting tokens for the Periphrastic Future was more complex. The first step was to eliminate any forms of the periphrastic construction, *ir a + infinitive*, that categorically exclude future interpretations. When the auxiliary is conjugated in the Preterit (past perfective), the periphrastic construction only yields motion interpretations. Only when the auxiliary verb *ir* is conjugated in the Simple Present, Imperfect (past imperfective), or Subjunctive (though much less common) can it be used to express intention, prediction, or other future-oriented meaning. Examples of these are shown below.¹

(43) Simple Present

El destino que hoy lloran las provincias que están al sur de Asturias retiradas va a ser el nuestro. . .

‘The destination that the distant Southern Asturian provinces mourn today is **going to be** ours.’

(CdE: Title: *Pelayo* (1778), Author: Gaspar Melchor de Jovellanos)

(44) Imperfect

Era la pobre niña que, habiendo seguido a Flavio y comprendido que iba a ser descu-

¹Imperfect Subjunctive conjugation of the Periphrastic Future can also yield future-oriented interpretation; however, I did not find any examples of this in the token-collection process, so I haven’t included an example of this here.

bierta...

‘She was the poor girl who, having followed Flavio and understood that she was **going to be** found...

(CdE, Title: *Flavio* (1861), Author: Rosalía de Castro)

(45) Present Subjunctive

*No creo que **vaya a ser** negativo porque está suficientemente aclarada la manipulación y el atraco que se hizo en la casilla que hemos impugnado.*

‘I don’t think that it is **going to be** negative because it is sufficiently clear that there was manipulation and hijacking in the voting box which we have contested.’

(CdE, Title: *Entrevista (PAN)* (1999), Author: Bravo Mena)

It is important to explain why tokens were included in which *ir* is conjugated in the Imperfect. In the *ir a + infinitive* periphrastic construction, when the auxiliary is conjugated in the Imperfect, various sub-readings of the future are available. That is, the only difference in meaning between the periphrastic construction conjugated in the Simple Present and the Imperfect is the perspective. This is especially apparent in instances where the periphrastic construction is embedded under the verb ‘say’ conjugated in the past as in (46). In this example, there was a time when the nephew said, “Voy a correr...” (‘I am going to run...’).

(46) Intention

*Su sobrino le había dicho que él **iba a correr** con todos los trámites para la publicación...*

‘Her nephew had said that **he was going to run** with all of the procedures for publication...’

(CdE, Title: *Un sueño en en la ventana: (25 relatos breves)* (1991), Author: Milia Gayoso Manzur)

(47) Prediction

La consigna ‘¡Que vengan todos!... demostró el grado de desorientación en que estaban los dirigentes del destierro, al creer, inocentemente, que el éxodo de las nuevas genera-

*ciones criadas bajo el adoctrinamiento marxista **iba a derrocar** a Castro...*

‘The slogan ‘¡Come all!...demonstrated the degree of confusion of the leaders of the exile, believing, innocently, that the exodus of new generations raised under Marxist teachings **were going to overthrow** Castro...’

(CdE, Title: El Nuevo Herald (October, 1998))

(48) Predestination

*Pues nada, que llegue al dichoso taller con ansias de abreviar cultura, sin saber que lo único que **iba yo a libar** ahí eran jugos biliares.*

‘In any case, I arrived at the blessed workshop, anxious to drink in culture without knowing that the only thing that **I was going to drink** there were juices of bile.’ (CdE, Title: “Mis razones” (2000), Author: Salvador García Lima y César Vargas)

As I said above, tokens in which *ir* was conjugated with another verb form were excluded from analysis because in these forms *ir* categorically referred to motion and did not serve as an auxiliary. Examples of excluded tokens are shown below:

(49) Preterit

*Yo **fui a hacer** la misma diligencia a la cocina, donde me despachó muy bien nana Clara, que era la cocinera.*

‘I **went to complete** the same task in the kitchen, where nana Clara, who was the cook, took good care of me.’

(CdE, Title: *El Periquillo Sarniento* (1816), Author: José Joaquín Fernández de Lizardi)

(50) Future

***Iré a ver** mañana a ese hombre ponderado.*

‘Tomorrow, **I will go to see** that man with a great reputation.’

(CdE, Title: *El artista barquero, é Los cuatro 5 de junio* (1844), Author: Gertrudis Gómez de Avellaneda)

(51) Conditional

*El que tuviese un amigo como Carlos III, en quien depositar su corazón y a quien pedir consejo, se creería muy dichoso, y le **iría a buscar** continuamente*

‘He that had a friend like Carlos III, in whom to entrust his heart and from whom to ask for advice, would believe himself very blessed and **he would go to see** him constantly.

(CdE, Title: *Historia del reinado de Carlos III en España* (1843), Author: Antonio Ferrer del Río)

A second complexity in the extraction of tokens of the Periphrastic Future is the fact that in early stages of grammaticalization, this form allows material to intervene within the construction.² Because of this, I searched for all instances in the corpus in which any form of *ir* was within six words of the infinitive.

I only included tokens which contained the preposition *a* in the construction. As I will discuss further below, it is tokens in which *a* indicates that its object (an infinitive) is a goal of the speaker, which give rise to intention readings. Other prepositions, such as *para* can signal that its object is a goal of the speaker. In the present analysis, I only included tokens containing *a*, excluding tokens with other prepositions (as in (52)).

I also excluded tokens in which the lemma returned by the search was not directly subordinate to *ir*. In (53a) for example, the lemma returned by the search—*entender*—is subordinate to *tratar*. That is, this example is a future expression, but the lemma returned by the search is not the main verb of the root expression. Example (53b) is more straight-forward, in which *ir* and *conocer* are in two separate constituents of a complex verb phrase.

(52) Non-a Preposition

*Allí **fué** Pocapena **para decir** á Manolo que el señor Mariano esperaba en el Juzgado.*

‘Pocapena **went** there **to tell** Manolo that lord Mariano was waiting in the court.’

(CdE, Title: *Los gusanos* (1884), Author: Silverio Lanza)

²And, in fact, this occurs in modern Spanish as well, as shown in (48).

(53) Different Clause

a. ...*pero lo que los analistas políticos **van a** tratar de **entender** es qué implicaciones tienen esos resultados para las diferentes candidaturas.*

‘..but what the political analysts **are going to** try to **understand** is that the implications have those results for the different candidacies.’

(CdE, Title: “Los Palos” (1998), Source: semana.com)

b. *Pero... esté... cuando **van** y se hacen **conocer** - - - tienen mucho mérito.*

‘But... be it... when **they go** and make themselves **known** - - - they have a lot of merit.’

(CdE, Title: *Habla Culta: Buenos Aires: M9 A* (1900s))

2.2.2 The predictors

Having determined the envelope of variation—deciding which tokens I would and would not include in the analysis—I coded for a variety of factors, which had the potential to predict the use of each form. Most of these factors were drawn from previous research on the variation of the future (Aaron, 2006; Poplack & Turpin, 1999; Poplack & Malvar, 2006; Tagliamonte et al., 2014; Torres Cacoullos & Walker, 2009):

- (54)
- a. Person: first, second, third³
 - b. Number: singular, plural
 - c. Animacy of the subject
 - d. Presence of a future-referring adverbial or prepositional phrase in the same sentence
 - e. Clause type: main or subordinate⁴
 - f. Sentence type: declarative, interrogative, imperative
 - g. Passive voice
 - h. Polarity

³Formal variants, such as Ud., “vuestra merced,” etc. are conjugated in the third person but are semantically addressee-oriented. I coded these examples as second person.

⁴“Main” clauses include prototypical main clauses as well as apodoses of conditionals.

- i. Genre: written, oral, dialogue

A number of these factors require further comment.

2.2.3 Agent and Director

Previous variationist research has hesitated to include factors whose values depend on the judgement of the analyst, in order to maintain objectivity. Generally speaking, this is desirable: as an analyst reading tokens in a corpus, it is impossible to determine the communicative intention of the speaker. The serious drawback of this approach is that it limits our ability to code for factors which may be essential to understanding the variation of the forms we study. However, some researchers have developed methods to code for these factors while maintaining objectivity.

Torres Cacoullos & Walker (2009), for example, in studying the variation of the *be going to* future in English, coded for agentivity of the subject based on lemma. I did the same for the factor category that I will call “agent.” However, there are a few issues with this approach. The first is that semantic roles are not discreet categories as is often assumed. Dowty (1991) argues that there are prototypical agents (corresponding to subjects) and prototypical patients (corresponding to direct objects) but that the actual semantic role of the participant may be more or less prototypical based on qualities such as volition, consciousness, movement, causation, and independence. Thus, even to assign a semantic role to a subject based on lemma, the analyst must make a judgement call.

The second issue with this approach is that subject agentivity does not correspond perfectly to lemma. There are lemmas whose subjects may be agents, experiencers, or another semantic role based on the context. There are also lemmas which have different meanings in different contexts and thus vary across contexts in their assignment of semantic role to the subject. Consider the following examples.

(55) Context dependence:

- a. *Les contaremos y les **mostraremos** más detalles de ese eclipse de sol, el último del siglo, al final del “Telediario.”*

‘We will tell you and **we will show** you more details about this solar eclipse, the last century, at the end of the “TV News”.’

(CdE, *Corpus Oral de Referencia de la Lengua Española Contemporánea (CORLEC)* (1991-1992))

- b. *Estoy segura de que la cuenta de consumo eléctrico **no mostrará** cambio alguno.* ‘I’m sure that the electric bill **will not show** any change.’ (CdE, Title: *Preludio con fuga* (1992), Author: Sara Karlik)

(56) Meaning change

*¿Pero cómo lo dice? Con un modo oculto, y artificioso, que ya **voy a descubrir**.*

‘But how does he say it? In a hidden and deceptive way, which I **am** now **going to reveal**.

(CdE, Title: *Teatro crítico universal, vol. 2* (1728), Author: Fray Benito Jerónimo Feijoo y Montenegro)

Example (56) illustrates a polysemic verb whose more common reading is similar to ‘discover’ in English, a verb whose subject is not an agent. In this example, however, the author is using this verb in a different sense that can be translated ‘reveal.’ The subject in this case is an agent.

Because of discrepancies like this, I also coded for what I will call “director,” using the term from Copley (2009). Copley uses the term ‘director’ to describe a salient agent who is responsible for the realization of the verb. This agent need not be the subject. In the present analysis, this consisted of a judgment call in which I made a token-by-token determination of whether or not there was a director in the context. Most crucially, it was necessary to determine whether the subject was an agent in each token. My judgment was based on whether or not the subject had control over the realization of the state of affairs described by the infinitive. Some of these examples are described below.

(57) *Cuando están los escuadrones con el enemigo bando, **voy a morir peleando**, y no de imaginaciones.*

‘When the squadrons are here with the enemy faction, **I am going to die fighting**, and not in my imagination.’

(CdE, Title: *Deste agua no beberé* (1604), Author: Andrés de Claramonte y Corroy)

(58) *No el todo. Hoy voy a ver al médico.*

‘Not everything. Today, **I’m going to see** the doctor’

(CdE, Title: *Los pies de barro* (1996), Author: Terry Pratchett, Translator: Javier Calvo Perales)

In example (57), *morir* is not typically agentive, yet the speaker expresses the intention to *morir peleando* ‘to die fighting,’ a decision over which the subject does have control. In example (58), we find that *ver* ‘to see’ is used to describe an intention. Typically, the subject of *ver* is an experiencer, but in this case the subject has control over whether she sees the doctor.

2.2.4 Verb Class and Eventuality

I coded for “verb class,” which includes the values stative, dynamic, motion, psychological state, and perception. In addition, I coded for the category “eventuality” which distinguishes between states and events, described in the introduction. I coded both of these categories based on lemma. In the final analysis, I excluded eventuality because there is sometimes vagueness in the categorization of a lemma as stative or eventive. Most notably, perception verbs tend to transcend this categorization, sometimes acting as states, other times as events, and sometimes resisting categorization altogether.

The greater precision of the category “verb class” was advantageous: even though perception verbs resist categorization based on eventuality type, in the data, they patterned with events. As a result, verb class was a superior predictor in the analysis and was included in all models, while eventuality was excluded.

2.2.5 “Go verbs”

One hypothesis that I had at the outset was that the Periphrastic Future would show a preference early on for verbs that individuals ‘go and do,’ even when expressing future meaning. In order to

operationalize this hypothesis, I developed a quantitative measure of how likely each lemma was to appear in a motion expression relative to future expressions. For each century, I divided the number of tokens in the preterit periphrastic construction—obligatorily a motion reading—by the total number of tokens in which that lemma appeared in a periphrastic construction. For example, in the 1900s there were 102 tokens of the lemma *dormir* in the periphrastic construction. In 66 of these, *ir* was conjugated in the Preterit. The estimate assigned to *dormir* in the 1900s was thus, .647 (one of the highest estimates in the 1900s).

This factor did not end up as a significant predictor in any century, but it is important to note it here because this result challenges the hypothesis that the newly grammaticalized Periphrastic Future is favored with verbs that people tend to ‘go and do.’

2.2.6 Interpretation

The final factor that I coded for was interpretation. This coding decision is the principle element that distinguishes the present analysis from previous analyses of the future using the variationist approach. As described above, analysts have generally avoided using interpretation as a factor in corpus analysis because it is impossible to know the communicative intention of the speaker or author in the corpus. Coding for interpretation risks circularity: if a given form is theorized to express a certain meaning (e.g. the Periphrastic Future expresses intention) the analyst may claim that a given token of this form has the postulated meaning by virtue of containing that form. That is, the reason for the interpretation is the form, and the reason for the form is the interpretation.

A related concern, which applies even to the skilled analyst who would avoid circularity errors in reasoning, is that the hypotheses of analyst may bias the interpretation of a token, creating replicability problems for the analysis.

Due to these issues, previous analyses have used morphosyntactic factors as a proxy for interpretation. For example, Aaron (2006) and Tagliamonte et al. (2014) use the observation that first person and animate subjects favor the Periphrastic Future—especially in early stages of grammaticalization—as evidence that the Periphrastic Future first grammaticalized into a marker of

intention. The serious drawback to this approach is that while there is a relationship between morphosyntactic factors and interpretation, there are a great many instances in which this relationship does not hold. For example, among the Periphrastic Future tokens in the data set, only 69.5% adhered to the assumption that tokens with first-person subjects express intention and tokens with second- or third-person subject did not express intention. Only 66% of the tokens adhered to the assumptions that animate subject tokens express intention and inanimate subject tokens do not. While these numbers are above 50%, representing some predictive power of first person and animate subjects with respect to interpretation, there is a great deal of indeterminacy.

Furthermore, because interpretation and morphosyntax (i.e. form) are not perfectly correlated, they can have independent effects in the prediction of variation. The present analysis aims to understand whether the Periphrastic Future grammaticalized as a marker of intention. If this was the case, we should expect that the strongest predictor of form in early stages of grammaticalization is interpretation. If not, the other factors included in the analysis should be the strongest predictors of variation.

In other words, in order to get good answers to the question of whether or not there was indeed an intention stage in the evolution of the Periphrastic Future, it is necessary to include interpretation among the factors in the variation analysis. But as I described above, coding for interpretation presents difficulties.

In order to address the issues associated with coding for interpretation, I developed a process to systematically code for interpretation using a combination of morphosyntactic factors and facts about the context in which tokens appear. This process was developed out of formal theories of modality, which I have reviewed in the introduction.

Recall that literature on future expression in language has generally agreed that at least to some extent, expressions of future are modal expressions (e.g. Coates, 1983; Fleischman, 1982; Copley, 2009). I will assume that future marking does involve modality here and characterize the sub-interpretations of the future with respect to the type of information in the modal base and ordering source. There are five principle classes of sub-interpretation that I identified in the corpus:

intention, prediction, predestination, scheduled, and command.

2.2.6.1 Intention

The modal base of intentions is factual and the ordering source contains the action-ordering preferences of the individual who holds the intention.⁵ Action-oriented preferences describe how individuals behave in certain sets of circumstances. Notice that while the thinking agent in most expressions of intention is the speaker, there are cases in which the thinking agent is someone else.

(59) Prototypical Intention:

En cuanto al sujeto que V.S. me recomienda, voy a decirle lo que hay. ‘Regarding the subject that you recommended to me, **I am going to tell you** what there is.’ (CdE, Title: *Correspondencia* (1778), Author: Gaspar Melchor de Jovellanos)

(60) Reference to another’s intention:

El funcionario aclaró, sin embargo, que “con mucho gusto” la Secretaría de Hacienda va a colaborar con el Comité Técnico para desahogar también esa auditoría.

‘The official clarified, however, that “with great pleasure” the Secretary of Secretariat of Finance and Public Credit **is going to collaborate** with the Technical Committee to relieve the pressure of this audit.’

(CdE, Title: Mex: Yucatán (1997))

2.2.6.2 Prediction

The modal base of predictions is a set of factual propositions, and the ordering source contains generalizations about how facts relate in the world. Predictions concern what is to be expected in a set of circumstances. In prototypical uses, individuals make predictions with respect to inanimate subjects, but there are cases in which speakers make predictions about animate subjects (including themselves). This is a distinction that I will explore in much more detail in later chapters. Example (62) below illustrates that *creo que* can coerce prediction readings of sentences with animate

⁵I will explain these choices of modal base and ordering source in much more detail in the following chapter.

subjects.

(61) Prototypical Prediction:

*...un día **llegará** en que no se escriba este pacto, porque estará sobreentendido siempre.*

‘... **a day will arrive** in which the pact won’t be written, because it will forever be implied.’

(CdE, *Viajes por Europa, África i América: 1845-1847* (1850), Author: Domingo Faustino Sarmiento)

(62) Coerced by “creo que:” ... *y todavía creo que, siendo tal acto incumbencia del presidente, **no lo realizará éste** y le daréis el apoyo de vuestros afectos republicanos y por ende pacíficos.*

‘... and I still believe that, such an act being the responsibility of the president, **he won’t realize it** and you will give him the support of your Republican, and therefore pacifist, followers.’

(CdE, Title: *Crónica Internacional* (1866), Author: Emilio Castelar)

2.2.6.3 Predestination

Like prediction, the modal base of predestination is also factual, but the ordering source contains generalizations about the world that are ‘objective.’ Whether or not a generalization is taken to be objective will be discussed in great detail in the next chapters, but generally speaking, it describes statements in which the speaker has all the information necessary to be sure about what will happen. This is to say, statements of predestination are statements about what is inevitable in the world as it is. Here I consider objective generalizations to be licensed when facts are publicly available or in the Common Ground. In prototypical formulations of this sub-interpretation, the verb phrase is in a dependent clause, such as an if-clause, since the information in this type of clause is taken for granted. There other ways that speakers indicate that a claim is taken for granted, as shown below where a technological advancement has set in motion the superior quality of a satellite which is in the process of construction.

(63) Prototypical Predestination:

... y si ya **se va a poner**, claro está que otra vez por la mañana por celajes de oro y grana rey coronado saldrá.

‘... and if **it is** already **going to set**, it is clear that once again in the morning among golden and crimson cloudscapes the crowned king will rise.’

(CdE, Title: *Los trabajos de Job* (1622), Author: Felipe Godínez)

(64) Set-in-motion:

Este ingenio será una versión mucho más avanzada del satélite norteamericano COBE, pues su resolución será de seis grados.

‘This device **will be** a version much more advanced than the North American satellite COBE, for its resolution will be six degrees.’

(CdE, Title: “Científicos para explorar el Cosmos” (1994), Author: Diego Jalon Barroso)

2.2.6.4 Scheduled

Scheduled readings arise when there is a publicly available plan, setting scheduled readings somewhere in between intention and predestination. This plan can be put in place by an individual agent or an institution. What is most relevant in scheduled readings is that the prejacent is scheduled to be realized at a specific time in the future.

(65) *La junta directiva del Marathón se reunirá mañana para oficializar las multas y las separaciones de jugadores.* ‘The board of directors of Marathon **will meet tomorrow** to approve the fines and the dismissal of the players.’

(CdE, Source: La Prensa Honduras (1998), Website: laprensa.hn)

2.2.6.5 Command

Command readings of future forms are those in which the speaker voices her will for the future actions of the interlocutor. I will assume a factual modal background and an ordering source that contains the action-oriented preferences of the speaker for these readings.

(66) ¡**Te vas a quedar** así, ¿me escuchás?!

‘**You are going** to stay like that! Do you hear me?!’

(CdE, Title: *Debajo de la cama* (2000), Author: Mabel Pedrozo Cibilis)

2.2.6.6 Coding for sub-interpretation

In order to code for these interpretations, I developed systematic criteria to justify each interpretative decision. The criteria take into account morphosyntactic facts, semantic facts, and facts about the context. In other words, the criteria aim to make explicit what features speakers use to cue which modal base and ordering source are at work. The Periphrastic Future and Synthetic Future distinction does not factor in any way into these criteria.

By using criteria in this way, this process of coding for interpretation avoids circularity. In addition by specifying the criteria explicitly, any biases of the analyst are shown. This transparency allows for replicability of the methodology and ensures consistent coding among similar tokens. The full list of criteria can be found in Appendix A.

While this list is rather cumbersome, I want to draw out a few observations. First, few tokens are entirely explicit with respect to the conversational background. As a result, many of the tokens are potentially ambiguous with respect to the interpretation. I noted these ambiguities in the coding process but because the types of ambiguities were so diverse, it was impossible to operationalize them as a factor in the variation analysis. However, these ambiguities will factor into my broad characterization of the data.

Despite the ambiguities of tokens, I assigned each token a single interpretation. As I developed the coding criteria, I observed that certain collections of facts gave a default interpretation unless otherwise specified. For example, first person, singular, animate, agentive subjects constitute the prototypical realization of statements intention. However, if the prejacent is undesirable, the token does not communicate intention, but rather prediction:

(67) *El cielo, Señor, os guarde. **Vamos a morir**, agravios, y ruego a Dios que esta vida, que tan infelice aguardo, deba su postrer consuelo a las violencias de un rayo.*

‘May Heaven protect you, Sir. **We are going to die**, damned, and I beg God that this life, which I hold so unhappily, send as its final comfort the violence of a lightning bolt.’

(CdE, Title: *La fuerza del natural* (1644), Author: Agustín Moreto)

I assumed that for verbs in main clauses the ordering source was not objective by default. This is because main declarative clauses prototypically assert information (Roberts, 1996), so such statements are not taken for granted as true. So I did not assign main clauses Predestination meaning unless there was an explicit indication that the modal claim is made with respect to publicly available facts that yield a guaranteed conclusion.

Finally, I took verbs in subordinate clauses to be objective by default. This decision was based on literature which has observed that embedded content may be not-at-issue, yet nevertheless taken to be true (e.g. Tonhauser et al., 2013). In other words, in these cases, the content of an embedded clause is often taken for granted. Of course, as above, there are many specific situations that cancel this default interpretation, but without explicit structures that indicated an alternative interpretation, I took future constructions in subordinate clauses to express predestination.

2.2.7 Non-future interpretation

Until now, I have discussed interpretations which are sub-classes of future meaning. However, one of the most important meaning distinctions that factored into the present analysis is the difference between motion and future interpretations of the periphrastic construction. Because the variationist approach studies the variation in forms that communicate the same meaning, it is important to exclude non-future tokens from analysis.

In the same way as described in the previous section, I used concrete criteria to determine whether a given token should be classified as motion or future. These criteria are included in Appendix A. In general, tokens were classified as motion in two cases: (1) the token expressed a generalization or (2) the context made clear that subject was in motion at utterance time.

When not classified as motion, tokens of the periphrastic construction were often ambiguous between futurate or a future interpretation. This distinction is subtle but important. Consider the

following constructed example:

(68) Mañana, **voy a estudiar** en la biblioteca a las 5.

‘Tomorrow, **I’m going to study** in the library at 5.’

In this example, the ambiguity lies in whether the speaker intends to leave for the library at five or arrive at the library at five. What is illustrated here is that the difference between the futurate and future reading of the periphrastic construction rests in whether it is the verb *ir* or the infinitive that is taken to occur at the time of evaluation (five o’clock in this example). That is, both readings express an intention, but they differ in whether the speaker intends to ‘go’ at five o’clock or ‘study’ at five o’clock.

The criteria that I used to distinguish between futurate or future interpretations of these examples are also included in Appendix A. As I will discuss in the next section, this distinction does not factor into the variation analysis because the Synthetic Future does not permit futurate interpretations, so the inclusion of this distinction would be uninformative. However, distinguishing futurate and future meanings turned out to be essential in understanding the evolution of the Periphrastic Future.

2.3 Data Analysis

2.3.1 A Broad Characterization of the Data

After coding for the factors as described above and discarding tokens that did not fit the appropriate criteria, I collected a data set as summarized below in Tables 2.1 and 2.2:

One of the striking shifts in this data is the drop off of futurate readings from the 1600s to the 1700s found in Table 2.1. As shown, the relative frequency of futurate readings continues to fall in subsequent centuries. Additionally, we find a successive reduction in the percentage of tokens that are categorized as motion decreasing approximately 10 percent each century from the 1600s to the 1900s.

	Future		Futurate		Motion		Other		Total
	#	%	#	%	#	%	#	%	#
1600s	32	23%	44	31%	47	33%	18	13%	141
1700s	63	66%	9	9%	21	22%	3	3%	96
1800s	51	76%	2	3%	9	13%	5	7%	67
1900s	77	90%	1	1%	3	3%	5	6%	86
Total	223		56		80		31		390

Table 2.1: Summary of Periphrastic Tokens

	Future		Futurate		Motion		Other		Total
	#	%	#	%	#	%	#	%	#
1600s	67	80%	0	0%	0	0%	17	20%	84
1700s	63	68%	0	0%	0	0%	30	32%	93
1800s	79	81%	0	0%	0	0%	18	19%	97
1900s	81	82%	0	0%	0	0%	18	18%	83
Total	290		0		0		83		373

Table 2.2: Summary of Synthetic Tokens

This decrease in relative frequency of futurate tokens is illustrated slightly differently in Table 2.3 below, in which motion tokens have been removed. Removing motion tokens allows us to target in on the crucial relationship: the distribution between futurate and future readings of the Periphrastic Future over time. Table 2.3 also attempts to make sense of the drop in the “other” category from the 1600s to the 1700s. In the 1600s, 14 of the 18 “other” other tokens were classified as “imperative” (an interpretation different than ‘Command’ explained above). Imperative tokens include those in which *ir* appears in the first-person plural form and whose utterance is followed by the assent or obedience of interlocutors (see Appendix A for more details).

	Future vs. Futurate			Future vs. (Futurate + Imper.)	
	<i>Future</i>	<i>Futurate</i>	<i>Futurate/Total</i>	<i>Imper.</i>	<i>(Futurate + Imper.) / Total</i>
1600s	32	44	57.89%	14	64.44%
1700s	63	9	14.29%	2	14.87%
1800s	51	2	3.92%	3	8.93%
1900s	77	1	1.30%	3	4.94%
Total	223	56		22	

Table 2.3: Summary of the Periphrastic Future Tokens after Removing Motion Tokens

What the changes in Table 2.3 represent are a true shift in the way speakers used the periphrastic construction. In the 1600s, the majority of future-referring instances of periphrastic construction described situations that were generally concrete and contained in a definite volume of space. In other words, these constructions described situations in which individuals needed to ‘go in order to do’ (an observation that is similar but not identical to the proposal of Eckardt, 2006). By the 1700s, however, the situations described are notably more abstract and often not contained within a definite volume of space. This is the essence of the difference between future and futurate uses: futurate uses describe an intention to ‘go’ with the goal of ‘doing’ something; future uses describe an intention, prediction, etc. about the realization of a situation in an evaluation time that is after the time of utterance.

What is crucial is that the majority of futurate uses of the periphrastic construction are ambiguous as illustrated in Table 2.4. As described above the ambiguity lies in whether the intention is to go (with the goal of doing something) or whether the intention is simply to do something. In futurate constructions, the infinitive must be realized outside of the spatial deictic center of the subject; in future constructions the infinitive can be realized inside or outside of the subject’s deictic center.

		Future	Futurate	Total
1600s	Total	32	44	76
	Ambiguous	10	33	43
	Percent Ambiguous	30.20%	75%	56.58%
1700s	Total	63	9	72
	Ambiguous	10	8	18
	Percent Ambiguous	15.87%	88.90%	25.00%

Table 2.4: Ambiguity of future vs. futurate readings of the Periphrastic Construction

In the 1600s, the extensive employment of futurate uses of periphrastic construction—to express the intention to go and do something—is what creates the potential for grammaticalization of the Periphrastic Future. The distinction between futurate and future expressions of *ir a* is subtle and therefore ripe for reinterpretation. Once an interlocutor reanalyzes the futurate sentence “*voy a estudiar*” as a future (i.e. the intention to study and not to go and study), that individual has drawn a form-meaning connection between the periphrastic construction and future meaning. The

widespread futurate uses of the periphrastic construction allow this process of reanalysis to take place many times within a population, which precipitates the systemic shifts shown in Tables 2.1 and 2.3.

What these data show, then, is that the grammaticalization of the periphrastic construction into a future construction took place sometime during the 1600s and was widely used by the 1700s (a result that corroborates the conclusion in Aaron, 2006).

With this in mind, I now turn to the results of the variation analysis. The discussion up to this point argues that futurate uses of the periphrastic construction are the bridging context that precipitates to innovation of the Periphrastic Future. The question that remains, however, is whether *ir a* is grammaticalized as a marker of intention (that is, it becomes an intention construction in 17th and 18th centuries) and then later evolves to express prediction meaning, or whether the *ir a* construction grammaticalizes directly into a future construction and intention is merely the realm of ambiguity that enables the transition.

As will become apparent in the following discussion, the data suggests the latter option. That is, at no stage is intention meaning a predictor of use between the Periphrastic and Synthetic Future. Rather, non-semantic factors create the most robust models of prediction. Further evidence of this is that all interpretations are possible from the beginning stages of the grammaticalization of the Periphrastic Future. I will discuss these details further below.

2.3.2 The Variation Analysis

To determine the models that best predict the variation between the Periphrastic Future and Synthetic Future, I carried out a fixed-effects logistic regression using the `lme4` package (Bates et al., 2015) in R. Following other analyses (e.g. Aaron, 2006; Poplack & Malvar, 2006; Schwenter et al., 2019), I conducted a separate analysis for each century of data. This enables us to see how the influence of constraints changes (or remains stable) over time.

I systematically coded a total of 763 tokens distributed across all four centuries for semantic and morphosyntactic factors. Of these, I only included those tokens with futurate or future in-

terpretations in the regression analysis. In the data set, 194 tokens had a non-futurate or future interpretation, leaving 569 tokens for the regression analysis.

For each century, I conducted a fixed-effects logistic regression analysis in R (R Core Team, 2019). I first performed a step function analysis to determine which factors were most influential in predicting the form of the future construction: Periphrastic Future or Synthetic Future. Based on the factors returned by the step function analysis, I created a series of logistic regression models, adding in one factor at a time. In addition, I used Random Forests and Conditional Inference Trees to inform the models that I created. Finally, I used a Chi-Squared analysis to compare whether subsequent models with additional factors had significantly more predictive power than models with fewer factors.

The significant predictors in the models of best-fit are presented in Table 2.5. I will discuss the details of each analysis in turn. From left to right, the columns represent the order in which the step function analysis added each subsequent predictor.

	First	Second	Third	Fourth
1600s	Interpretation	Clause Type	Person	
1600s (w/o futurate)	Clause Type	Verb Class		
1700s	Verb Class	Clause Type	Director	
1800s	Interpretation	Genre		
1900s	Genre	Non-past Adverbial	Clause Type	Animacy

Table 2.5: Summary of Constraints

As a final note, I set the Synthetic Future as the intercept in all regression models. In the tables below, the values of the independent variables are ranked by the extent to which they favor the Synthetic Future. For example, as showing in Table 2.6 below, the most important constraint is interpretation. Prediction has the highest estimate, which means that we are more likely to see Synthetic Futures in contexts where the speaker is making a prediction than in contexts where the speaker is stating an intention (the value in the intercept). The low p -value indicates this difference is statistically significant. Predestination has an estimate that is greater than zero, so we are more likely to see Synthetic Futures in predestination contexts than in intention contexts, but the p -value

= .089 says that this difference is not statistically significant. In the interest of being concise, I will use the term *favor* to describe this relationship (e.g. in the 1600s prediction contexts significantly favor the Synthetic Future (with respect to intention contexts)). I discuss these facts below for each century and summarize the findings in Table 2.11.

2.3.2.1 The 1600s

Because of the high number of futurate tokens in the 1600s, I ran two models: one model including these tokens with a futurate interpretation and a second model excluding them.⁶ As I discussed above, futurate readings correlate highly with intention interpretations.

Factor	Estimate	Std. Error	z value	p value	
INTERPRETATION (Reference Level: Intention, n = 52)					
Prediction (n = 37)	2.26	.65	3.5	<.001	***
Predestination (n = 42)	1.16	.68	1.7	0.089	
CLAUSE TYPE (Reference Level: Subordinate, n = 34)					
Main (n = 108)	2.53	.62	4.12	<.001	***
PERSON (Reference Level: First, n = 49)					
Second (n = 10)	1.73	.58	2.98	0.003	**
Third (n = 76)	1.21	.53	2.29	0.02	*

Table 2.6: Constraint Ranking in the 1600s (including futurate tokens)

As shown in Table 2.6 prediction favors the use of the Synthetic Future significantly more than intention. Predestination falls somewhere between these two variables with no significant difference between either prediction or intention surfacing in the analysis. Clause type is the second significant constraint, where main clauses significantly favor the Synthetic Future. Finally, both second- and third-person subject predict the use of the Synthetic Future compared to first-person subjects, and—though not shown in the table—there is no significant difference between second and third person.

In order to examine the relative importance of these constraints as well as to understand how they interact, I generated a conditional inference tree displayed below in Figure 1. As shown in

⁶This was the only century in which this separation was necessary. In the remaining centuries, not only were there a low number of futurates, but these tokens did not have a significant impact on the statistical analysis.

the figure, the hierarchical ranking of the constraints is the same as reflected in Table 2.6. In addition, we find that the constraints interact: we are most likely to find the Synthetic Future form in prediction contexts. In intention and predestination contexts, we are significantly more likely to find the Synthetic Future in main clauses with second and third person subjects. We are more likely to find the Periphrastic Future in subordinate clauses or main clauses with first person subjects. It is important to highlight that the Conditional Inference Tree makes binary partitions in the data set: in the inference tree, intention and predestination are grouped together, but this does not mean that predestination is significantly different than prediction.

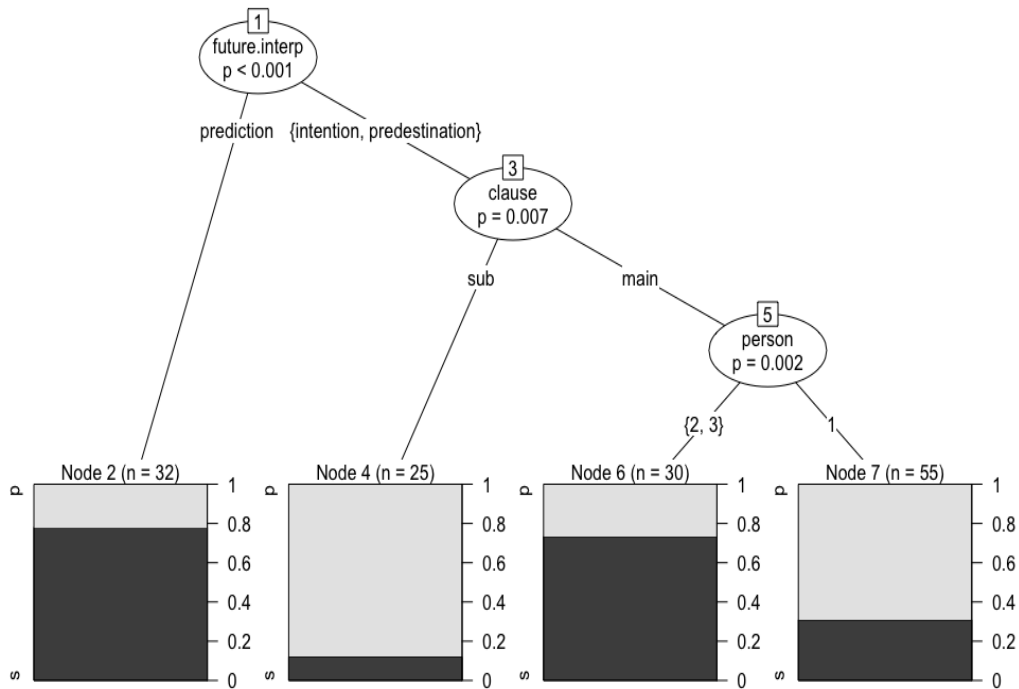


Figure 2.1: A conditional inference tree depicting the interaction of constraints in the 1600s with futurate tokens

When futurate tokens are removed from the 1600s data set, interpretation and person cease to be significant predicting factors, and verb class becomes significant. As shown in Table 2.7, the difference between motion verbs and stative verbs only approaches significance. However, the model as a whole, which includes both clause type and verb class is significantly more predictive than a model which excludes verb class. With futurate tokens removed, the number of Periphrastic

Future tokens is reduced to 32, which means that there is a greater chance that the result that verb class is a reliable predictor of variation surfaced at random in this particular sample.

Factor	Estimate	Std. Error	z value	p value	
CLAUSE TYPE (Reference Level: Subordinate, n = 23)					
Main (n = 76)	1.6	0.54	2.96	0.003	**
VERB CLASS (Reference Level: Motion, n = 13)					
Stative (n = 14)	1.66	0.99	1.67	0.096	.
Dynamic (n = 62)	0.23	0.66	0.35	0.725	

(Excluded from above for low token count: Perception, n = 4; Psychological State, n = 6)

Table 2.7: Constraint Ranking in the 1600s (excluding futurate tokens)

Despite this, verb class is the highest ranked constraint in the 1700s, which suggests that this result was indeed not obtained at random. For this reason, I will assume that in the 1600s, if we compare non-futurate uses of the Periphrastic Future with the Synthetic Future, stative verbs favor the Synthetic future. Though not shown in the table above, the difference between dynamic and stative verbs also approaches significance ($p = .092$).

What is apparent in the comparison of these two models is that the distinction between futurate and future tokens matters. I will discuss this further below in §2.4.

2.3.2.2 The 1700s

Factor	Estimate	Std. Error	z value	p value	
VERB CLASS (Reference Level: Dynamic, n = 92)					
Stative (n = 27)	2.65	0.81	3.26	0.001	**
Motion (n = 7)	1.03	0.84	1.22	0.223	
Perception (n = 7)	0.03	0.83	0.03	0.975	
CLAUSE TYPE (Reference Level: Subordinate, n = 42)					
Main (n = 93)	1.36	0.5	2.73	0.006	**
DIRECTOR (Reference Level: Yes, n = 65)					
No (n = 70)	1	0.45	2.24	0.025	*

(Excluded from above for low token count: Psychological State, n = 2)

Table 2.8: Constraint Ranking in the 1700s

In the 1700s, the highest ranked predictor is verb class. This can be seen in Table 2.8 above and is also shown in the conditional inference tree in Figure 2.2 below. Stative verbs significantly favor

the Synthetic Future with respect to dynamic and (though not shown in the table above) perception verbs. This division is clear in Figure 2.2, in which prototypical statives—psychological state verbs and stative verbs—overwhelmingly are realized in the Synthetic Future.

As discussed in §2.2.4, perception verbs pattern with eventive verbs: motion and dynamic. Among eventive verbs, the Synthetic Future is favored in main clauses. Though not shown in the conditional inference tree, the director constraint is also significant: the presence of a director favors the Periphrastic Future.

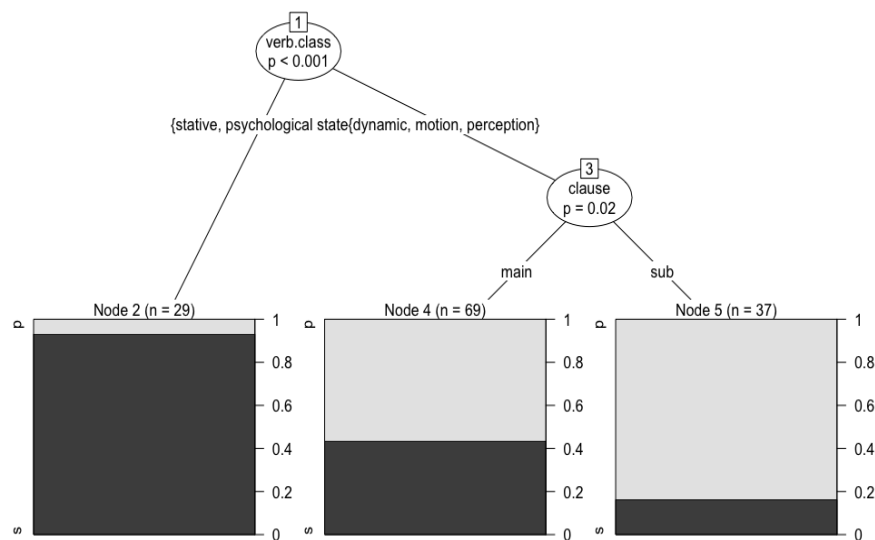


Figure 2.2: A conditional inference tree depicting the interaction of constraints in the 1700s

2.3.2.3 The 1800s

Factor	Estimate	Std. Error	z value	p value	
INTERPRETATION (Reference Level: Predestination, n = 26)					
Prediction (n = 35)	1.5	0.61	2.44	0.015	*
Intention (n = 54)	0.3	0.5	0.59	0.553	
GENRE (Reference Level: Dialogue, n = 79)					
Written (n = 42)	1.01	0.47	2.16	0.031	*

(Excluded from above for low token count: Command, n = 2; Scheduled n = 4)

Table 2.9: Constraint Ranking in the 1800s

In the first round of analysis, the Non-past adverbial constraint combined with interpretation yielded the best model. However, there was a categorical lack of use of non-past adverbials for periphrastic tokens in the past tense. I, therefore, removed past tense tokens from the data set (n = 11) and recalculated the best-fitting model, which is presented in Table 2.9 above.

In the 1800s, the most important constraint was interpretation. Unlike the 1600s, in which predestination found itself in the middle of intention and prediction (not significantly different than either), in this century, prediction favors the Synthetic Future significantly more than predestination. Intention and predestination thus pattern together, both favoring the Periphrastic Future with respect to prediction.

This model contains a new constraint: genre. In the 1800s, utterances in dialogues favor the Periphrastic Future. I have not included a conditional inference tree for the 1800s because there is no significant interaction between the two constraints.

2.3.2.4 The 1900s

Factor	Estimate	Std. Error	z value	p value	
GENRE (Reference Level: Dialogue, n = 22)					
Written (n = 68)	2.54	0.66	3.88	<.001	***
Oral (n = 69)	0.74	0.60	1.24	0.214	
NON-PAST ADVERBIAL (Reference Level: No, n = 130)					
Yes (n = 29)	1.53	0.55	2.78	0.005	**
CLAUSE TYPE (Reference Level: Subordinate, n = 53)					
Main (n = 106)	1.53	0.48	3.19	0.001	**
ANIMATE (Reference Level: Yes, n = 49)					
No (n = 110)	1.22	0.46	2.62	0.009	**

Table 2.10: Constraint Ranking in the 1900s

Contrary to the 1800s, the removal of past tense tokens (n = 12) had no impact on the constraints in the model of best fit or on the hierarchy and interactions of the constraints as represented in a conditional inference tree. For this reason, the data for the 1900s contains past tense tokens. The passive constraint was removed from the analysis due to a low number of passive tokens (n = 13). The resulting best-fit model appears in Table 2.10 above. The conditional inference tree

is shown below in Figure 2.3. In this century, the strongest predictor of variation is genre, with written texts having a significantly higher proportion of Synthetic Futures than transcriptions of spoken texts and dialogue.

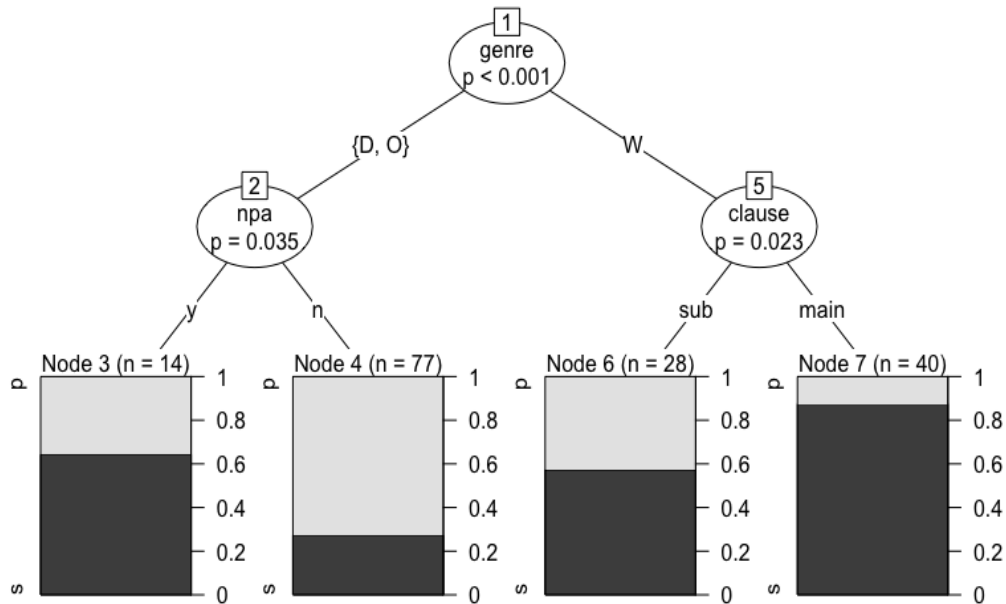


Figure 2.3: A conditional inference tree depicting the interaction of constraints in the 1900s

Among oral and dialogue tokens, the Synthetic Future is more probable in the presence of a non-past adverbial. In the written data, as in other centuries, main clauses predict the use of the Synthetic Future. The constraint that does not appear in the conditional inference tree is the animacy constraint. Inanimate subjects favor the Synthetic Future, but do not interact significantly with other variables.

2.3.2.5 Summary of the Data

The data for all four centuries is summarized in Table 2.11 below. Variables are ordered from left to right according to their Estimates. In other words, for each constraint, variables with the highest estimates are listed first.

Century	Favored Synthetic	In-between	Favored Periphrastic
1600s			
INTERPRETATION	Prediction	Predestination	Intention
CLAUSE TYPE	Main		Subordinate
PERSON	Second, Third		First
1600s Strict			
CLAUSE TYPE	Main		Subordinate
VERB CLASS*	Stative		Dynamic, Motion
1700s			
VERB CLASS	Stative	Motion	Perception, Dynamic
CLAUSE TYPE	Main		Subordinate
DIRECTOR	No		Yes
1800s			
INTERPRETATION	Prediction		Intention, Predestination
GENRE	Written		Dialogue
1900s			
GENRE	Written		Oral, Dialogue
NON-PAST ADVERBIAL	Yes		No
CLAUSE TYPE	Main		Subordinate
ANIMATE	No		Yes

*In this model, the inclusion of Verb Class created a significantly more predictive model than a model without it; however, the difference between stative and dynamic/ motion only approached significance.

Table 2.11: Summary of the Favoring Relations Across Time

2.4 Discussion

What do these results tell us about the intention stage? In §2.3.1, I showed that the ambiguity between futurate and future intentions in the 1600s led to the recruitment of *ir a* as the Periphrastic Future. And in fact, this finding can tell us why often-called ‘go-futures’ take the form that they do. There are three grammatical ingredients that combine to create these future ‘go’ constructions:

- (69)
- a. the verb ‘go’
 - b. an aspectual marker with futurate readings (such as the Spanish Imperfect or the English Progressive)
 - c. a preposition that can mark its object as a goal (such as ‘a’ in Spanish and ‘to’ in English)

Here I take the lexical content of *ir* ‘go’, that is the sense of movement, to be lost when the periphrastic construction grammaticalizes as a future construction. This analysis is supported, for example, by Eckardt (2006, 2012).

Regarding the relevant aspectual marking, in Spanish the prospective uses of the periphrastic construction uniformly require imperfective verbal morphology (see (7) - (9) above). For past prospectives, *ir* is conjugated with Imperfect morphology, and for present prospective readings—that is, future readings—*ir* is most often conjugated with Simple Present morphology. Imperfective aspect is cross-linguistically reported to have futurate readings. Futurate readings of the Imperfect in Spanish, for example are accounted for in Spanish by Cipria & Roberts (2000). The next necessary ingredient is the preposition *a* ‘to,’ which was available for use by speakers to mark a verb phrase as the goal of the salient agent. It was the combination of these three pieces that produced ambiguous futurates: (1) a futurate form of (2) *ir* + (3) *a infinitive*. Futurate intentions expressed in this way are easily reinterpreted as future intentions; an expression to go and do something, after all, expresses an intention to do something. What disambiguates these interpretations is whether it is the *going* or the *doing* that occurs at the evaluation time. However, evaluation times are often vague. For example, when a speaker describes an intention to (go and) study “tomorrow,” both the going and studying occur within the evaluation time. Is the intention to go and study tomorrow or to study tomorrow? Yes.

A crucial follow-up question is whether intention constitutes a bona fide stage in the grammaticalization of future constructions. Once a listener has reinterpreted a futurate intention as a future intention, does he show any preference to use this new periphrastic construction to express intention, or are all uses fair game? The data from the logistic regression support the argument that non-furate uses of the periphrastic construction show no preference for intention once other structural factors are taken into consideration.

From the very beginning stages of grammaticalization of the Periphrastic Future in the 1600s, we find that the Periphrastic Future (i.e. non-furate uses of the periphrastic construction) shows no preference for intention. At the population level, the Periphrastic Future was emerging as a

future construction in the 1600s and established as a future construction in the 1700s. In neither of these times periods was interpretation a significant predictor of the Periphrastic Future.

This is apparent both in the 1600s data that excludes futurate uses of the periphrastic construction as well as in the constraint rankings of the 1700s. We do, however, find that interpretation is a significant predictor in the 1600s data that includes futurate tokens. This effect is a result of the near-categorical use of futurates to express intentions. This helps to explain why proxies for interpretation make it look like the Periphrastic Future passed through an intention stage. Futurate uses of the periphrastic construction manifest the same surface properties of non-futurate expressions of intention: animacy and agency of the subject and preference for first-person, singular subjects.

Instead of interpretation, the most important constraints in the beginning stages of grammaticalization are verb class and clause type. The preference for the Periphrastic Future in subordinate clauses is reported in the literature (Poplack & Tagliamonte, 2000; Torres Cacoullós & Walker, 2009; Tagliamonte et al., 2014). The preference based on verb class—for dynamic, motion, and perception verbs—is also reported in the literature (Aaron, 2006).

One thing that the data in the present study can add to existing conversations about the grammaticalization of the Periphrastic future is to provide evidence against the claim that the periphrastic construction first grammaticalized as a marker of intention. In other words, at no point was the Periphrastic Future an intention construction. Instead, it was statements about the intention to go (and do something) that were reinterpreted as the intention to do something. As soon as this reinterpretation took place, other future readings—like prediction and predestination—were available. Given semantic analyses which treat future constructions as a type of modal operator (e.g. Abusch, 1998; Condoravdi, 2001), this makes sense. The contextually independent meaning of intention, prediction, and predestination is the same: a modal structure whose interpretation varies based on a contextually dependent ordering source.⁷

An interpretation-based preference does, however, develop as the Periphrastic Future ages. By the 1800s interpretation is the most significant predictor of the variation between the Synthetic

⁷I use ‘contextually dependent’ here loosely. In the next chapter, I will discuss in depth in what ways the ordering source of a modal expression is contextually dependent.

Future and the Periphrastic future. In this century, what we find is not that the Periphrastic Future is a marker of intention, but rather that the Synthetic Future is a marker of prediction (that is to say, is significantly preferred by speakers when communicating predictions). The predestination interpretation makes this clear: in the 1600s predestination favors neither form, but in the 1800s it favors the Periphrastic Future. This behavior of the predestination meaning allows us to conclude that it is a single interpretation—prediction—that favors the Synthetic Future.

One possible explanation for this shift is that the morphosyntactic preferences in the early stages of grammaticalizations give way to pragmatic preferences in subsequent stages. Neither of two constraints that form the model of best fit in the 1800s are structural factors; both concern what the forms mean, whether that be pragmatic (interpretation) or social (genre) meaning. This pattern may be due to a preference by speakers to find meaningful ways to differentiate between the use of competing forms in the future domain of meaning.

They may reinterpret morphosyntactic differences as pragmatic differences based on how morphosyntax correlates with meaning. Consider a dataset which groups together prediction interpretations and ‘epistemic’ interpretations. ‘Epistemic’ interpretations include instances in which future constructions are used to express an inference as in the following constructed example:

- (70) [Context: Yuri is sitting in his living room. Yuri’s husband, Maykel storms into the living room looking for his keys and asking where they are. Yuri hasn’t seen Maykel’s keys, but he knows that they always fall out of his pocket into the sofa. Yuri says:]

Estarán dentro del sofá.

‘They’ll be in the sofa.’

Prediction and ‘epistemic’ uses have a common ordering source, one which contains generalizations about the way the world works. It turns out that we are more likely find such epistemic conversational backgrounds where stative verbs are used. This is depicted below in Figure 2.4. In this conditional inference tree, Conversational Background is treated as the dependent variable and verb class as the independent variable.

Because the use of stative verbs is associated with the epistemic conversational background in the 1700s, it is possible that speakers reinterpret the positive relationship between stative verbs

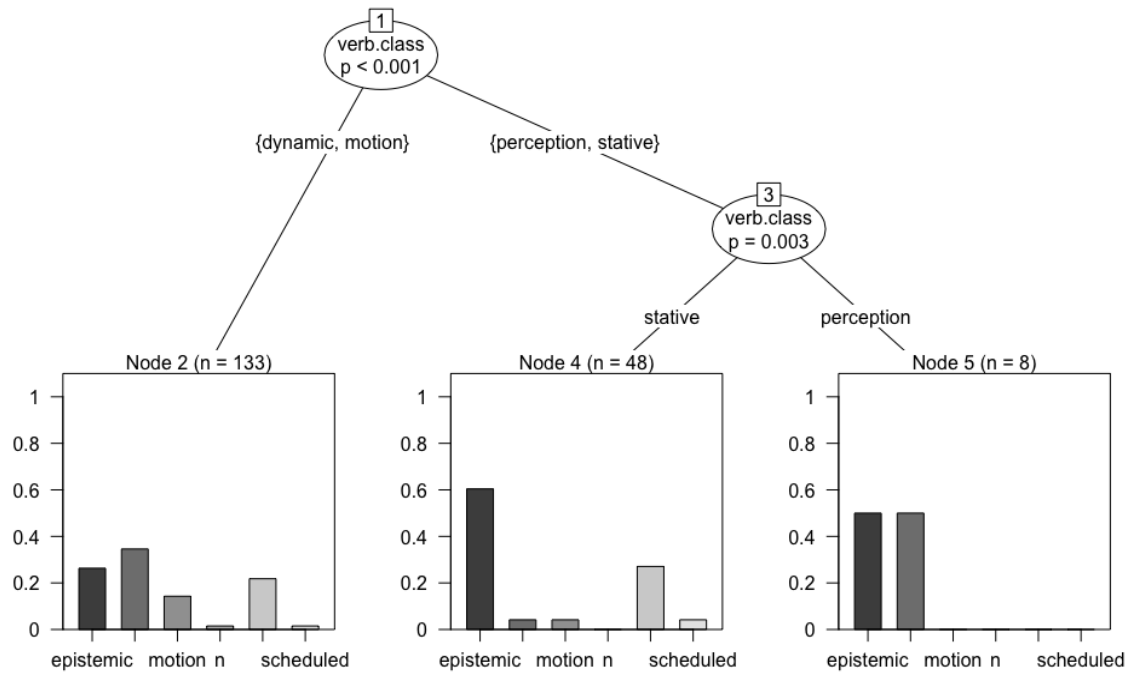


Figure 2.4: A conditional inference tree depicting the interaction of verb class and interpretation in the 1700s

and the Synthetic Future in this century as a relationship between the epistemic conversational backgrounds and the Synthetic Future. This would yield the results found in the 1800s where the majority of predictions employ the Synthetic Future.

Crucially, for the present analysis, the emergence of interpretation as a significant predictor is not due to the Periphrastic Future grammaticalizing as a marker of intention as both intention and predestination contexts predict the use of the Periphrastic Future. Moreover, the preference for Synthetic Future to express prediction appears to be motivated only indirectly by the presence of another form in the same domain of meaning. In the 1700s, a relative preference for the Synthetic Future emerged for stative verbs. Since this class of verbs was also associated with epistemic conversational backgrounds, the Synthetic Future became associated with this type of Conversational Background by the 1800s.

Moving into the 1900s, genre becomes the most important constraint. Genre had emerged as the second significant constraint in the 1800s, which may be reflecting an association that speakers

formed between the new Periphrastic Future and spoken Spanish. In the 1900s, the older Synthetic form is preferred in written contexts, and the newer Periphrastic form is preferred both in oral transcripts—the way that people actually spoke—and in dialogue—texts that reflect authors’ ideas about how people speak. This change may reflect the claim made by some authors that in Spanish the Periphrastic Future has become the ‘default’ future marker (e.g. Orozco, 2005) in that it has no special meaning as a future construction.

Interestingly, clause type remains a significant predictor of the use of the Periphrastic Future in the 1900s, especially in written texts. The use on non-past adverbials and animate subject also constrain the variation between the two forms under study. Such results reflect the finding of “pragmatic niches” proposed for futures in English by Torres Cacoullos & Walker (2009). While the present results are unable to find these niches with the same level as granularity as the Torres Cacoullos and Walker study, the variation in the most recent century seems to reflect the, “tenacious patterns of distribution inherited from once-meaningful associations” (p. 349). That is, while the Periphrastic Future shows no preference for intention readings in the 1900s, it has retained the preference of animate subjects and subordinate clauses that existed under its initial circumstances of grammaticalization.

The predictive power of non-past adverbials may have arisen in the 1900s as the Synthetic Future began to be used more regularly as an epistemic marker (e.g. Aaron, 2006, 2014; Tena Dávalos, 2017). Non-past adverbials can be used by speakers to disambiguate epistemic uses of the Synthetic Future from future uses. At this stage of analysis, such a claim is a hypothesis, which can be explored in further research.

2.5 Conclusion

The story that emerges from this analysis is that intention is not a stage in the grammaticalization of future constructions in the same way that perfect, for example, is in its respective pathway. To understand the role of intention in the grammaticalization process, we may imagine the case of a

particular listener in the 1600s. A speaker expresses the intention, “Mañana, voy a ver al Rey,” (‘I’m going to see the King’). While the speaker may have intended to communicate the intention to go, this listener interprets the sentence to mean that the speaker has the intention to see the King. An intention to go and see, after all, is an intention to see. In making this form-meaning connection, our listener has understood the periphrastic construction to express a future construction, a future construction with a particular Conversational Background. Thus should our listener reanalyze the periphrastic *ir a* construction as a marker of intention, he is also licensed to use this construction in a variety of other meanings. As I will argue in Chapter 4, this “variety of other meanings” is restricted to a natural class of meaning, which includes only certain kinds of Conversational Background. This natural class includes backgrounds which yield prediction meanings, and this explains why we find prediction uses of the periphrastic construction in the 1600s and even before. In short, the periphrastic construction grammaticalizes as a future construction, which is compatible with any of the Conversational Backgrounds that are available to future constructions.

So given the evidence which suggests that the Periphrastic Future was never an intention construction, how should this stage in the grammaticalization pathway be characterized? What did the Periphrastic Future mean at this time? What I propose is that the first step to answering this question is observing that it was futurate (intention) uses of the motion construction that were most prominent when reanalysis of the construction occurred. As I mentioned in the introduction, futurate uses of present tense are licensed when the future-oriented claim is presumed to be settled.

In order for agents to presume settledness of their own intentions, they not only need to have made the decision to realize a state of affairs, but they need to know that they are able to realize this state of affairs. I propose that knowing that a desire will be effective follows from an understanding of how things work in a particular environment. This is a concept that I will develop in much more detail in the following chapter, but the basic intuition is that societies (big and small) can form relatively closed systems in which the processes that operate in the system reproduce themselves. As a result, familiarity with a particular society allows one to proceed with nearly absolute confidence that certain states of affairs will be the case. For example, in the United States, I don’t think twice

about driving on the right side of the road; the members of this society have agreed that we drive on the right side of the road. If I am asked about which side of the road I am going to drive on tomorrow, and even next month, I can say with absolute confidence that I am going to drive on the right side of the road: it is both my intention to do so, and I have confidence that it is within my ability to do so because I trust that such a fundamental element of transportation will not change overnight.

I will call these closed systems of processes “environmental states,” and I argue that they constitute a salient cognitive category of meaning. In the beginning of the grammaticalization process of the Spanish Periphrastic Future, the futurate intention is *to go*. Going, of course, may be rather immediate, and there are not many factors that could impede an agent from ‘going.’ However, when the infinitival complement is interpreted as the content of the intention, the intention concerns an action that is potentially much more distant (in space and time).

What I argue is that environmental states allow agents to presume settledness across these extended distances and times, which allow future (not futurate) interpretations of the *ir a* construction to satisfy the felicity conditions of futurate statements. As future interpretations became more prominent in the 1700s, the *ir a* construction no longer needed to satisfy the presumption of settledness constraint, but the environmental state reading remained.⁸

I thus argue that the cline representing the grammaticalization of the Periphrastic Future in Spanish, should be as follows:

(71) MOTION >> ENVIRONMENTAL STATE PROSPECTIVE

In chapter 5, I will argue that *ir a* continues to have an environmental state reading, and it is for this reason that *iba a* is being recruited into the hypothetical domain by speakers of Cuban Spanish. The environmental state reading is communicatively useful in hypothetical sentences, and therefore, *iba a* is taking root as a hypothetical construction in this variety of Spanish.

⁸Future research can explore the formal details of this change more explicitly.

Chapter 3

Theoretical Proposal: A generalization-based ordering source

3.1 Introduction

In the conclusion of the previous chapter, I suggested that the *ir a* motion construction in Spanish evolved into an environmental state prospective construction. In suggesting this, I was contrasting environmental state readings with other kinds of future readings. It is now time to make these notions more precise. My goal in this chapter is to propose a conceptualization of the Kratzerian Ordering Source—introduced in Chapter 1—that will allow me to clearly describe how modals of different flavors (within the domain of modal necessity) are related to one another. This is essential for an amphichronic account of modal necessity, which takes the relationship between categories of meaning, evident in universal diachronic pathways of semantic change, as part of the fundamental set of facts that must be explained.

An extensive body of literature has observed and studied, for example, the following deontic to epistemic pathway, illustrated below (Narrog, 2012; Nordlinger & Traugott, 1997; Traugott & Dasher, 2001).

(72) DEONTIC \gg EPISTEMIC

As discussed in Chapter 1, this pathway depicts the observation that deontic modals tend to acquire epistemic meanings over time, but not the other way around. Observations like this force us to ask what it is about each of these stages of meaning that causes the emergence of this phenomenon. The explanation offered in Nordlinger & Traugott (1997) in relation to English *ought* is that listeners infer that if an agent is obligated to act in a certain way, she will act in that way. While this explanation is suitable for weak necessity modals like *ought*, in the case of strong necessity modals like English *have to* and Spanish *tener que*, future-oriented readings are generally prohibited under epistemic readings.

I will propose a more detailed explanation for this phenomenon in the next chapter, but in order to do so, I will need a precise way to characterize the ordering source. The central proposal is this: the ordering source is a set of generalizations, which describe either relationships between facts in the world or preferences about the behavior of agents. A generalization-based account of the ordering source will show just how similar factual relationships and preferences can be.

My approach to generalizations is inspired by recent theories of (naturalistic) decision-making (Iigaya, 2014; Zsombok & Klein, 2014; Klein, 2008) and memory (Schacter & Welker, 2016), which take the ability to generalize about the world and the ability to categorize situations as fundamental to the human ability to make predictions.¹ Generally speaking, human memory is constructed through the strengthening of patterns of neuronal activation in neural networks (Kliegel et al., 2008). That is, when neurons are activated simultaneously, the connection between them grows stronger. This phenomenon is popularly summarized in the phrase “neurons that fire together wire together.” The consequence of memory formation is that human minds can recognize familiar circumstances in the real world and develop expectations about what will happen or what has happened based on the association that one set of circumstances has with another.

Fortunately, fine details of cognitive neuroscience are not required to create an effective theory of natural language semantics. But I take it to be an advantage to consider how cognitively realistic

¹As I will explain in further detail below, this observation is closely related to the ‘stereotypical ordering source’ discussed in literature on modality. As I will show, the implementation in the present account implements this concept in a different way than in Kratzer (1981a), for example.

our theories are—a trait that Kratzer (2012), for example, takes very seriously in accounts of natural language phenomena. To be clear, the theoretical framework that I propose in this chapter is not a neuro-semantic theory, but rather is a semantic-pragmatic theory that draws inspiration in its design and implementation from cognitive science.

It is also important to mention that describing the ordering source in this way has precedent in the literature on modal semantics. This starts with Kratzer’s (1981) original proposal for ordering source in which it is actually the set of circumstances that provides a generalization in one of her illustrations:

- (73) “In w the relevant circumstances are such that I will become mayor only if I go to the pub regularly.” (p. 66)

While sets of circumstances are generally considered to be part of the modal base, I will show below in what way I am treating generalizations such as (73) as members of an ordering source. In the account of epistemic modality proposed by von Stechow & Gillies (2010), we also find the invocation of generalizations in the modal reasoning process. Their account focuses on an example in which an observer is indoors and sees a group of people entering with wet clothing and umbrellas. The observer says, ‘It must be raining.’ The modal base of *must* contains propositions that can be paraphrased as in (74) below.

- (74) a. *p*: People are indoors with wet rain gear.
b. *q*: If people have wet rain gear, it is raining.

Here again we have a case in which a modal base (and not an ordering source) contains a generalization, but I will explain below how I will distinguish each of the propositions in (74) as different kinds of facts. The point here is that the use of generalizations in conversational backgrounds surfaces in a number of modal semantic analyses. Kratzer (1989) sets apart generalizations—particularly “whenever” generalizations—as taking a special role in counterfactual reasoning, suggesting that speakers are sensitive to generalizations as a distinct kind of fact about the world. Abusch (2012) describes an ordering source that contains rules-of-thumb to account

for counterfactual readings of *might* and *could have* in order to solve problems for accounts which assume that counterfactual readings have a metaphysical modal base. What these studies point to is that generalizations are fundamental to the way that people draw conclusions from available evidence.

It is important to note, however, that many authors do not invoke generalizations in their descriptions of ordering sources. Consider a few examples from existing accounts:

- (75) a. An ordering source describing the desired outcome of a scenario in which miners are trapped in a mineshaft that is filling with water: { all miners are saved, at least 9 miners are saved, ..., at least 1 miner is saved } (Cariani et al., 2013:p. 231).²
- b. A ‘non-interruption’ ordering source, which describes worlds in which Mary’s climb on Mount Toby does not get interrupted: { Mary does not get eaten by a bear, Mary does not slip and hurt her ankle, A surprise summer blizzard does not start on Mount Toby, Mary does not get lost,... } (Portner, 1998:p. 773)
- c. An ordering source describing ideal outcomes in a health intervention: { The patient lives, The patient is perfectly healthy } (Katz et al., 2012:p. 498)

I include these examples to illustrate that the ordering sources in many researchers’ accounts do not contain generalizations—which is not to say that such accounts are non-existent. What I aim to do in this chapter is to be more constrained in the way that ordering sources. In particular, I will argue that the propositions in ordering sources *must* be generalizations, and more specifically, generalizations that are defined in terms of biconditional relationships between truth conditions. In doing this, I rule out ordering sources like those described above in (75). This constraint allows us to define the meaning of deontic and epistemic modality—as well as other flavors of modality—in terms that are mutually comparable.

There are two comments that I would like to make about this claim. First, in many cases, the existing analyses can be reformulated in terms of generalizations. For example, Portner’s (1998)

²The authors note that in a personal communication, Kratzer objected to this characterization of the ordering source, proposing that the ordering source might be better formulated with modalized propositions.

non-interruption ordering source could be formulated as a set of generalizations that includes, ‘Runners do not get eaten by bears,’ and ‘Blizzards do not occur in the summer.’ I will comment on this kind of generalization further below. Second, in the present work, I will restrict my claim—that ordering sources must contain (biconditional) generalizations—to the readings under study: necessity modals with epistemic, deontic, teleological, and disposition (to be defined more precisely below) flavors. Bouletic modals, such as analyses of the meaning of English *want*, may contain propositions that are not generalizations (see Portner, 2018 for an discussion of such an analyses).

An advantage of the generalization-based ordering source is that it can help us model the fact that speakers draw conclusions even when presented with incomplete information. This is especially relevant for statements about the future, in which speakers cannot possibly gather enough information to be certain about the claims that we make about the future. In literature on the meaning of future constructions, many authors invoke a ‘normal’ or ‘stereotypical’ ordering source—introduced in Kratzer (1981a)—as an explanatory tool of future meaning (e.g. Ippolito & Farkas, 2019; von Stechow & Iatridou, 2008; Werner, 2006). A stereotypical ordering source is an ordering of worlds according to how normally events proceed. One of the drawbacks of this kind of account is that what speakers consider normal or stereotypical lacks definition. As I will demonstrate in this chapter, it is not necessary to call upon a stereotypical ordering source if the propositions are generalizations.³ Broadly speaking, I will distinguish between two kinds of ordering sources: Universal Generalizations and Action-Oriented Preferences. This distinction is similar to the fundamental ‘volitive’ vs. ‘non-volitive’ distinction that Narrog (2012) makes in his cross-linguistic analysis of the semantic change that modals undergo over the course of centuries. As I will show below, the relative specificity of generalizations allows us model the literal belief that default generalizations such as, “ravens are black,” are true while accepting that not necessarily all raven are black (Carlson, 1977).

³In fact, the present analysis will define a single set of generalizations that describe how ‘things go’ in the world, what I am calling ‘universal generalizations.’ In many senses, this is a stereotypical ordering source, but as I will argue, it includes generalizations about what is normally the case as well as generalizations about what is always the case.

Before moving onto the analysis, I want to make clear how the present account fits into previous literature on the meaning of modal expressions. The first decision that I will make is to define the modal base as a set of facts. This decision follows Kratzer (2012) who comments in the introduction to an updated version of her 1981 paper, “It now seems to me a hopeless enterprise to try to characterize formal objects like conversational backgrounds as ‘circumstantial’ versus ‘epistemic.’ Both types of backgrounds are functions that map possible worlds to sets of factual premises” (p. 24). Yielding myself to the hopelessness of this enterprise, I will simply call this set “facts.” As I will discuss further below, I will also assume that the modal base does not contain biconditional generalizations. The modal base may contain propositions that are (in the terms of Goldsmith & Woisetschlaeger, 1982) *structural*—like, ‘The Moon is the Earth’s only permanent satellite’—and *phenomenal*—like, ‘My little sister is drawing a moon.’

In order to illustrate how I intend my discussion to respond to prior literature, I compare my analysis with that of Portner (2009) in Table 3.1. The modal base and ordering source in this table is based on the set of sentences in 76 which Portner presents to exemplify modal flavors that arise from different combinations of modal base and ordering source (p. 72). Note that the labels in the ‘meaning’ column are terms that are my own selection in an attempt to place Portner’s sentences into categories of meaning.

- (76) a. *Epistemic*: The book must have been checked out.
- b. *(Goal-driven) Obligation*: You must turn right at the next light.
- c. *Internal Obligation*: I must have that painting.
- d. *Circumstantial*: We all must die.

Meaning	Portner (2009)		Present Account	
	<i>MB</i>	<i>OS</i>	<i>MB</i>	<i>OS</i>
Epistemic	Epistemic	Doxastic	Facts	Universal Generalizations
(Goal-driven) Obligation	Circumstantial	Teleological	Facts	Universal Generalizations
Internal Obligation	Circumstantial	Bouletic	Facts	Action-Oriented Preferences
Circumstantial	Circumstantial	Empty	Facts	Universal Generalizations

Table 3.1: Comparison of Portner’s analysis of a collection of readings and the present analysis

Of note in this table is that the present analysis seems to be much less constraining than Portner's analysis. As I will show below and develop further in Chapter 4, there are specific constraints on the ordering source and other aspects of the definition of the modal operator that yield differences in interpretation. I take this to be an advantage of the present analysis, which moves towards a more explicit account of the labels that are used to describe different types of ordering source. The principle focus of this chapter will be to explain my proposal clearly. When appropriate, I will take the opportunity to highlight its usefulness in accounting for the use of modal expressions in the natural language. Its utility will most clearly be illustrated in the following chapters where I discuss these advantages explicitly as they pertain to the evolution of *tener que* and *iba a* in Cuban Spanish.

3.2 The assertion of modalized utterances

I am going to begin with a discussion of the assertion of modalized utterances in order to show what it is that can be said about propositions that are added to the Common Ground when modalized sentences are asserted.⁴ Like any assertion, modalized assertions are informative, but the key thing that they tell us is how facts relate to one another in the world. It is most clear to illustrate what I mean with an example, presented in (78) below.

In the present analysis, I will assume that facts in the Common Ground can be partitioned into different sets. This includes the 'set of facts,' as I have said above as well as different sets of generalizations that describe, for example, the preferences of particular agents in the world. In other words, it is a 'fact' about a particular possible world that an agent has a certain set of preferences. To illustrate, the Common Ground includes facts like the following:

- (77) a. *p*: 'The Moon is the Earth's only permanent satellite'
b. *q*: 'My little sister is drawing a moon.'

⁴This discussion differs from Dynamic Semantic accounts of modalized utterances which relate modal expressions to specific instructions about the update of an information state. See Portner (2009) for a review.

- c. r : The set of relevant circumstances includes $\{p, q, \dots\}$ ⁵
- d. s : The set of action-oriented preferences of agent a_1 includes $\{a, b, c, \dots\}$
- e. t : The set of action-oriented preferences of agent a_2 includes $\{a, c, d, \dots\}$
- f. u : The set of action-oriented preferences of agent a_n includes $\{b, c, d, \dots\}$
- g. v : The set of ideal behaviors for agents in social group 1 includes $\{b, d, e, \dots\}$
- h. w : The set of ideal behaviors for agents in social group n includes $\{c, e, f, \dots\}$

To be clear, each of the statements above is a fact in the Common Ground. That is, the makeup of agent a_1 's set of action-oriented preferences s can be represented as an atomic fact in the Common Ground. Additionally, the ordering source of a modal orders modal base worlds according to what is 'inside' a (contextually determined) set of preferences. The reason that I am describing the Common Ground in this way is to argue that the informational contribution of a modalized utterance is to narrow down on the content of a set of generalizations (e.g. if according to the law, I must not throw my litter on the side of the highway, it is impossible that the law in my society contain the generalization, 'People who throw aluminum cans on the side of the highway are rewarded.')

The assertion of a modal is thus about the content of these sets of generalizations. To say that something *must* happen in a deontic sense, the speaker says given the set of relevant circumstances, the preferences of salient social group entail the prejacent. The assertion itself does not 'see' inside this set of preferences but only establishes the relationship between the circumstances and the prejacent; I will exemplify this below. Something to highlight here is that, until now, I have described a rather standard account of modality. It is not new to argue that the contents of an ordering source are ultimately inscrutable (see, for example, Kratzer, 1977). How the present account will differ from previous accounts is positing that the propositions in an ordering source (for the modal under study) must be biconditional generalizations, and there are two kinds of generalizations: universal generalizations and action-oriented preferences.

⁵This set of circumstances would be the modal base.

I will illustrate what I have said up until now with an example. Consider the following interaction:

- (78) [Context: Idris is at his friend Talia’s house to celebrate her wife’s birthday. Talia offers Idris chocolate chip cookies that contain walnuts. Idris say to Talia:]

Sorry, I can’t.

We might imagine that Idris and Talia are both members of the same social circle and that the proper social behaviors are part of the background of Idris’s response. For the moment, assume that $Best(s, MB, OS)$ is the set of best worlds according to circumstances at time interval s and the ordering source. We can represent the proposition asserted by Idris’s utterance as the following:⁶

- (79) Where $Facts$ is the set of relevant factual premises at a time interval s and OS_{sc} is the ordering of the modal base in terms of the ideal behaviors in Idris and Talia’s social circle in time interval s . Take i_u to be the time interval of utterance:

$$\llbracket \text{I can't eat a cookie} \rrbracket = \{w \mid \exists s : s \subseteq w : \tau(s) \subseteq \tau(i_u) : \{w' \mid w' \in Best(s, Facts, OS_{sc})\} \subseteq \llbracket \text{I do not eat a cookie} \rrbracket\}$$

Talia assumes that the social rules-of-thumb presented below in (80) are part of the Common Ground. In other words, she takes the following propositions for granted as descriptions of ideal behavior according the social circle of which Idris and Talia are members (i.e. ‘The set of ideal behaviors for agents in Idris and Talia’s social circle includes...’):

- (80) a. ‘If doing so does not cause acute physical problems, an agent accepts an offer of food.’
(Note here that nothing else ‘releases’ an agent from the responsibility of accepting an offer of food).
b. ‘An agent avoids actions that cause acute physical problems.’

Talia also assumes that the following facts are in the salient set of facts, which are also in the Common Ground:

- (81) a. ‘The only possible danger of a cookie is an allergic reaction.’

⁶Note below that I treat the definition of the negative possibility modal *can* as a necessity modal.

- b. ‘Walnuts cause acute allergic reactions in susceptible individuals.’
- c. ‘Milk, eggs, sugar, chocolate, and butter do not cause acute allergic reactions in any individuals.’
- d. ‘The cookies contain milk, eggs, sugar, chocolate, butter, and walnuts.’

Recall that by the nature of the Common Ground, Talia assumes that Idris takes the facts in (81) and the ideals in (80) for granted. Talia assumes that Idris is cooperative and is therefore speaking honestly, and computes the following conclusion from Idris’s utterance: Idris has an allergy to walnuts. It may be surprising that an utterance that is as truth-conditionally vague as the one defined in (79) can yield such specific information; yet intuitively, it is not so surprising that Talia should walk away from the interaction described in (78) with the belief that Idris has an allergy to walnuts. Talia’s inference, of course, may be incorrect with respect to the actual state of affairs, but given the information that she takes for granted, Idris’s allergy is the only possible conclusion she can draw. This is the nature of taking facts for granted: speakers are not necessarily aware of the facts they take for granted, so they may have no reason to question these assumptions.

In using the modal expression *can’t*, Idris’s utterance in (78) invokes the norms of behavior in the social group. According to these rules, an agent in Idris’s position only refuses an offer of food if doing so causes acute physical problems. In fact, if doing so causes acute physical problems, the agent must refuse the offer. Because these rules constrain Idris not to eat the cookies, Talia can infer that doing so would cause him acute physical problems. Furthermore, based on the facts that she assumes in (81)—and which she assumes that Idris assumes, etc.—Talia can (and must) infer that Idris is susceptible to allergic reactions from walnuts: walnuts are the only allergen in the cookie that causes acute reactions, and such a reaction is the only acute physical danger that a cookie poses.

Talia arrives at this concrete inference because she and Idris know each other well and share a common sense of appropriate behavior and of the circumstances. However, I want to highlight that what the utterance, ‘I can’t (eat a cookie)’ means in terms of its propositional content is much more vague. According to the definition given in (79), the set of worlds that are added to the Common

Ground are worlds in which Idris (or his counterpart in these worlds) does not eat a cookie due to a combination of the circumstances in s —which may be any set of circumstances—and the social rules of Talia and Idris’s social circle in that world—which can be any set of rules.

The following are all possible worlds that are members of the proposition communicated by Idris’s utterance in (78):

- (82)
- a. w_1 : The social circle ideals say that agents refuse offers in all circumstances.
 - b. w_2 : The social circle ideals say that agents only accept offers when doing so would resolve an acute physical problem. Idris does not have any acute issue—such as critically low blood sugar, perhaps—that is resolved by the consumption of a cookie.
 - c. w_3 : The social circle ideals say that agents only refuse offers when doing so would conflict with their long-term goals. In s , Idris is pursuing a diet where he is limiting his sugar intake in order to have more stable energy levels throughout the day.

While all of these worlds are elements of the proposition communicated by the utterance in (78), none of them end up in the Context Set because they are incompatible with other information that is in the Common Ground. Worlds that end up in the Context Set, of course, are not uniform. In some of these worlds, Idris is allergic only to walnuts. In others, he is allergic to all nuts. His utterance is informative, but it is only informative to the extent that the other facts in the Common Ground restrain the possibilities.

What this example illustrates clearly is that, even under standard accounts of modality, what modalized sentences communicate is that certain relationships hold between facts in the world and the prejacent. What I aim to show in this chapter is that this relationship can be represented as the existence of a generalization. In the example above, the relevant generalization is the description of ideal behavior with respect to Idris and Talia’s social circle.

A final point that I would like to make about this example is that the social rules need not be so well-defined. In fact, modalized utterances can actually help interlocutors narrow in on what the rules are without discussing them explicitly. I therefore suggest that one of the principle functions of modals in human interaction is to negotiate these generalizations, be they generalizations about

what the world is like or generalizations that describe appropriate behavior. I want to emphasize here that I believe this is a more realistic account of communication than assuming a contextually-given ordering source. In actual communication, social norms are not explicitly written, but given what is in the Common Ground, interlocutors can narrow in on what these norms are. In the following section, I will present a formal and precise account of generalizations, which will form the basis of my theoretical account in the remainder of my analysis.

3.3 Generalizations and Modal Necessity

3.3.1 Preliminary Set-up

As I explained in chapter 1, I will assume a domain of worlds \mathcal{W} and times \mathcal{T} . An important way to understand a possible world w is as a continuous sequence of states of affairs from the beginning to the end of time. In other words, for each moment in the history of a possible world, a set of true propositions can be identified for that world. This means a set of true propositions can be assigned to each world-time pair $\langle w, t \rangle$. I assume that propositions are sets of sets of world-time pairs (i.e. indices of evaluation), which I will represent with the variable s . An index of evaluation s may be a singleton set, an interval, or a world. Intervals, represented as i, j, k, \dots , are constituted by a continuous sequence of world-time pairs that share a world coordinate. Possible worlds are maximal intervals such that there is a world-time pair in w for every time t in the domain of times. Propositions that can be verified in a moment (like descriptions of a state or time) may contain singleton indices—sets that contain a single world-time pair. In other propositions (like descriptions of events), the cardinality of indices is obligatorily greater than one because the truth of an event can only be verified in a temporal interval. Some propositions, like those that are asserted through natural language utterances, contain only worlds (i.e. maximal sets of world-time pairs).

The temporal precedence relation $<$ orders times in \mathcal{T} and consequently world-time pairs that share a world coordinate (Kaufmann, 2005). I will also define an interval precedence relation $<$,

which orders intervals such that they do not overlap. Finally, the temporal trace function τ returns the set of times that correspond to a set of indices (i.e. it returns the temporal trace of an interval).

\mathcal{W} :	The set of worlds ($w_1, w_2, w_3 \dots$)
\mathcal{T} :	The set of moments, along which possible worlds are meta-historically aligned.
$\mathcal{W} \times \mathcal{T}$:	The set of world-time pairs.
$\wp(\mathcal{W} \times \mathcal{T})$:	The set of indices of evaluation: the powerset of world-time pairs ($s_1, s_2, \dots, i, j, k, \dots, w_1, w_2, \dots$)
$\wp\wp(\mathcal{W} \times \mathcal{T})$:	The set of propositions, defined as a sets of sets of indices.
\mathcal{I} :	The set of temporal intervals ($i, j, k \dots$) defined as continuous sequences of indices with a constant world coordinate: $i = \{\langle w, t \rangle \mid \forall t : \exists t', t'' : t' < t < t''\}$
$<$:	The temporal precedence relation that orders any two indices with a constant world coordinate: $\langle w, t \rangle < \langle w', t' \rangle$ iff $w = w'$ and $t < t'$
$<$:	The interval precedence relation, which orders temporal intervals, defined as: $i < j$ iff $\langle w, t \rangle \in i \wedge \langle w, t' \rangle \in j \rightarrow \langle w, t \rangle < \langle w, t' \rangle$
$\tau(s)$:	The temporal trace function whose input is an index of evaluation s and whose output is the set of times that correspond to the world-time pairs in s .

As I discussed in Chapter 1, I will assume the following definition of truth:

(83) **Truth**

$$V(p)(s) = p(s) = 1 \text{ iff } s \in p$$

As Kratzer (1989, 2019) discusses extensively with respect to a situation semantics, and as I have addressed in the introduction, I will not go into detail about what it means for a proposition to be verified in an index of evaluation. Intuitively, a proposition is verified in an index of evaluation if a rational agent judges that a sentence expressing that proposition is true in that index. There is

certainly more to be said here, but these questions lead too far afield of the present discussion.⁷ Something that I will also assume is persistence; that is, if a proposition is verified at some interval in the history of a world, it is also verified in the entire world.

(84) **Persistence**

$$\forall s, w \in \mathcal{P}(\mathcal{W} \times \mathcal{T}) : s \in p \wedge s \subset w \rightarrow w \in p$$

Finally, as I presented in the introduction I will also be assuming the following definitions of tense and aspect operators for the time being. Though I note here that in my discussion of *iba a* in Chapter 5, I will reevaluate the meaning of the tense operators. To this list I also add **ASPROSP**, which is an aspectual prospective operator. This is not to be confused with a modal **PROSP** operator, but is rather the mirror image of the **PERF** operator.

- (85) a. **PRES**(p) : $\{w \mid \exists s : s \subseteq w : \tau(s) \subseteq \tau(i_u) \wedge p(s)\}$
 b. **PAST**(p) : $\{w \mid \exists s : s \subseteq w : \tau(s) < \tau(i_u) \wedge p(s)\}$
 c. **PERF**(p) : $\{s \mid \exists s' : s' < s \wedge p(s')\}$
 d. **ASPROSP**(p) : $\{s \mid \exists s' : s < s' \wedge p(s')\}$
 e. **PROG**(p) : $\{s \mid \forall w' \in \text{Inr}(s) : \exists s' : \tau(s) \subseteq \tau(s') \wedge s' \subseteq p\}$
 f. **IMPF**(p) : $\{s \mid \forall w' \in \text{Inr}(s) : \exists s' : \tau(s) \subseteq \tau(s') \wedge \forall k \in \mathcal{R}_{s'}^c : \exists s'' \subseteq k : p(s'')$

3.3.2 What is a generalization?

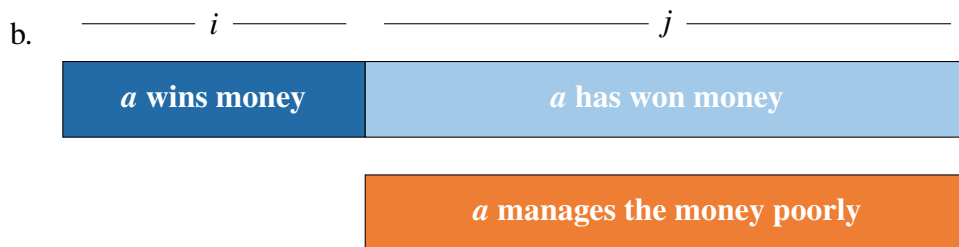
As I have said above, the present account will propose a generalization-based account of the ordering source. The first step in developing this account is to be precise about what I mean by a ‘generalization.’ The most basic definition that I will provide for a generalization is ‘a bundle

⁷A alternative approach may assume a sorted domain of eventualities \mathcal{E} , and the truth of a proposition can be defined by saying that an eventuality with a certain property is instantiated at a certain time in a world (e.g. $\lambda w. \exists e : P(e, w) \wedge \tau(e) \circ \text{Now}$). What it means it to be true that an eventuality is of a certain kind or has a certain property is also a question whose answer requires some kind of evaluator. It is important to note that while I exclude the domain of eventualities from the present analysis, I do not take there to be any fundamental difference between this analysis and one which assumes such a domain. Kratzer (2019) in fact suggests that events and states are simply a kind of minimal situation that exemplify a proposition.

of spatiotemporally-bound facts.’ Intuitively, a generalization is a set of circumstances that ‘go together,’ and which may be temporally ordered with respect to one another. As I define them, generalizations are propositions which describe a mutual implication of circumstances (i.e. circumstance p implies circumstance q and vice versa).

In order to make this concept clear, I will begin with an example. One important observation is that the natural language sentences that I provide to describe the generalizations are somewhat clunky because it is much more common in natural language to discuss asymmetric implication of circumstances. Throughout my discussion, I will represent generalizations in two ways. First, I will use a schematic representation, which provides an intuitive picture of the temporal relationships that hold between the circumstances that make up the generalizations. Second, I will use formal semantic language to define the truth conditions of generalizations since they are, after all, propositions that are members of an ordering source. I present an example of this below:

(86) a. g : ‘A person who wins money manages the money poorly and vice versa.’



c. $\lambda w.\forall i, j \subseteq w : i < j : \forall x, y : \text{PERSON}(x, w) \wedge \text{MONEY}(y, w) :$
 $x\text{-wins-}y(i) \Leftrightarrow x\text{-manages-}y\text{-poorly}(j)$

One observation to note about the schematization in (86b) is that the event in which agent a wins money is followed by a state of affairs in which agent a has won money. This follows the definition of PERF in (85c) above, and it will become apparent in subsequent discussion why I have made the choice to represent generalizations in this way.

Another important feature of generalizations is the claim that the propositions mutually entail one another, which is represented by the logical biconditional (\Leftrightarrow) in the truth conditions. The reason I have made this choice is to represent the fact that this generalization can be used to

make an inference about the future or an inference about the past, depending on the information available to the speaker. In other words, according to this generalization, any individual who wins money will manage the money poorly, and any individual who manages money poorly has won that money.

In fact, I will be representing all generalization in terms of the logical biconditional, but this is rather a strange generalization to hold: it seems plausible that a rational agent might believe that a person who wins money will manage that money poorly, but it is less likely that the individual will assume the converse. However, let's assume that this rational agent believes that there are exactly two scenarios in which a person manages money poorly: either the person has won the money or the person has stolen the money.

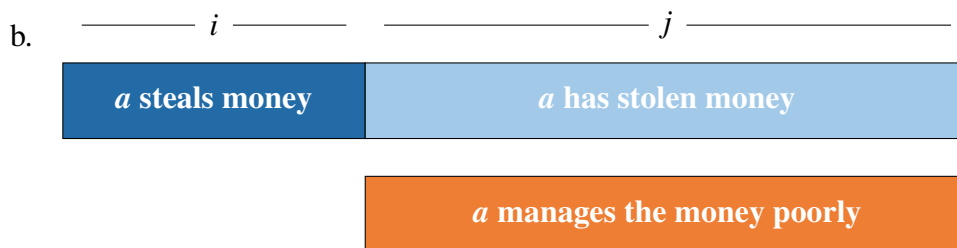
Now, we might suppose that the rational agent learns of an individual who is managing their money poorly and who has not stolen that money. We want a model that allows the rational agent to conclude, 'The individual must have won the money.' In other words, while it may seem implausible at first glance for generalizations to be represented as propositions that mutually imply one another, this choice accounts for these 'backward' inferences when rational agents are provided with enough information.

What I propose is that an agent's knowledge includes a set of generalizations about the world, which I will call *universal generalizations*. This set of generalizations includes propositions that are taken to be literally true in the world—like the Law of Gravity—as well as generalizations that may be violated—like, 'I go to the grocery store on Thursdays.' Crucially, agents speak as if these generalizations are true (recall that the definition of these generalizations includes universal quantification). I note here that there is extensive literature in linguistics and other fields that seeks explain the kinds of generalizations that humans tend to hold. For example, raters robustly accept generic statements like "ticks carry Lyme disease" and "sharks attack swimmers," even though few ticks actually carry Lyme disease and shark attacks are rare (Prasada et al., 2013). Proposals to explain this tendency include, Leslie (2007), which argues that people are more likely to accept low-probability generalizations when they relate to danger. Ultimately, the question of how or

why people accept certain generalizations as true—interesting as this question may be—is largely orthogonal to the purposes of the present study. What I am proposing here is that an individual who accepts the truth of a sentence like “ticks carry Lyme disease” believes a proposition of the form presented in (86) to be true about ticks and Lyme disease.

I propose that the set of universal generalizations is an ordering source,⁸ and I will discuss in more detail in §3.4 how this kind of ordering source is related to modal flavor. Returning for a moment to the rational agent who believes (86) above, let us also assume that our agent believes the following:

(87) a. *h*: ‘A person who steals money manages the money poorly and vice versa.’



c. $\lambda w. \forall i, j \subseteq w : i < j : \forall x, y : \text{PERSON}(x, w) \wedge \text{MONEY}(y, w) :$
 $x\text{-steals-}y(i) \Leftrightarrow x\text{-manages-}y\text{-poorly}(j)$

In this toy scenario, the full set of generalizations that constitutes the ordering source with respect to our rational agent’s beliefs is $\{g, h\}$. Something to highlight about this proposal is that these beliefs are not consistent, a fact that I do not take to be problematic for the present account.⁹ Presented with a set of circumstances in which her neighbor has won money, the rational agent can say, “My neighbor will manage the money poorly.” In a set of circumstances in which her boss is managing money poorly, the rational agent would say, “My boss has stolen the money or won the money.”¹⁰ So far this is completely consistent with Kratzer’s notion of an ordering source.

⁸This is a proposal that I will adjust slightly below.

⁹See Easwaran (2015) for an model of belief states in terms of *coherence*, which holds that agents’ belief states need not be consistent.

¹⁰Recall that I am arguing that the speaker’s beliefs are incorporated into the ordering source. It is therefore not a requirement for the beliefs to be consistent, so in some of the best worlds, the manager has stolen the money and in others, the manager has won the money. In all of the best worlds the manager has stolen or won the money (but not both).

A conflict arises however when we consider generalizations that constitute ‘exceptions to the rule.’ In practical terms, when confronted with situations that violate their expectations, rational agents seek explanations: what fact about the circumstance led to an unexpected outcome? Answering this question leads to new, more specific generalizations. As I will explain in the next section, the existence of such generalizations is problematic for the Krazterian ordering source because there are multiple generalizations that are compatible with the circumstances, and it is clear that only one of them should apply. I will clarify this through an extensive example in the next section. I will then explore a solution to this conflict through in which a it is a subset of the universal generalizations (or other kind of generalization) that are selected for the ordering source. This subset is the set of *maximal generalizations*, which are the broadest generalizations that are compatible with the relevant set of circumstances.

3.3.3 Maximal Generalizations and Modal Necessity

I think it is most appropriate to begin a discussion of the notion of (and necessity for) maximal generalizations with an example. This example describes an situation in which deontic modality is relevant. Traditionally, deontic modality has been associated with a circumstantial modal base and deontic ordering source, where the ordering source contains rules, morals, and the like. As I will show in this example, I assume that deontic modality consists of a factual modal base and an ordering source made up of action-oriented preferences (a type of generalization) that are held by a salient community. These can be thought of as moral rules-of-thumb. I will define the different types of generalizations in much more detail below in §3.4. Consider the example below.

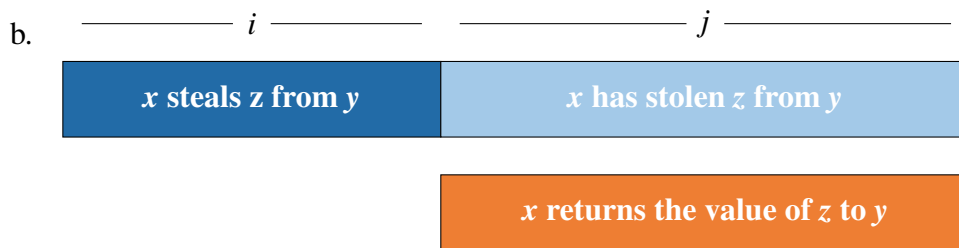
- (88) [Context: Charlie stole money from her neighbor and knows that this was wrong. Charlie doesn’t know what to do to make things right, but she knows that her socially savvy friend, Kamal, can help. She tells Kamal what happened, and he responds:]

‘You **have to** return the money.’

In this example, Charlie’s question (i.e. the question under discussion) concerns Charlie’s future actions. The salient social group whose action-oriented preferences are invoked is the com-

munity where Charlie and Kamal are residents. We might imagine that this community holds something like the following rule-of-thumb as appropriate behavior: ‘Individuals who steal something return the monetary value of the stolen item to the original owner.’ This rule-of-thumb is represented below.

(89) a. g : ‘Individuals who steal something return the monetary value of the stolen item to the original owner.’¹¹



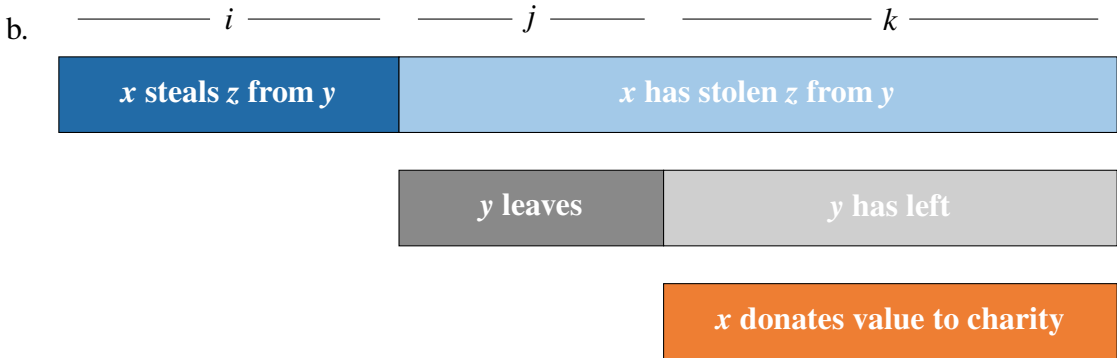
c. $\lambda w. \forall i, j \subseteq w : i < j : \forall x, y, z :$
 x -steal- z -from- y (i) \Leftrightarrow x -return-value-to- y (j)

We can imagine that following their conversation, Charlie resolves to return the money the next day. However, that night her neighbor leaves the community and is never heard of again. It is now impossible for Charlie to fulfill the deontic preference of her community as represented above. Charlie, once again, consults Kamal for advice. Fortunately for Charlie, this is not the first time a thief has been unable to provide restitution, so her community has an additional, more specified rule-of-thumb for this case, which is represented below:¹²

¹¹Technically, it is appropriate to add “and vice versa” to this generalization; however, given the clarity of the context and the theoretical purpose of the example, I will opt to exclude this phrase here, and I will continue to do in similar examples. Recall that I have opted for an analysis that include biconditional generalizations to allow a single generalization to allow for both prospective and retrospective reasoning. In other words, generalizations that include multiple multiple time intervals represent entire processes.

¹²I have described the event at time j as ‘ y leaves.’ A realistic generalization may or may not be this specific in this case. It may be that in this community that y leaving is the only valid way for it to be impossible to return the money. Alternatively, this event could be described as ‘It becomes impossible to return the money,’ in order to be more general.

(90) a. *h*: ‘If an individual has stolen something and it is impossible to return the monetary value to the original owner, the thief donates the money to a charity in the community.’



c. $\lambda w. \forall i, j, k \subseteq w : i < j < k : \forall x, y, z :$
 $x\text{-steal-}z\text{-from-}y(i) \Leftrightarrow y\text{-leave}(j) \Leftrightarrow x\text{-donate-value-of-}z(k)$

This generalization will lead Kamal to give the following response:

(91) ‘You **have to** donate the money to charity.’

I would first like to comment on the biconditional in this case because it creates an especially odd generalization: in all sets of circumstances in which an individual *x* steals from another *y*, *y* leaves. I will address why this is not a problem for the present account below, but for the time being, recall that there are multiple generalizations in a system of rules (be they rules-of-thumb about the way the world works or action-oriented preferences) that can be compatible with a single set of circumstances. As I will argue below, when this is the case, some kinds of generalizations are privileged over others, which will mean that agents do not conclude that *y* will certainly leave if *x* steals from *y*.

What emerges from this example is that it is perfectly reasonable to say that both moral rules-of-thumb are true. Thieves *should* return what they stole. And thieves who cannot return what they stole *should* donate the monetary value to charity. However, as defined, the rules are mutually incompatible: there are no worlds where every instance of stealing leads to the return of the item to the owner when the original owner is irrevocably absent. Fortunately, the Kratzerian ordering

source can accommodate mutually incompatible propositions, and can account for cases in which some of the ordering source propositions are incompatible with the set of circumstances.

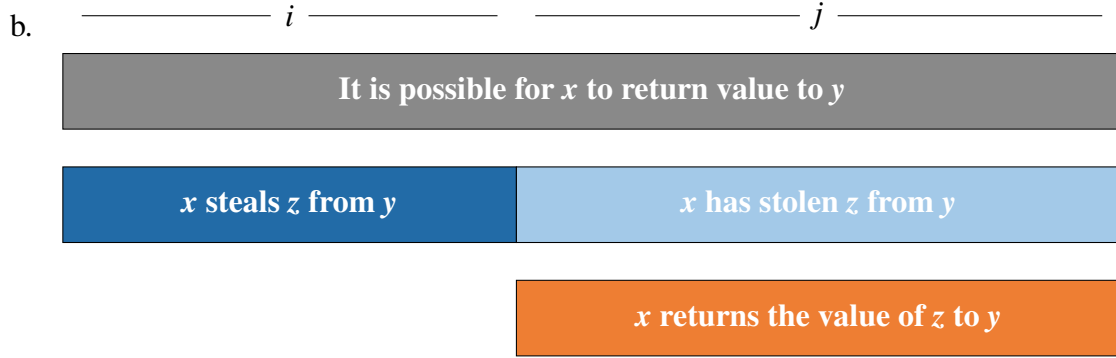
Given Charlie's situation described above, when her neighbor leaves, given an ordering source contain the generalizations g in (89) and h in (90), a traditional ordering semantics yields the conclusion in (91). Because the generalization g is incompatible with the set of circumstances (i.e. there are no worlds in which Charlie returns the money to her neighbor when her neighbor is inaccessible), the set of best worlds is ranked only with respect to h . This is parallel to the case of Jean Valjean in Chapter 1.

A 'problem' surfaces, however, in Charlie's initial conversation with Kamal. When the set of circumstances (that is, the set of factual premises) did not include any information about her neighbor, both generalizations in the ordering source were compatible the circumstances. In other words instead of (88), Kamal should have said something like:

(92) 'You **have to** return the money to your neighbor or donate it to charity.'

There are a number of reasons that this utterance does not work. The most relevant for the present discussion is that it is not a natural response in this context; it is intuitively incorrect. Kamal's response in (88) is a natural response of a rational agent in this context. Because of this conflict, something about the formal definitions needs to be reworked. There are two possible solutions for this issue. The first is that generalization g is not specific enough. We could stipulate that an assumption of generalization g is that it is possible for Charlie to return the money to her neighbor, such that the formulation of this generalization is that of g' shown below:

(93) a. g' : 'Individuals who steal something return the monetary value of the stolen item to the original owner when it is possible to do so.'



c. $\lambda w. \forall i, j \subseteq w : i < j : \forall x, y, z :$
 $x\text{-steal-}z\text{-from-}y(i) \wedge \text{it-is-possible-for-}x\text{-to-return-value-to-}y(i) \Leftrightarrow$
 $x\text{-return-value-to-}y(j) \wedge \text{it-is-possible-for-}x\text{-to-return-value-to-}y(j)$

This is not the solution that I will opt for. The reason for this is that I seek to represent the assumption that the possibility of returning the value of the stolen object to the original owner is taken as the default state of affairs. That is, Kamal does not seek confirmation from Charlie that it is possible to return the money. This makes sense: rational agents make inferences from incomplete sets of information constantly. If we did not do this, we would be unable to make quick predictions and decisions in a complex world.

The solution that I propose is an extension of the traditional Kratzerian account. I will argue that the ordering source contains a subset of the generalizations in the relevant background. In the case of Charlie and Kamal, the ordering source in each case contains a subset of the action-oriented preferences of their community. Intuitively, this subset is the set of generalizations that are both compatible with the set of factual premises and which do not add irrelevant information to the set of circumstances. Let us consider how this relates to Charlie and Kamal. I will call the set of circumstances in their initial exchange in (88) C_1 , and use the label C_2 to refer to the set of circumstances in their subsequent exchange in (91). The set of generalizations G represents the action-oriented preferences of their community.

(94) C_1 : The set of circumstances in (88)

a. p : Charlie has stolen money from her neighbor.

- (95) C_2 : The set of circumstances in (91)
- a. p : Charlie has stolen money from her neighbor.
 - b. q : Charlie's neighbor has (irrevocably) left.
- (96) G : The set of action-oriented preferences
- a. g : (89)
 - b. h : (90)

Beginning with the second set of circumstances, C_2 , there is no conflict from the perspective of a standard account of the ordering source. Because Charlie cannot return money to an absent neighbor, the first generalization g is incompatible with the set of circumstances. For this reason, the best set of worlds need only fulfill the second generalization h . In all best worlds, Charlie returns the money. However, in the case of the first set of circumstances, C_1 , both generalizations in the background are compatible with p ; that is, there are worlds in the modal base in which Charlie will return the money, and there are worlds in the modal base in which Charlie's neighbor has irrevocably left. This means that a standard account of the ordering source will not yield an appropriate response.

What I propose is that g and h are straightforwardly related to one another based on the answers that they provide to the Question Under Discussion (Roberts, 1996). In this situation, the QUD can be paraphrased, "What must Charlie do with the money?" Each of the generalizations provides an answer to the QUD:

- (97) a. g : Individuals who have stolen money from someone must return the money.
- b. h : Individuals who have stolen money from someone (and who are unable to return it) must donate the money to charity.

There is a clear intuition, however, that generalization g is broader than h and that the answer provided by g is the appropriate one in a set of circumstances that provides no further detail than the fact that Charlie stole. I will formalize this intuition of broadness as the relationship between the set of propositions that are implied by the answer to the QUD. Consider these sets of facts

below in (98). Note that that QUD partitions the Context Set according to the realization of a predicate in a time interval that begins with the interval of utterance and continues indefinitely into the future. I will discuss this in more detail below.

- (98) a. $g: x\text{-return-value-to-}y([i_u, \infty)) \rightarrow \{ \text{PERF}(x\text{-steal-z-from-}y)([i_u, \infty)) \}$
 b. $h: x\text{-donate-value-to-}y([i_u, \infty)) \rightarrow \{ \text{PERF}(x\text{-steal-z-from-}y)([i_u, \infty)), \text{PERF}(y\text{-leave})([i_u, \infty)) \}$

In prose, what these say is that according to g , if it is true that, an individual returns the value of an item, then it is true that the individual has stolen the item.¹³ According to h , if it is true that an individual donates the value of an item, then it is true the the individual has stolen the item, and that the person from whom the item was stolen has left. There are two important observations about the sets of propositions that are implied by the answer to the QUD. First, both sets are compatible with the circumstances in C_1 . Second, the set of propositions implied by the answer given by g is a subset of the set implied by the answer given by h . This captures the intuition of broadness that I referred to above. The generalization g is more broad than h because the collection of facts that imply an answer to the QUD in the case of g is a subset of the collection of facts in the case of h .¹⁴ It is this relationship that I will use to define the set of generalizations in the ordering source.

Because only a subset of the action-oriented preferences are part of the ordering source, I will use the term `GENERALIZATION BACKGROUND` to refer to the full set of generalizations of a kind. I will use the abbreviation $GB(s)$ for this purpose. For example, the generalization background in the conversation between Charlie and Kamal is the set of action-oriented preferences of their community in the index of evaluation s . The ordering source is a subset of the generalization background that contains the broadest generalizations that are compatible with the circumstances. I will use the term `MAXIMAL GENERALIZATIONS` to refer to the broadest generalizations, and I define this relationship as follows, where G represents a set of generalizations.

¹³Realistically, in Charlie and Kamal's community, there would be additional standards about appropriate behavior such that people return items. For example, 'If x borrows money from y , x returns the value to y .' Because there are multiple generalizations that yield ' x returns something to y ,' that x has stolen from y is not a natural conclusion in a circumstance where x is returning money to y .

¹⁴This can be understood intuitively because all situations in which an individual has stolen something from someone who has (now) left are situations in which an individual has stolen something from someone.

(99) **Maximal Generalization**

Let $\text{QUD}(g, s)$ stand for the set of propositions that are implied by a possible answer to the QUD given g as illustrated in (98) above:

$\text{MAX}(g, s, G) = g \in G$ is maximal in G iff

$\forall h \in G : \text{QUD}(g, s) \cap \text{QUD}(h, s) \neq \emptyset \rightarrow \text{QUD}(g, s) \subseteq \text{QUD}(h, s)$

What this says is that a maximal generalization is the broadest among a set of generalizations that are compatible with the same set of circumstances. Recall that I am taking the modal base to be a set of relevant circumstances. It is now possible to define an ordering source in terms of maximal generalizations:

(100) **Ordering Source:** the set of maximal propositions that are compatible with the modal base in a salient generalization background $GB(s)$.

$g \in OS_{GB(s)}$ iff

a. $g \in GB(s)$

b. g is compatible with the modal base: $g \cap \bigcap MB(s) \neq \emptyset$.¹⁵ Let the set of generalizations in $GB(s)$ that are compatible with the modal base be called $GB_{MB}(s)$.¹⁶

c. g is maximal: $\forall h \in GB_{MB}(s) : \text{QUD}(g, s) \cap \text{QUD}(h, s) \neq \emptyset \rightarrow \text{QUD}(g, s) \subseteq \text{QUD}(h, s)$.

The identification of the ordering source can be explained algorithmically:

(101) First identify the generalization background through restrictions imposed by the interpretation of a modal expression and contextual factors. Next, identify the subset of generalizations (in the generalization background) that are compatible with the set of factual premises (i.e. the modal base). Finally, identify the maximal generalization(s), which

¹⁵It is important to note that such a modal base cannot be realistic under the current definition. Because generalizations entail that certain relationships hold in *all* situations, broad generalizations would be incompatible with reality. It is not that case in the real world, for example, that all thieves return the monetary value of the thing they stole, so generalization g in (89) is incompatible with the actual facts. In a circumstantial modal base that only includes immediately relevant facts, this conflict is not an issue.

¹⁶Note also that a generalization background need not contain mutually compatible generalizations—something that is consistent with a standard Kratzerian account—and not all generalizations in the GB need to be compatible with the modal base. This makes intuitive sense: not all laws in a society are relevant to all circumstances.

are the broadest generalizations, among the set of compatible generalizations. This set of maximal generalizations is the ordering source.

Returning to Charlie and Kamal, there is now a straightforward explanation for Kamal’s utterance in (88)—the first set of circumstances. While both g and h are compatible with a set of circumstances in which Charlie stole money from her neighbor, g is broader than h , so h is excluded to the ordering source. Inputting this ordering source into a traditional Kratzerian account yields Kamal’s utterance in (88).

At this point I would like to propose a definition for a generic necessity modal operator. An important element to note is that, following prior literature on modality such as Condoravdi (2001), I assume that modals of necessity extend the time of evaluation forward.

I start by defining the set of best worlds:

(102) **The set of best worlds**

$$Best(s, MB, OS, GB) = \{ w \in \bigcap MB(s) \mid \text{there is no } w' \in \bigcap MB(s) \text{ such that } w' <_{OS_{GB}(s)} w \}$$

This definition of best worlds is almost identical to the one presented in the introduction. Something to note in this definition is that both the modal base and the ordering source have an index of evaluation argument. This represents the fact that the modal base can be defined in terms of the set of worlds that is accessible from s . Similarly, I will assume that generalization backgrounds can change over time. This is especially relevant in the discussion of the action-oriented preferences of individuals, which are frequently reassessed. Another element to note in this definition is the inclusion of a generalization background. Below, I will discuss different kinds of generalization backgrounds. One of the key changes that modal expressions undergo in the process of semantic change is the kind of generalization backgrounds that they permit. We are now in a position to define modal necessity.

(103) **Modal Necessity**

$$NEC(p, s) : \{ w \mid \exists s' \subset w : \tau(s') \subseteq \tau(s) \wedge \forall w' \in Best(s', MB, OS, GB) : p(w', [\tau(s'), \infty)) \}^{17}$$

¹⁷This representation is somewhat abbreviated to highlight the similarity with previous literature on time and modal-

In prose, this definition says that the utterance of a necessity modal assert that the actual world is among a set of worlds in which p (i.e. the prejacent) is verified in all best worlds in a time interval that begins with the reference time and extends indefinitely into the future. The set of best worlds is determined with respect to a set of factual premises (more precisely, a set of worlds that are consistent with a set of factual premises) and a generalization background that are accessed from an interval s' whose run time is contained within the run time of s . Recall, that above, I have built the concept of maximal generalizations into the definition of an ordering source; that is, the ordering source only contains those generalizations that are compatible with modal base and, of these, those which are maximally broad. Note that s is the interval of utterance in the case of present tense and is generally a past time interval in the case of past tense marking. Something that I would like to highlight in this definition is that the generalization background is explicitly represented. In the evolution of modal expressions, it is often the nature of the generalization background that changes and nothing else. The details of this will be explored in future chapters.

As a form of conclusion to this section, I would like to present definitions of Kamal's utterances in the two sets of circumstances described above in (94) and (95).

(104) Where $sg_c(s)$ is Charlie and Kamal's community at time interval s , and i_{u1} and i_{u2} are the time intervals corresponding to each of Kamal's utterances:

a. $\llbracket \text{You have to return the money} \rrbracket =$

$$\{ w \mid \exists s' \subset w : \tau(s') \subseteq \tau(i_{u1}) \wedge \forall w' \in \text{Best}(s', C_1, OS, \text{Act.Pref}_{sg_c(i_{u1})}) : \text{you-return-the-money}(w', [\tau(s'), \infty)) \}$$

b. $\llbracket \text{You have to donate the money} \rrbracket =$

$$\{ w \mid \exists s' \subset w : \tau(s') \subseteq \tau(i_{u2}) \wedge \forall w' \in \text{Best}(s', C_2, OS, \text{Act.Pref}_{sg_c(i_{u2})}) : \text{you-donate-the-money}(w', [\tau(s'), \infty)) \}$$

When the circumstances change between i_{u1} and i_{u2} , the maximal compatible generalizations (i.e. the generalizations in the ordering source) change. That is, the set of action-oriented prefer-

ity. The argument of p is a set of world-time pairs. An alternative representation is as follows:

$$\text{NEC}(p, s) : \{ w \mid \exists s' \subset w : \tau(s') \subseteq \tau(s) : \{ s \mid s_n = \{ \langle w_n, t \rangle \mid w_n \in \text{Best}(s', \text{Facts}, OS, GB) \wedge t \in [\tau(s), \infty) \} \} \subseteq p \}$$

ences of Charlie and Kamal's community did not change when Charlie's neighbor fled the community. The prejacent changes due to the change in the ordering source. It is important to note that, as illustrated in the illustration of modal assertion in §3.2, Charlie may walk away from the conversation with any number of conclusions about what the actual preferences of the community are or could be:

- (105) a. If an individual has stolen money, the thief returns the money.
b. If an individual has confessed to stealing something, the thief returns the stolen object.
c. If an individual has stolen something from their neighbor, the thief returns the stolen object.

But there are other action-oriented preferences that are ruled out by Kamal's utterance such as, 'If an individual has stolen money, she spends it on a party with her friends.' This differs from other formal accounts of modality, which assume that the ordering source is given by the context. I take this opportunity to reiterate that the informational content of a modalized utterance is a narrowing down of what the possible set of generalizations may be.

A consequence of this analysis is that there is no need to invoke a stereotypical or normal ordering source. The degree of stereotypicality or normality is built into the generalizations themselves in terms of broadness. The intuition that this analysis aims to capture is that speakers rely on the broadest generalizations available to them in modal reasoning, whether this pertain to action-oriented preferences or universal generalizations. There may, of course, be multiple broadest generalizations, which can yield a prejacent containing a disjunction (i.e. "or") as in the example pertaining to (86) and (87) above.

I have shown in this section that by stipulating that the propositions in an ordering source are biconditional generalizations, we can produce a straightforward account of natural language modal expressions by relying on a standard account of modal semantics. I have argued that by ranking ordering source generalizations according to their degree of specificity/ broadness, we can account for judgments about what is appropriate when multiple generalizations are compatible with the salient set of factual premises.

In future research, I would like to explore the possibility that necessity can be defined in terms of the existence of a unique maximal generalization that implies the prejacent. This simplification would yield a more intuitive account of the informational content of modal expressions. Such a definition of modal necessity may look something like the following:

(106) **Unique Generalization Modal Necessity**

$$\text{NEC}(p, s) = \{w \mid \exists s' \subset w : \tau(s') \subseteq \tau(s) \wedge \exists! g \in OS_{GB}(s') : g(w) \rightarrow p([s', \infty)) \wedge p \in QUD\}$$

The intuition behind this definition is that there is a unique maximal generalization that is compatible with the circumstances which resolves the QUD. The point of defining modal necessity in this way is to highlight the fact that modal expressions ultimately clue interlocutors into logical relationships between facts in the world or in the preferences of agents. In the next section, I turn to teleological modals, arguing that these modal expressions are not a proper flavor of modality, like deontic and epistemic are; but rather, they presuppose a revision of the set of factual premises.

3.3.4 Teleological necessity and revision of the modal base

Teleological readings of modals have been extensively studied in the literature on modality and refer to modalized utterances that express possibility or necessity with respect to a rational agent's goals (Condoravdi & Lauer, 2016; von Stechow & Iatridou, 2005, 2008). One of the often-cited teleological expressions is paraphrased below from von Stechow & Iatridou (2005):

(107) (In order) To get to Harlem, you ought to take the A Train. (p. 14)

In this sentence, the *in order to* clause is frequently referred to as the 'purpose clause' because it represents the goal or purpose of an agent. The prejacent of the necessity modal is taken to be a necessary precondition of the goal or of an optimal realization of the goal. While teleological necessity most prototypically describes the necessary preconditions of the achievement of agents' goals, there are sentences that are parallel in form but which can not be appropriately called teleological.

(108) In order to be ripe by July, the peaches have to get twelve more inches of rain.

Peaches are not sentient beings, so they can not have goals.¹⁸ The *in order to* clause describes an outcome of which getting twelve more inches of rain is a precondition, but it need not be the goal of an agent. The reading of the necessity modal in this case might be more appropriately called ‘precondition’ necessity. What I will show here is that there is no foundational difference in the meaning of teleological reading of a necessity modal and a precondition reading of a necessity modal. In both readings the *in order to* clause expresses an outcome; when the subject of the main clause is animate, there often exists an inference that outcome is a goal. However, what I will argue in this section is that the role of the *in order to* clause is to add a proposition to the set of factual preferences. I will also argue that this revision process may be implicit, and in Chapter 4, I will demonstrate that this results in an ambiguity between deontic and teleological readings of obligation modals. I will continue to use the term ‘teleological necessity’ throughout to refer to the relevant set of sentences that I am accounting for in this section. I do so because the examples have teleological readings; however, it is important to note that the proposition in the *in order to* clause need not be a goal of a rational agent.

In terms of a generalization-based ordering source, I will first consider an example with a universal generalization background, which is made up of generalizations that describe processes and relationships between facts in the world. The following example illustrates the generalizations that underlie the assertion, ‘In order to win the lottery, you have to buy a lottery ticket.’ It is important to note here, that there are two readings of this sentence. One is a general description of how a lottery system works in a particular society. The other is a concrete assessment of the circumstances, which could constitute advice given to a single individual. The relevant reading for the discussion is the latter: a concrete assessment of the circumstances.

¹⁸It may be argued that the peaches being ripe by July is the goal or desired outcome of some salient agent. This may be the case; however, as I will explain below, I will not build preferences into the definition of teleological expressions, so I will treat the goal or desire reading as an implicature.

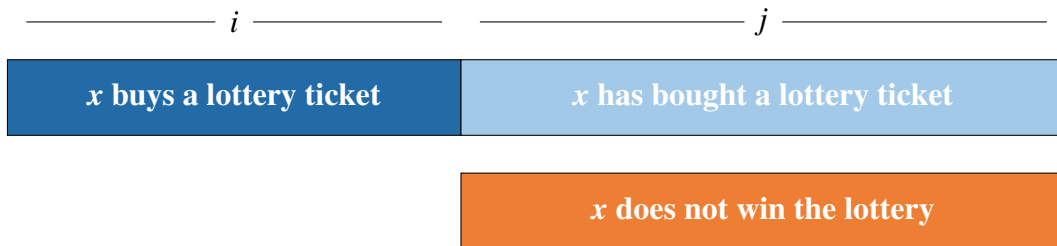
(109) [Context: A young girl is watching television with her mother and a commercial for the Mega Millions Lottery comes on. The following dialogue ensues:]

Young Girl: Mom, how do I win the lottery?

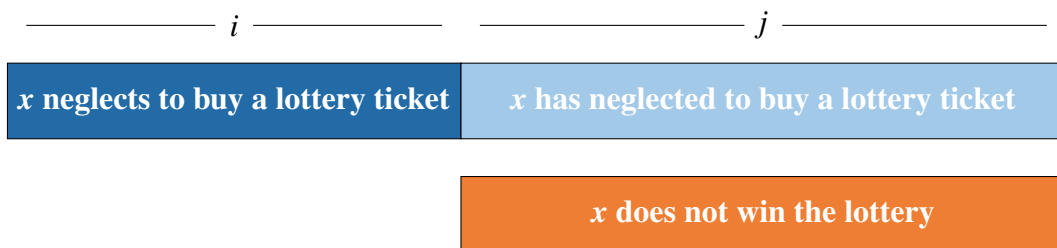
Mother: Well first, you have to buy a lottery ticket.

Father: (*from the kitchen*) And you have to be extremely lucky.

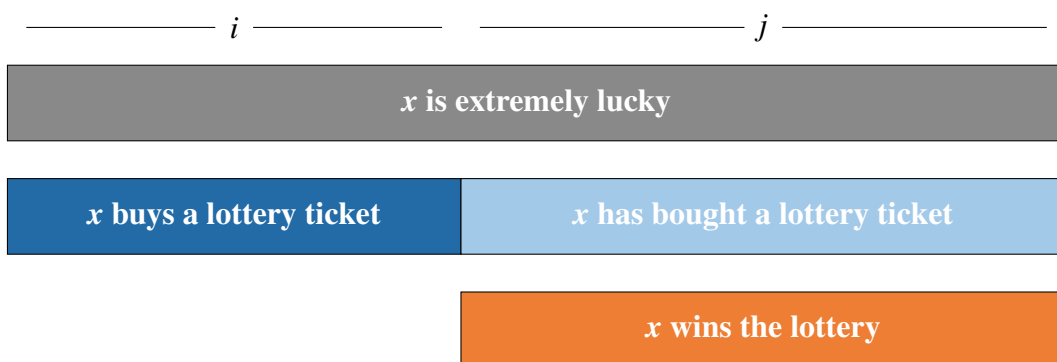
(110) *g*: ‘People who buy lottery tickets don’t win the lottery.’



(111) *h*: ‘People who neglect to buy lottery tickets don’t win the lottery.’



(112) *l*: ‘People who are extremely lucky and who buy lottery tickets win the lottery.’¹⁹



I will take these three generalizations to be the content of the universal generalization background of the conversation, and I will paraphrase the mother’s response as the following:

¹⁹I am treating ‘*x-be-extremely-lucky*’ as an individual-level predicate in this example. While it may be debatable whether an individual can actually *be* lucky, there are other less-disputably individual-level predicates that may exhibit the same behavior in generalizations. In this particular example it is impossible to verify an individual’s luck until after she has won the lottery, so it presents certain obstacles that the present analysis sets out to resolve.

(113) In order to win the lottery, you have to buy a ticket.

Similar to Kratzer's account of *if-clauses*, I propose that the proposition in the *in order to* clause is added to the set of factual premises. However, I will add the stipulation that the time of evaluation of an *in order to* clause begins with the reference time and extends into the future. I will not propose a fully compositional account here but rather describe the contribution informally.

(114) **In order to**

Let C be a set of circumstances, and let i_m be the reference interval of the main clause. Let MB be the modal base of the main clause. 'In order to α ,' revises the modal base of the main clause such that,

- a. $\llbracket \alpha \rrbracket = \lambda s.p(s)$
- b. $MB_{rev(p)} = \{s \mid \exists s' \subseteq s \wedge \tau(s') = \tau([i_m, \infty)) \wedge p(s')\} \cup MB$

The result of this revision process is a new set of factual premises with respect to which the main clause is evaluated. In the utterance in (113), the revised set of circumstances includes the proposition that the young girl wins the lottery in some time beginning with the interval of utterance and extending indefinitely into the future.

The universal generalization background contains the propositions g , h , and l , shown above in (110) - (112). The revised set of circumstances, is only compatible with a single generalization in the generalization background: l . I define the meaning of the sentence below:

(115) Where C is the set of relevant circumstances in the conversation in (109), and i_u is the time of the mother's utterance, and p stands for the proposition paraphrased, 'You win the lottery':

- a. $\llbracket \text{In order to win the lottery, you have to buy a ticket} \rrbracket = \{w \mid \exists s' \subset w : \tau(s') \subseteq \tau(i_u) \wedge \forall w' \in Best(s', MB_{rev(p)}, OS, Univ.(w)) : you-buy-a-ticket(w', [\tau(s'), \infty))\}^{20}$

²⁰Note that it is the definition generalization g that guarantees that the the buying of the ticket precedes the winning of the lottery because g stipulates that all winning intervals are preceded by intervals in which a ticket is bought. This account straightforwardly accounts for the variety of utterances that correspond to different reference intervals: 'In order to win the lottery, you have to buy a ticket,' 'In order to win the lottery, you have to have bought a ticket,' 'In order to have won the lottery, you have to have bought a ticket.'

What is shown in this definition, is that the set of circumstances is revised by the *in order to clause*. The result of this revision is that of generalizations in $Univ.(w)$, only the single generalization l is compatible with the circumstances, so the ordering source contains a single generalization. In all of the best worlds, according to this generalization, the daughter buys a lottery ticket. In other words, it does not matter in this case that the best worlds are lottery losing worlds, according to the broader generalization g shown in (110). This generalization is incompatible with the set of circumstances that has been revised by the *in order to clause*.

As I mentioned above, the revision of the set of circumstances may be given implicitly by a contextually determined outcome. This is the case, for example, in utterances that express an obligation with respect to a goal of a rational agent. I will represent this in the definition of teleological necessity below, where p_c may be given by the context or by an *in order to clause*.

(116) **Teleological Necessity**

Where $Univ.(w)$ is the set of universal generalizations in world w and p_c is a contextually salient outcome:

$$\text{TELEO}(p, s) : \{ w \mid \exists s' \subset w : \tau(s') \subseteq \tau(s) \wedge \forall w' \in \text{Best}(s', \text{Facts}_{\text{rev}(p_c)}, OS, Univ.(w)) : p(w', [\tau(s), \infty)) \}$$

According to this definition, teleological claims depend on logical relationships that hold among facts in the world. This differs quite substantially from standard accounts, like Portner (2009) shown in Table 3.3, in which these claims take a rational agent's goals to be the ordering source. I argue that these claims are fundamentally about what is the case in world such that certain actions are necessary for agents to realize certain outcomes (which are most often their goals). I will discuss the flavor of teleological necessity with respect to deontic necessity further in the next chapter.

3.3.5 Absolute necessity

In the previous two sections, I have discussed how the modal base and ordering source are defined given a generalization background. There is one final distinction that I would like to make along

these lines, which is the notion of ABSOLUTE NECESSITY. This is a reading that surfaced in my study of *tener que* in Cuban Spanish, and describes claims that are based on exceptionless generalizations.

Absolute generalizations are also relevant in the modal system of English. Consider epistemic necessity modals. In general, these uses of modals are resistant to future-orientation, a term I use in the same sense as Condoravdi (2001). I illustrate the case of English *have to* below:

- (117) a. I just watched the news. The meteorologist said **it's gonna rain** tomorrow.
b. I just watched the news. # The meteorologist said **it has to rain** tomorrow.
c. I have looked at all the evidence and have concluded that the meteorologist **has to have doctored** the records.

On the relevant reading, (117b) is unacceptable because the sentence contains a strong epistemic necessity modal and is future-oriented.²¹ This is the essential difference between strong epistemic modals and future constructions: whereas, future constructions communicate claims what is necessary about the future, strong epistemic modals are generally restricted to claims about what is necessary in the present or the past.

There is a case, however, in which the epistemic reading of *have to* is available for future-oriented readings. This is most clear in examples in which the generalization underlying the modal utterance invokes a Natural Law like the Law of Gravity, as in (118) below.

- (118) [Context: In an introduction to a lecture on the Law of Gravity, a physics professor holds a bowling ball in front of herself and says to her students:]

‘What will happen after I let go of the ball? The bowling ball **has to fall** to the ground.’

What (118) illustrates is that the prejacent of a strong epistemic necessity modal can be future-oriented in certain cases. What distinguishes cases like this one is that the underlying generalization is absolute. The intuition behind an absolute generalization is that it is formulated such

²¹There is a reading of (117b) in which some outcome is dependent on the rain—such as the elimination of a forest fire—and this reading is perfectly compatible with *have to*. However, the relevant reading is a prediction on behalf of the meteorologist, and it is this reading which is incompatible with *have to*. This kind of a reading, of course, is available when the prejacent describes a state of affairs in the present or past, as illustrated in (117c).

that further specifying the circumstances does not change the conclusion in the prejacent. In other words, there are no exceptions to the predictability of the generalization.

I will propose that in such cases, the ordering source is further restricted such that it only allows absolute generalizations. I define the relevant notions below.

(119) **Absolute Generalization**

Let $\text{QUD}(g, s)$ stand for the set of propositions that are implied by a possible answer to the QUD given g :

$\text{ABS}(g, s, GB) = g \in GB$ is absolute in GB iff

$\forall h \in GB : \text{QUD}(g, s) \subseteq \text{QUD}(h, s) \rightarrow g \supseteq h$

What this says is that a generalization is absolute if any further specification of the generalization has no effect on the other entailments of the generalization. In practice, this means that learning more information about a set of circumstances will have no effect the conclusion given in the prejacent, so a speaker invoking an absolute generalization essentially claims to be able to predict the future given the available information when the prejacent is evaluated at a future moment. An absolute ordering source contains only absolute generalizations. Note in this definition that it is not necessary to distinguish maximal generalizations because if a generalization is absolute, any further specification of the generalization yields the same conclusion, so it is not necessary to distinguish between broad and specific generalizations. However, adding the stipulation that g is maximal would not cause any issue.

(120) **Absolute Ordering Source:** the set of absolute compatible propositions in a salient generalization background $GB(s)$.

$g \in OS_{\text{ABS}(GB)}(s)$ iff

- a. $g \in GB(s)$
- b. g is absolute: $\forall h \in GB : \text{QUD}(g, s) \subseteq \text{QUD}(h, s) \rightarrow g \supseteq h$
- c. g is compatible with the Modal Base: $g \cap \bigcap MB(s) \neq \emptyset$.

What this says is that an absolute ordering source contains only generalizations that are abso-

lute with respect to a generalization background and which are compatible with the set of factual premises. Taking (118) as an illustration, the relevant generalization, of course, is the Law of Gravity. A possible formulation of this law could be paraphrased, ‘Any two objects with mass accelerate toward one another at a rate proportional to the mass of each object minus any additional contradictory forces acting on each object.’ We might imagine that the physics professor has assessed the environment and determined that there are no additional forces that would interrupt the path of the bowling ball to the floor once she releases it from her grasp. In this case, the two objects are the bowling ball and the Earth. The Law of Gravity entails that the ball will fall to the ground when the professor releases it. The professor, knowing the Law of Gravity and assessing the environment to determine that no additional forces can interrupt the path of the bowling ball, can have absolute certainty that the bowling ball will fall to the floor. This is the essence of an absolute generalization. I will not define absolute necessity as a modal operator here because, as I will explain in the next chapter, absoluteness is a felicity constraint on future-oriented epistemic uses of strong necessity modals.

Something that I argue with respect to this definition of absoluteness is that an absolute generalization is also an objective generalization. Note that, as defined here, this is not the same as saying that it is a true generalization. An objective generalization means that the speaker has all of the information necessary to be absolutely sure of the claim in the prejacent. This stands in contrast to broad generalizations, which permit exceptions and which can yield changing conclusions when information is added to set of factual premises.

An important observation to highlight is that, as I have discussed in the example above, the Law of Gravity is formulated in a way that is general enough to apply to the interaction of any two physical objects with mass. When the professor utters (118), her students do not necessarily infer the Law of Gravity in its proper formulation. What they do learn, though, is that whatever is acting on the bowling ball is exceptionless.

In the next chapter, I will discuss in more detail how absolute generalization uses of modals come into use in the first place. What is important to acknowledge here is that previous accounts

of modality have not made a distinction between strong necessity and absolute necessity. With this distinction in hand, the present account has a clear explanation for the relative appropriateness of (117a) and (117b).

3.4 Modal Flavor and Kinds of Generalizations

In the previous section, I was concerned primarily with the definition of the modal base and the ordering source. Along the way, I referred to different modal flavors in passing as a means of illustration. In this section, my aim is to provide a clear picture of modal flavor in terms of kinds of generalization backgrounds. Recall that my claim in this chapter is that the propositions in the ordering source are biconditional generalizations. What I will show here is that different flavors of modal necessity can be derived by defining two kinds of generalization backgrounds. This is similar to traditional accounts of modality, which define modal flavor in terms of different kinds of sets of propositions, but I have attempted here to be much more precise in my definition of modal background such that I can show clearly how they are related to one another. My aim in the present account is to develop a systematic characterization of the kinds of generalizations in order to generate a principled account of how the meaning of modal expressions changes over time.

I will begin by distinguishing between two main kinds of generalizations and a subsetting of a generalization background, which I call an “environmental state”:

- (121) **Universal Generalizations:** generalizations which describe relationships between states of affairs in the world. These generalizations describe how the world works.
- (122) **Action-oriented Preferences:** generalizations which describe appropriate behavior in different circumstances. Action-oriented preferences can be further broken down into two sub-kinds:
 - a. *Social Preferences:* the action-oriented preferences held by groups of agents.
 - b. *Individual Preferences:* the action-oriented preferences held by an individual²² (see

²²To be clear, these are called “effective preferences” because incompatible preferences are necessarily ranked with

Condoravdi & Lauer, 2011, 2012, 2016).

(123) **Environmental States:** an environmental state is a subset of a generalization background such that these generalizations are taken to be temporally contingent.

I will discuss each of these kinds of generalization backgrounds in turn. Different modal constructions restrict what kinds of generalization backgrounds can contribute to the ordering source, and therefore are compatible with a restricted set of the flavors that are available to modals of necessity.

3.4.1 Universal Generalizations

The most straightforward kind of generalization background that I will discuss is the universal generalization background. Universal generalizations concern processes and relationships that exist in the actual world. As I mentioned in the introduction, universal generalizations allow rational agents to make predictions about the world—be this about the past, present, or future—based on available information.

Like any other generalization, universal generalizations can range from general to highly specified. Consider the following examples:

- (124)
- a. Animals enter fight mode or flight mode when threatened.
 - b. Small dogs bark when approached quickly.
 - c. My dog Fido runs under the kitchen table during thunderstorms.

Universal generalizations allow rational agents to make predictions and decisions when presented with a set of circumstances. Fido's owner in (124c) knows to look under the kitchen table if she needs to find Fido during a thunderstorm. Universal generalizations underlie what are traditionally called epistemic and teleological modality. Both of these flavors of modality concern natural processes and factual relationships in the actual world.

respect to one another, not because they are attributed to an individual. I will use the term to refer to preferences that can be attributed to an individual or individuals, contrasting these with preferences at the social level.

It may seem odd that universal generalizations underlie ‘epistemic’ modality since this flavor of modality is associated with the beliefs or knowledge of a thinking agent. A traditional formulation of the definition of an epistemic modal may be as follows:

$$(125) \quad \llbracket \text{must}_{\text{EPIS}} \alpha \rrbracket = \{ w \mid \{w' \mid w' \text{ is consistent with the beliefs/ knowledge of agent } a \text{ in } w \} \subseteq \llbracket \alpha \rrbracket \}$$

In the traditional formulation of epistemic modality, there is direct reference to the beliefs or knowledge of an agent. However, one of the issues with this kind of account is that when speakers utter sentences with *must* or other epistemic modal constructions, they don’t seem to be talking about their beliefs but about what is the case in the actual world. Von Stechow & Gillies (2010) address this point of view, arguing that when speakers use *must* epistemically, the strength of the claim is not necessarily weaker than a non-modalized claim.²³ In other words, speakers using *must* may have complete confidence in the truth of the prejacent. One work-around in the literature is to assign a doxastic (i.e. concerning an agent’s beliefs) ordering source to epistemic modals as well as a presupposition that the beliefs of the agent are true (see for example Kaufmann et al., 2006) such that an agent asserts that the actual world is among her belief worlds. The result of these kinds of assumptions is that the central concern of epistemic modal statements is about what is the case in the actual world. Ultimately, I quote Kratzer above saying that the difference between circumstantial and epistemic sets of factual premises is vague and does not map clearly to linguistic expressions.

This does not eliminate the observation that, at least in some cases, epistemic modals seem weaker than non-modalized assertions (Karttunen, 1972; Groenendijk & Stokhof, 1975; Lyons, 1977). This variation can be captured straight-forwardly in terms of the relative subjectivity or objectivity of the generalizations underlying a claim. Through life experience, rational agents form generalizations, connecting circumstances to outcomes. These subjective generalizations are intuitive and personal, and they are some of the most important tools that agents use to make

²³This is, of course, true in the case of epistemic modals of possibility, but here my concern is with necessity modals. When I refer to “epistemic modals,” I make reference to epistemic necessity modals only.

decisions. But, of course, rational agents do not live in isolation and can learn from the experiences of others. Generalizations can be negotiated implicitly through the uptake or rejection of modalized utterances; they can be negotiation explicitly through hypothesis formation and controlled testing. At this level, generalizations move towards a greater degree of explicit recognition and distribution across populations until they are accepted as objective fact.

To call these modals “epistemic” is a bit of a misnomer. Modalized utterances that are predicated on objective generalizations (defined above as absolute generalizations) are technically epistemic, but they are not about agents’ knowledge. What is actually at the core of these modals is a certain kind of factual relationship that holds in the actual world that predicts the relationships between circumstances and outcomes.

It is important to note that I am not addressing when speakers are licensed to use epistemic modals. Yanovich (2013) argues that what is relevant in making this determination is the knowledge that can be accessed by a relevant group of knowers before a contextually salient decision must be made. Accounts like this venture into questions about the degree of certainty that is required to make any claim whatsoever. Intriguing as they are, I will not be addressing these questions directly here as they are largely unrelated to the central questions explored here.

3.4.2 Action-oriented Preferences

In standard accounts of modality, the preferences of agents are typically represented as sets of propositions that describe ideal worlds. Portner (2018), for example, illustrates a bouletic ordering source as a set that contains the following propositions:

- (126) a. p : Nicolas takes free ride on the Concorde
b. q : Nicolas rides the Concorde (p. 53)

In fact, he uses this hypothetical ordering source to illustrate some of the challenges that this kind of analysis presents. Alternative accounts of preferences that exist in the literature invoke a preference relation, a concept that was first formalized by Heim (1992). Simplifying slightly, the

intuition behind a preference relation is that rational agents consider alternative possible worlds that are maximally similar to the actual world. If a rational agent always prefers worlds in which p is the case to worlds in which $\neg p$ is the case, then the agent prefers p to $\neg p$.

Condoravdi & Lauer (2011, 2012) build on this kind of analysis and develop an account of a *preference structure*, which is a partially ordered (or ranked) set of propositions. At a given moment in time, rational agents have a consistent preference structure,²⁴ which defines how an agent will make decisions at that given moment. They call this structure the *effective preference structure* of an agent at w .

In later work, Condoravdi & Lauer (2016) develop a more substantial account of *action-relevant* preferences, highlighting the distinction between mere desires of agents and preferences of agents that lead to action. They introduce action-oriented preferences to account for examples like the following, presented originally in Levinson (2003:p. 222):

- (127) Do you want to play tennis?
- a. I want to, but I have to teach.
 - b. No [=I don't want to], I have to teach.

Levinson observes that these responses are not contradictory and suggests that there are two kinds of wanting that are expressed by the lexical item *want*. The key difference is that in the first response, the visceral desires of an agent are expressed; whereas in the second response, the speaker expresses her action-relevant preferences. In certain modal expressions, it is action-relevant preferences that are incorporated into the ordering source. Condoravdi & Lauer (2016) argue that in addition to being consistent, agents' effective preferences must be realistic, meaning that agents must believe that their preferences are possible to achieve.

These accounts clarify an important distinction between what agents merely desire and preferences that agents hold which lead to action. I agree with this basic distinction, but as I have shown above, I will implement preferences in terms of action-oriented generalizations (i.e. rules-

²⁴Defined as a structure such that if any two propositions in the preference structure are inconsistent, they are ranked with respect to one another

of-thumb that describe the appropriate or preferred behavior of agents). While Condoravdi and Lauer focus on the effective preferences of individual agents, I will propose that systems of agents (i.e. social groups) can also have action-relevant preferences. I use the term *action-oriented* preferences to make clear that my implementation, while significantly influenced by the concept of *action-relevant* preferences, differs from the original analysis in important ways. I will first discuss effective preferences in more detail to show how the present analysis implements concepts like Condoravdi and Lauer's consistency and realism. Then I will describe how groups of agents can hold action-oriented preferences.

3.4.2.1 Effective preferences

In the present analysis an effective preference structure is a set of generalizations that describe the behavior of an individual agent in different sets of circumstances. As explained above, these generalizations are not ordered *per se* as is the case in other accounts of effective preferences. However, the generalizations are ordered *de facto* in terms of broadness, where the broadest generalization that is consistent with a set of circumstances is predictive of an agent's behavior. It is worth mentioning that agents may not be explicitly aware of their own preference structure; rational agents make (among other kinds of decisions) 'gut decisions' that follow from their effective preferences, but they are not always able to rationalize these decisions.

Because modal necessity is defined in terms of maximal generalizations, generalizations do not need to be mutually consistent. This has been discussed above, but I highlight it here to contextualize the present account in terms of previous accounts. I argue that one advantage of the present account is that there is no need to stipulate consistency. With respect to realism, I suggest here that because generalizations are formed through experience they are inherently realistic, but they are also idealistic to a degree that is desirable given linguistic use. Consider the utterance in (128).

(128) Even if I will surely fail, I will defend myself and my family if we are under threat.

Such an examples would violate realism if the relevant preferences of the rational agent are

propositions such as, ‘I live,’ and ‘My family lives.’ Generalizations account for utterances like (128) because they define the actions of agents in a given set of circumstances, even if these actions turn out not to be effective. That is, the intuition in (128) is that the speaker will take the action of defending herself and her family without respect to whether the desired outcome of this action is consistent with her beliefs about the world.

Because the concept of effective preferences was developed in order to account for the meaning of imperatives, I want to briefly discuss how the generalization-based account of effective preferences discussed here relates to those analyses. As explained in Condoravdi & Lauer (2012) the utterance of an imperative communicates that it is a (maximal) preference of the speaker that the addressee realize the action described by the utterance. This analysis was developed to account for a variety of readings of imperatives in which the utterance of the imperative does not create an obligation for the addressee, as is the case in the utterance, “Get well soon!” The authors, in fact, claim that in these cases, what is relevant are the speaker’s desires and wishes, and that imperative utterances in these cases are only licensed when certain conditions on imperatives are met. In a later account (Condoravdi & Lauer, 2016), the authors make a firmer distinction between action-relevant preferences and the desires and wishes of an agent.

To the extent that imperatives truly integrate action-relevant preferences, imperatives may invoke effective preferences such that the speaker identifies the relevant circumstances of other agents and prescribes action according to her own effective preferences, carrying a flavor of ‘If I were in your shoes, I would do this.’ As the present analysis is not fundamentally concerned with imperatives, I will set this discussion aside for now. It may be that agents’ desires can be defined by sets of propositions; whereas, their action-relevant preferences are better defined by sets of generalizations.

A final distinction that I will identify is the difference between effective preferences that can be reassessed by agents and the ones that are part of agents’ fundamental nature. There are some behaviors that agents cannot resist because they are part of the fundamental drivers of agents’ behavior. A clear example of this is the case of physical needs. An agent may utter the following:

(129) When my sugar crashes, I have to eat something.

In this case, the agent experiences an overwhelming (and necessary) drive to eat when her sugar crashes, and she takes the measures that are necessary to get food in these cases. While the utterance in (129) follows from an effective preference, this is not an effective preference that the speaker can ‘think her way out of.’ I will discuss this distinction further in the next chapter and highlight its relationship with absolute generalizations. What is important to observe for the moment is that effective preferences are not treated uniformly in terms of their capacity to guarantee a certain outcome, and grammatical material is sensitive to this distinction.

3.4.2.2 Multi-agent action-oriented generalizations

The effective preferences of an agent are the action-oriented generalizations that describe the behavior of that agent in different sets of circumstances. Action-oriented generalizations or preferences can also be attributed to groups of agents. Just like effective preferences, there is a spectrum of awareness of these preferences in social groups, where some preferences are explicitly known and others are entirely implicit.

To understand multi-agent preferences, it is useful to consider the purpose of generalizations in the first place: generalizations allow agents to make predictions and decisions quickly despite having limited information. These predictions and decisions ultimately serve to help agents survive in the worlds and to thrive in the world.

Andringa et al. (2015) develop a proposal for the emergence of morality in social groups by comparing the behavior of human social groups to the behavior that emerges in colonies of microorganisms. They adopt the definition of life that it is a self-contained dynamic system that is distinct from its environment. The fundamental purpose of this system is to perpetuate itself by ensuring its survival in the present moment and securing its future survival by modifying the environment so that threats to its survival become less frequent. To abbreviate this, individuals *survive* when they continue to live; they *thrive* when threats to their survival are reduced. Systems of individuals offer protection to the individuals in that system, but they also present competition

for resources in an environment. In order for these systems to help the individuals within them to thrive, group-level cooperative behaviors must develop. That is, while also invested in their own survival, it behooves individuals to invest in the survival of their system in order to thrive. The authors argue that the same principles that apply to systems of microorganisms also apply to systems of human agents.

They explain that moral behavior emerges in social groups in order to protect the interests of the individuals within those social groups. A principle of 'fairness,' for example, describes a pattern of behavior in which individuals in a social group ensure that all ingroup members have equal access to resources. This prevents individuals within systems from becoming threats to one another. As a result, social groups that practice fairness tend to grow faster and become more resilient to environmental threats than groups that do not practice fairness. That is, a behavioral rule-of-thumb of fairness, when practiced by individuals, supports the survival and thriving of the social group (which in turn supports the thriving of the individuals within that group). The emergence of 'fairness' can be seen in colonies of bacteria and in human societies alike.

It is important to note that some social norms that may seem pointless to survival or thriving may actually have emerged for these purposes. Consider, for examples, rules that pertain to dress. While it may not seem intuitive that norms surrounding appropriate dress are related to survival or thriving, clothing is a signal of group identity and membership. By observing the clothing of others (and the degree of conformity to ingroup standards) agents categorize others and make predictions about their behavior. Andringa et al. (2015) argue that in times of scarcity, the identification of ingroup and outgroup members becomes especially important for the survival of the social group. Of course, this process of categorization and prediction can have negative consequences for members within a society, but the fact stands that individuals generally conform to standards of dress in everyday life. I refer the reader to the original proposal by Andringa and colleagues for a more thorough reflection on the behavior of ingroup conformity.

Returning now to the discussion of generalizations, action-oriented preferences at the level of a social group are behavioral patterns assigned to individuals that ensure the survival and thriving

of a social group. Andringa et al. (2015) compare them to the “logic of metabolism” of living agents “according to which otherwise neutral events...can be good or bad for the continuation of the organism” (p. 3). In this way, action-oriented preferences of a social group can be separate from the effective preferences of individuals within that social group. For example, consider a context in which a student is invited by his cousin to go on a trip during the next week. The student may respond:

(130) I’d love to, but I have to go to school next week.

The generalization that students go to school on school days is a behavioral rule-of-thumb that produces educated individuals who can work to improve society. As in the case of effective preferences, action-oriented generalizations at the level of a social group can be explicit—in the form of rules issued by authorities—or implicit—in the form of social norms that guide the socially-oriented decisions of individuals in a social group. In (130) the speaker is likely referencing an explicit rule or law in her society about school attendance. The modal expression ‘have to’ invokes the set of action-oriented preferences of the speaker’s social group.

As I have suggested previously, modal expressions are an important linguistic resource that agents use to negotiate and come to an agreement about what the ‘correct’ behavioral rule-of-thumb are. As exemplified above in the case of Charlie and Kamal above in §3.3.3, agents often seek out the intuitions of ‘wiser members’ or ‘model citizens’ in order to make decisions that have social ramifications. Something that adds significant complexity to this picture is the fact that individuals are members of multiple social groups at the same time. One consequence of this is that modal expressions that presuppose action-oriented generalizations are vague with respect to the social group whose preferences are relevant in a given situation of utterance, which I will discuss further below.

Generally speaking, I have chosen to discuss the emergence of moral behavior in societies in order to show why generalizations do a good job of capturing the preferences of social groups. Through this discussion, I have shown that behavioral rules-of-thumb (i.e. generalizations) naturally fall out of a picture of morality in which moral behavior serves to direct the behavior of

individuals in a society toward the realization of a goal: the survival and thriving of a social group. In the next chapter, I will explore how the boundary between the rules of a society and the rules of the universe (i.e. universal generalizations) become blurred in certain contexts, which sheds light on the cross-linguistically stable deontic to epistemic grammaticalization cline.

3.4.2.3 Action-oriented generalizations and modal flavors

Action-oriented generalizations underlie two principal modal flavors:

(131) Effective preferences: Disposition modals

(132) Social group preferences: Deontic modals

Dispositions refer to the behavioral tendencies of subjects, a meaning which maps to English *will* and the Spanish Synthetic Future. The distinction between these future forms and other forms, such as the Spanish Periphrastic Future, is something that I will explore in more detail below in section §3.4.3. Above, I have said that effective preferences represent the action-oriented preferences of individuals, but there are of course, plural subjects in these utterances. A straightforward way to account for the effective preferences of multiple individuals is to intersect the sets of effective preferences of the individuals referred to by the plural subject—a simple operation in a generalization-based account. However, I also refer the reader to additional accounts in the literature which offers alternative explanations for the representation of the preferences of multiple agents (Wainer, 1994; Waaler & Solhaug, 2005).

One of the advantages of a generalization-based account is that it provides a straightforward explanation of the ‘willingness’ and ‘disposition’ uses that are cited in literature on the future (Bybee & Pagliuca, 1987; Bybee et al., 1991; Portner, 2009). An important observation is that these uses are not restricted to future constructions that evolved from verbs expressing desire, an argument that is made to support the hypothesis of semantic retention in grammaticalization (Bybee et al., 1994). This is illustrated below in Spanish in which a negated Synthetic Future expresses a lack of willingness:

(133) ¿ Siguen manteniendo esa exigencia de que renuncie?

'Are you still demanding that he resign?'

Tenemos planteada la demanda de juicio político y nosotros estamos siguiendo el procedimiento legal y **no nos apartaremos** de los procedimientos legales, **ni seremos cómplices**, pero **tampoco seremos partícipes** de una estrategia que provoque un desastre económico en el país.

'We have filed the lawsuit for political judgment and we are following the legal procedure.

And we will not set aside the legal procedures, nor will we be accomplices, but we won't be participants in a strategy that provokes an economic disaster in the country either.'

(Corpus del Español, *Entrevista PAN* (1999), Author: Bravo Mena)

Disposition readings such as these follow from future markers that evolve from lexical items that presuppose sets of action-oriented preferences, such as is the case for desire predicates (English *will*) and obligation constructions (Spanish Synthetic Future).

At the level of entire social groups, the relevant reading of modals that presuppose action-oriented generalizations is the deontic flavor. In standard accounts of modality, deontic modals presuppose an ordering source that contains the rules, ethical and moral obligations, and ideals of a society. Deontic modality is associated with modals in English like *have to* and *must* and with expressions in Spanish like *tener que* and *deber*. In Chapter 4, I will make a distinction between deontic readings and obligation readings, where deontic is a sub-type of obligation.

It is important to note that the present analysis does not take a set of rules or moral ideals to be given by the context. As I have said, I believe that this more accurately reflects the informational content of modalized utterances. That is, in the present analysis there is less constraint than in standard accounts regarding the detailed make-up of the set of rules that is presupposed by the use of a deontic modal. However, this set of action-oriented preferences is not entirely unrestricted.

In this dissertation, I will define deontic meaning in terms of the action-oriented preferences of a contextually salient social group. However, I believe that in reality, the identity of the relevant social group is more vague than this. Generally speaking, the subject of a deontic utterance will be

a member of the relevant social group, and it is likely that the addressee is a member of this group as well (unless otherwise marked).²⁵ While this leaves the determination of the relevant social group quite vague, it allows agents to make utterances like the following:

(134) [Context: Kala is working on a group project with a friend that is due tomorrow. It is almost 10:00pm. The project is not yet finished, and her input is essential for completing the project. Her family has a strict curfew of 10:00pm during the school year. She says to her friend:]

I have to go home, but I also have to stay and keep working. I don't know what to do!

In (134), Kala is experiencing competing obligations based on the action-oriented preferences of two separate social groups of which she is a member: her school community and her family. The vagueness in the determination of the relevant social group behind deontic modals allows for this kind of flexibility in discourse, where speakers can voice inconsistent obligations while still making logically coherent utterances.

To summarize what I have said so far in this section, I present definitions of the meaning of disposition and deontic modal operators.

(135) **Disposition**

Where $Act.Pref_{subject(s)}$ is the set of action-oriented preferences of the (animate) subject at reference time s :²⁶

$$DISP(p, s) : \{ w \mid \exists s' \subset w : \tau(s') \subseteq \tau(s) \wedge \forall w' \in Best(s', Facts, OS, Act.Pref_{subject(s')}) : p(w', [\tau(s'), \infty]) \}$$

(136) **Deontic**

Where $Act.Pref_{sg_c(s)}$ is the set of action-oriented preferences of the contextually given social group sg at reference time s :

$$DEON(p, s) : \{ w \mid \exists s' \subset w : \tau(s') \subseteq \tau(s) \wedge \forall w' \in Best(s', Facts, OS, Act.Pref_{sg_c(s')}) : p(w', [\tau(s'), \infty]) \}$$

²⁵It is also possible for certain modal expressions to give more guidance regarding the identity of the relevant social group by presupposing more restrictive constraints.

²⁶In the next chapter, I will adjust this definition slightly.

Both of these definitions follow the core structure of modal necessity given above. Because these are definitions of modal flavors, the relevant element in the definition is the kind of generalization background. In the case of both of these meanings, the generalizations are action-oriented preferences; what distinguishes them is whether the preferences are attributed to individuals or a social group.

Before concluding this section, an important distinction that I would like to highlight is the difference between the action-oriented preferences of a social group and the actio-oriented preferences of groups of agents who are the referents of the subject. In the case of the former, it is not necessarily the case that all agents within the social group internalize group-level preferences as effective preferences. This explains the difference in meaning in the following minimum pair of sentences:

(137) They will clean your house for free.

(138) They have to clean your house for free.

In (137) the relevant set of preferences are the effective preferences that are shared by the individuals referred to by the plural subject. What is understood in this sentence is that (given the circumstances of utterance) the addressee can expect that the subjects will ensure the realization of cleaning his house for free. In (138), the set of preferences is attributed to a social group of which the subjects are members. According to the behavioral rules-of-thumb of this social group, the subjects clean the house of the addressee for free; however, this sentence does not necessarily induce the expectation that the prejacent will be realized. What is important to observe here is that there is a distinction between the action-oriented preferences of a social group (deontic) and the intersection of the sets of effective preferences of a collection of individuals (disposition). It is because of this distinction, that I have aimed to make clear how the preferences at the level of a social group are decoupled from the preferences of individuals within a social group.

3.4.3 Environmental States

The final topic that I will discuss with respect to modal flavor is that of environmental states. I have developed an account of this subsetting of generalizations in order to explain the difference between future constructions that are derived from verbs of motion (also known as ‘go-futures’ or ‘be going to future’) and future constructions that evolve from predicates that invoke action-oriented generalizations. In the conclusion of Chapter 2, I argued that the Periphrastic Future grammaticalized through futurate uses of the motion construction. I proposed that environmental states allow agents to express future-oriented statements that are practically settled because of the inertia that environmental states hold, which I will discuss below.

In English this is represented in the distinction between *gonna* and *will*. The distinction between these future constructions in English was discussed in detail in Copley (2009) who cited a particularly clear example of their inherent difference in meaning: “Driving along the highway California one day, I saw a billboard advertising a mechanic’s shop in Madera. It included the sentence in (139a). The puzzle is: Why couldn’t it instead have included the sentence in (139b)?” (p. 79).

(139) A sign seen (and one not seen) on the highway

- a. We’ll change your oil in Madera.
- b. # We’re going to change your oil in Madera.

Copley uses this example to discuss the pragmatics of ‘making offers,’ and I will use this example to show that motion-derived futures behave differently than modal-derived futures (i.e. obligation- and desire-derived) in clear ways. Here I will construct an example in order to more carefully control the context of the utterance.

(140) [Context: In the Sardiñas family, Ernesto volunteers to mop the floor on weekends. This particular weekend, Ernesto’s older brother, Carlos, is visiting and volunteers to mop the floor before Ernesto has the chance to do so, and Ernesto is not aware of this fact. When Ernesto’s father asks him what chore he would like to complete, the following conversation takes place:]

Ernesto: I'll clean the floor.

Carlos: No, I'm gonna clean the floor.

In volunteering to clean the floor, Ernesto is voicing a modalized sentence in which an effective preference in the ordering source can be paraphrased as follows: 'When asked to do a chore on the weekend, I clean the floor.' However, there are extenuating circumstances that prevent Ernesto from following through with this preference in this particular case. Namely, Carlos has already volunteered. In this example, Carlos seems to be making a different kind of statement than Ernesto. While Ernesto is volunteering, Carlos is describing the state of affairs in a more concrete way.

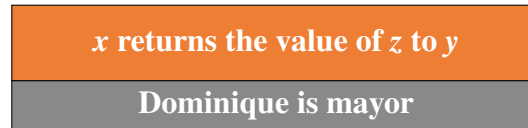
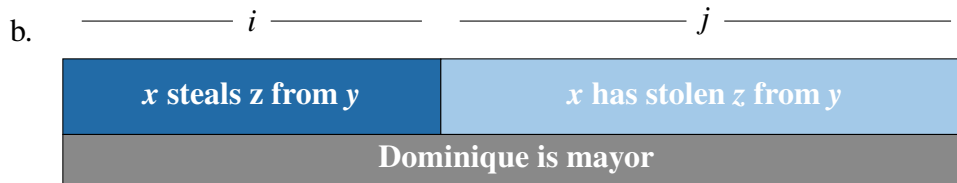
What I propose is that rational agents distinguish between global generalizations that are taken to hold generally—such as Ernesto's general behavior to clean the floor on the weekend—and generalizations that pertain to particular settings of the environment. These generalizations are only active when a certain state of the environment is active. I will define an ENVIRONMENTAL STATE as a set of generalizations that hold when this state is active. Crucially, because an environmental state is a set of generalizations, agents can look for the outcomes of these generalizations in order to determine if the state is active.

(141) **Environmental State**

An environmental state *ES* is a subset of a generalization background *GB* such that all generalizations in *ES* are compatible only with a set of circumstances such that the state *p* is active; that is, they are contingent on the activation of an environmental state.

To illustrate with a familiar example, suppose that in Charlie and Kamal's community the rule, 'individuals who steal must return what they stole,' is only in effect as long as Dominique is the mayor. In this case, the environmental state is the mayoral tenure of Dominique, and *ES* is a subset of the action-oriented preferences of the community that represent the rules that are active under Dominique's tenure. I depict this generalization below:

(142) a. g : ‘When Dominique is mayor, individuals who steal something return the monetary value of the stolen item to the original owner.’



c. $\lambda w. \forall i, j \subseteq w : j < i : \forall x, y, z :$
 $x\text{-steal-}z\text{-from-}y(i) \wedge \text{dominique-be-mayor}(i) \Leftrightarrow x\text{-return-value-to-}y(j) \wedge \text{dominique-be-mayor}(j)$

Note that the stipulation that Dominique is the mayor applies to every proposition in the generalization, which assures that the generalization is only active in when the environmental state is active.²⁷ The argument that I will make is that the ordering source of a motion-derived future is drawn from an environmental state. Because this is a new concept, I will provide two extensive examples below to illustrate what environmental states are and how they relate to linguistic choices.

Example 1: The Small Republic

There is a small country called The Small Republic with exactly three positions in the government: the lawmaker, the judge, and the executive. There are two candidates for each position, one from each of two parties: the Restorative Justice party and the Retributive Justice party. The candidates are listed in Table 3.3.

The governors have the authority to direct political processes in the Small Republic, and all

²⁷What if Charlie stole ten years before Dominique became mayor? According to this analysis, Charlie is under no obligation to return the value of the item to her neighbor, and that is the correct outcome given generalization g above. However, Dominique may also decide that those who *have stolen* something at a time when she is mayor must return the value of the item. Under this policy—a slightly different one—Charlie would be obligated to return the value of the stolen item.

	Restorative	Retributive
Lawmaker	Abe	Beth
Judge	Codie	Donna
Executive	Erin	Fred

Table 3.3: Governors of the Small Republic

have the following effective preferences regardless of party affiliation:

- 1 Policy decisions are made by 2/3 majority.
- 2 Elections occur yearly on December 31.
- 3 Policy changes (if relevant) are implemented on January 1.
- 4 Court trials take exactly one month, and sentences conform with government policy.
- 5 Criminals are sent to either jail or rehabilitation (according to government policy).

The following generalizations describe the effective preferences of governors based on their party affiliation:

- 1 Retributive: an agent who commits a crime is sentenced to jail.
- 2 Restorative: an agent who commits a crime is sent to rehabilitation.

As a result there are two relevant environmental states: one in which the Retributive party has majority and one in which the Restorative party has majority. The sentencing decisions of criminals depend on the environmental state:

(143) $ES_{Retributive}$

- a. g : ‘When the Retributive party is in power, an agent who commits a crime is sentenced to jail.’

(144) $ES_{Restorative}$

- a. h : ‘When the Restorative party is in power, an agent who commits a crime is sent to rehabilitation.’

On December 31, Year 0, the Small Republic is established, and Beth, Donna, and Fred (all members of the Retributive Party) are elected as governors. So as of January 1, Year 1 of the Small Republic, the state of the government is ‘Retributive.’

Suppose that on January 3, Year 1, Gilligan commits a crime. When he is apprehended, a friend says to him (145).

(145) They’re gonna send you to jail.

The use of *gonna* in this utterance reflects the fact that Gilligan’s friend knows that the government is in a retributive state, so there are certain consequences for criminals that are necessary in this state.

Now suppose that on December 15, Year 1, Halley commits a crime. When she is apprehended a friend cannot say (145). Because trials last one month, the state of the government may change. What this illustrates is that speakers are sensitive not only to the present environmental state but also their duration. In the Small Republic, the duration of governmental states is clear, so the appropriateness of predictions that rely on environmental states is clear cut. Halley’s friend could utter the following:

(146) If Beth and Donna win reelection, they’re gonna send you to jail.

I will discuss *if-clauses* in more detail in Chapter 5, but for the time being it suffices to say that like *in order to* clauses, the antecedent restricts the interpretation of the consequent to those circumstances in which the environmental state is a Retributive government.

On December 31, Year 1, Donna and Fred lose reelection to Codie and Erin. As a result, by January 1, Year 2, the state of the government changes and becomes a Restorative government. Suppose that on January 3, Year 2, Ingrid commits a crime. When she is apprehended, a friend tells her (147), based on the new environmental state.

(147) They are going to send you to rehab.

It is also possible for Ingrid’s friend to make the following hypothetical claim:

(148) If Codie hadn't won the election, they were gonna send you to jail.

What is important to note about this utterance is the use of the past-prospective construction *were gonna* in the consequent. This is the grammatical construction that will be the focus of Chapter 5. Here, the motion-derived construction is licensed as a hypothetical consequent because the claim is based on an environmental state generalization.²⁸

This example has been slightly 'sanitized' for clarity; that is, in the utterances above, it is obvious to speakers what the state of the environment is and how long it will last. When this is clear, the English *gonna* construction is licensed in both future-oriented claims as well as the consequent of hypothetical (i.e. counterfactual in (148)) conditional sentences. In the next example, I will illustrate another kind of case in which the state of the environment is not so obvious.

Example 2: The Foxes on Eversummer Farm

Ronald Eversummer owns a farm that is surrounded by forest. Foxes live in the forest and hunt at night, so Ronald keeps his chickens in a coop to protect them. The farmer knows that if a chicken is left out of the coop overnight when a fox comes by, the fox will eat the chicken, but the forest is large, so a fox does not visit the farm each night. Mr. Eversummer has installed a security system that detects when at least one fox has visited the farm on a given night. Each morning the security system registers either as "triggered" or "no response," depending on whether a fox visited the farm the night before. The following generalizations are true the foxes' behavior:

- (149) a. All foxes visit exactly one location per night.
b. All foxes visit locations sequentially in a cycle.

There are three foxes in the forest who visit a different number of total locations. Their presence leads to a number of generalizations, which I will describe below. In other words, the fact that there are three foxes with the hunting patterns described below is the relevant state of the environment.

I will call this state ES_{3Foxes} .

²⁸In fact, this particular example requires more study in English. As I will discuss in Chapter 5, expressions like this are theoretically impossible in English, but my intuitions suggest otherwise. What is clear is that in Cuban Spanish, it is environmental state contexts like the context of (148) that license the use of *iba a* as a hypothetical marker.

- (150) a. Fox 1 visits 6 locations
b. Fox 2 visits 8 locations
c. Fox 3 visits 9 locations

For each of the foxes, one of the locations visited is Eversummer Farm. On some nights multiple foxes visit the farm, on other nights all three foxes are patrolling other locations. Ronald does not have access to the number of foxes in the forest nor their location search patterns. The only data that he has about their visits comes from his security system. Although the foxes have a regular, cyclical hunting pattern, because the cycles are misaligned, Ronald's data when foxes visit his farm is effectively random. Despite this, Ronald can make a few generalizations about fox visits:

- (151) ES_{3Foxes}
- a. g : 'Eversummer Farms is subject to an average of about 2 fox visits per week.'
b. h : 'The maximum number of consecutive nights without a fox visit is 5.'

One morning, the farmer observes in his security system report that there has not been a fox visit during the previous five nights. He says (152) to his farmhands to ensure that no chickens are left out of the coop that night.

- (152) A fox is gonna come to the farm tonight.

Ronald uses *gonna* to signal that the ordering source contains environmental state generalizations. It is important to note, however, that unlike in the Small Republic, the underlying details of the environmental state are not explicitly available. Nevertheless, while Mr. Eversummer does not know the details of the foxes' hunting patterns, he does know that as long as the state ES_{3Foxes} is active, five nights of quiet are necessarily followed by a fox visit. Put in another way, the generalizations given in (151) are dependable and predictive as long as the environmental state continues unchanged (i.e. as long as there are three foxes with the hunting behaviors described in (150)).²⁹

²⁹An interesting consequence of this analysis is a possible explanation for the tendency for rational agents to assume

It is important to highlight that Ronald's prediction is based on the assumption that the environmental state has remained unchanged. If Fox 1 has decided to move to another forest, the farmer's claim could turn out to be inaccurate. That is, unlike in the case of the Small Republic, there are many cases in which rational agents only have indirect access to the state of the environment. For this reason, agents may scan an environment to confirm whether a state of the environment is still intact.

A number of circumstances could cause Ronald to doubt that ES_{3Foxes} is still active: suppose, for example, that a neighbor called up the farmer with the news that he had trapped a fox a few days earlier. Alternatively, Ronald's prediction in (152) could turn out to be false, in which case the farmer would need to reassess his assumptions about the environmental state. I argue that rational agents use observations about their environment as well as their knowledge of recent history to assess their current environmental state. Because an environmental state is a set of generalizations, agents look for the outcomes of these generalizations to confirm that a state is active.

Something to be observed in these example is the element of causation. In the Small Republic, the preferences of the political leaders direct the sentencing decisions. In Eversummer farm, the foxes (and their hunting patterns) cause the generalizations that Ronald could draw from his data. In other cases, I propose, the generalizations in an environmental state are mutually sustaining, which results in a set of generalizations that do not have a clear cause. What is important is that these generalization are only assumed to hold as long as an environmental state is active.

I will use the notion of an environmental state to define two cognitively salient meanings: Environmental State Prediction and Environmental State Intention, which describe the meanings that are expressed by modals that presuppose the use of environmental state generalizations in the reasoning process. I define these below.

that because an event has occurred many times in a row that it is less likely to occur in the future. This is the well-known 'gambler's fallacy' (Croson & Sundali, 2005). This has been shown, for example, in studies in which human judges assign a lower probability to a heads outcome in a coin flip if the previous outcomes were all heads. This intuition is, in fact, rational in the present example, where the probability of a foxless night decreases if there was no fox visit the previous night.

(153) **Environmental State Prediction**

Where $Univ.Gen_w$ is the set of universal generalizations in world w and $ES_{Univ.Gen(w)}$ is a subset of these generalizations that correspond to an environmental state:

$$(154) \text{ ESPRED}(p, s) : \{ w \mid \exists s' \subset w : \tau(s') \subseteq \tau(s) \wedge \forall w' \in Best(s', MB, OS, ES_{Univ.Gen(w)}) : p(w', [\tau(s'), \infty)) \}$$

What this says is that the ordering source of an environmental state modal operator selects generalizations from a subset of the generalization background. Because the definition of the ordering source permits only generalizations that are compatible with the factual premises, it is understood that the environmental state is active at the time of utterance.

The definition of environmental state intention is almost identical. The essential difference is that instead of a universal generalization background, the relevant background is the action-oriented preferences of an agent.

(155) **Environmental State Intention**

Where $Act.Pref_a(s)$ is the set of action-oriented preferences of agent a in s and $ES_{Act.Pref_a(s)}$ is a subset of these generalizations that correspond to an environmental state:

$$(156) \text{ ESINTEN}(p, s) : \{ w \mid \exists s' \subset w : \tau(s') \subseteq \tau(s) \wedge \forall w' \in Best(s', MB, OS, ES_{Act.Pref_a(s)}) : p(w', [\tau(s'), \infty)) \}$$

An observation about these readings is that there is no environmental state reading that accepts a social group action preference generalization background. This is something that I will develop in more detail in future chapters. Before concluding this section, I want to briefly address two empirical advantages of this account. First, it provides an explanation for the difference between dispositions and natural intentions as illustrated above in (140). In (140), Ernesto uses a disposition construction (English *will*) in order to volunteer to clean the floor. Here he is making known his own effective preferences: that on weekends, he cleans the floor. Carlos responds, using natural intention construction (English *gonna*) in order to express that his cleaning the floor depends on a state of the environment. Namely, the chore of cleaning the floor had already been assigned to him; this is a state of the environment when chore assignments (or any publicly available plan) are

understood to control or instigate future action in agents who are committed to those assignments. In other words, an environmental state story can explain why English speakers use *will* to volunteer for a future action and *gonna* to indicate that they have already committed to a future action. Plans, after all, are environmental states which explain the action-oriented preferences of agents for as long as the plan is active.

A second advantage of this account is that it explains why *gonna* cannot be used to describe the dispositions of agents with respect to arbitrary reference times (i.e. habitual readings). Consider the following naturally-occurring example in English from the Santa Barbara Corpus of Spoken American English (DuBois, 2004):

(157) “I mean we do get mad at our horses for, you know, whatever they do wrong. We do get mad at ’em—like I notice horses at college, they just haven’t been disciplined enough. And they’re just—it’s like a kid. They’re just—are ornery you know? And like **they’ll move around** and kinda be ornery about half way but not too bad.”

In this example, the speaker uses English *will* to communicate a generalization about the horses’ behavior. While I will leave a full analysis of this kind of use to future work, for the time being I suggest that this utterance indicates that the generalization that horses move is relative to certain circumstances (perhaps when individuals are trying to get them to remain still). In this use of *will*, the relevant set of circumstances do not come from the present moment; instead, they are implied. That is, the utterance in (158) is not a prediction about the future behavior of the horse but rather a circumstantially-contingent generalization about their behavior. This kind of reading is not available for environmental state prediction markers, which can only receive a future-oriented interpretation. Consider the substitution below:

(158) “They’re just—are ornery you know? And like **they’re gonna move around** and kinda be ornery about half way but not too bad.”

In this utterance, the only available interpretation is that the horses are going to move around

at some moment in the future.³⁰ The environmental state analysis accounts for this distinction because environmental state generalizations are only active when the relevant environmental state is active. That is, they are not global generalizations. Contingent generalization uses of *will* as in (158) are understood to hold across environmental states, but because environmental states are temporally contingent, they do not license these kinds of readings.

Environmental states are thus useful for describing clear empirical differences between the use of English *will* and *gonna*, and as I will show in Chapter 5, they can help us understand how the *iba a* past prospective construction evolves into a hypothetical marker.

3.5 Conclusion

In this chapter I have presented a modest extension of the standard Kratzerian framework of modality in order to develop a more precise and restricted account of the ordering source. My motivation for doing this is that in order to account for the cross-linguistic diachronic patterns in the modal domain, it is essential to have a precise account of the ordering source that allows us to show exactly how readings like ‘epistemic’ and ‘deontic’ are related to one another.

The extension that I have proposed is the stipulation that the propositions in an ordering source are biconditional generalizations. Furthermore, I have proposed that the ordering source is properly defined as a subset of a generalization background such that the propositions in the ordering source are compatible with the salient set of factual premises and that the propositions are maximally broad. I defined broadness in terms of a subset relationship, where a generalization *g* is more broad than a generalization *h* if the set of propositions entailed by the answer that *g* has for the

³⁰In fact, this claim may be too strong. Consider the following example from Twitter:

(i) They are always gonna talk about you behind your back. Just make sure you give them a good reason.

(Author: @JillianMichaels; Date: July 16, 2016; Accessed: July 11, 2020)

On one hand, it is possible that contingent generalizations can apply within environmental states, licensing the use of *gonna* in these cases. Alternatively, the meaning of *gonna* may be evolving in English, such that the environmental state distinction is disappearing. Ultimately, more research is needed to resolve this, but it is clear that substituting *will* for *gonna* in (158), at the very least, heavily biases the interpretation towards a future (i.e. not contingent generalization) reading.

Question Under Discussion is a subset of this same set of propositions for *h*.

In this chapter, I have argued that there is no stereotypical background, but rather generalizations may be more or less specified. When rational agents have limited information, they rely on broad generalizations in order to make predictions and decisions in the world. This is an argument that accounts well for the use of future expressions in language and which I will continue to rely on in future chapters.

I also proposed that like Kratzer's account for *if*, *in order to* revises the modal base with a future-oriented proposition, accounting for teleological readings of modals as well as non-teleological readings in sentences containing *in order to*. I also introduced the notion of an absolute generalization, which is a generalization that is exceptionless. An absolute generalization is one such that the addition of information to the modal base does not have any effect on the prejacent. In other words, an absolute generalization is objective in the sense that the predictions drawn from it are fully reliable.

I discussed two main kinds of generalization backgrounds: universal generalizations and action-oriented generalizations. And I have introduced the notion of an environmental state, which is a subset of a generalization background, such that all of the generalizations in an environmental state are compatible only with a set of circumstances in which that environmental state is active. I have shown that a variety of modal flavors can be attributed to these generalization backgrounds, and I have argued that grammatical expressions can be sensitive to these kinds of generalizations, yielding the modal flavors that are associated with different grammatical forms.

In subsequent chapters, I will be putting my proposal here to work in order to explain the evolution of *tener que* and *iba a* in Cuban Spanish. I will show that the extensions of the Kratzerian framework in this chapter provide straightforward solutions to the diachronic questions that arise from the changes in progress in the future domain in this variety of Spanish.

Chapter 4

Tener que: From obligation to future

4.1 Introduction

I'm going to begin this chapter with the two overheard examples that started my investigation into the use of *tener que* in Cuban Spanish:

- (159) a. [Context: Yuleidys is calling a bed and breakfast to confirm a reservation on behalf of her brother. She says:]

Est-oy llam-ando por mi hermano que **tiene que** quedar=se en tu
be-1s call-PROG for my brother COMP *tener que*.PRS.3SG stay=REFL.3SG in your
casa.
house

'I'm calling on behalf of my brother who **is going to** stay in your house.'

- b. [Context: Yuleidys knows that whenever she sends a text to James he takes a long time to respond. One morning, she texts him a question, and because he happens to be on his phone, he responds. In response, she humorously remarks:]

Me dij-e: Le esrib-o a James porque **tiene que**
DAT.1SG say-PFV.PST.1SG: DAT.3SG write-PRS.1SG to James because *tener que*.PRS.3SG
contestar=me rápido
respond.INF-1SG quickly

'I told myself: I'll write to James because **he'll respond** quickly.'

These sentences may strike speakers of most varieties of Spanish as notably odd and perhaps even uninterpretable given the contexts. In most varieties of Spanish, when the prejacent of *tener que* describes an event whose subject is animate, the only interpretation of the modal expression is that of obligation. However, an obligation interpretation does not make sense here. In (159a) it would be strange to tell the owner of a bed breakfast that a future guest is obligated to stay in her home for the night. In (159b), it would be odd to suggest that James could be obligated to respond to text messages quickly. Instead, the intended interpretation in both of these expressions is that the subjects of *tener que* are in some sense guaranteed to realize the action described by the prejacent—of course, this guarantee creates a humorous effect in the case of (159b).

What I will be arguing in this chapter is that these two examples, which caught my ear in the field, are precisely the kinds of utterances which illustrate the step forward in the obligation to future pathway that is occurring in Cuban Spanish. Building on the framework that I described in the previous chapter, I will define obligations as expressions of what is necessary given either action-oriented preferences of a society or universal generalizations. That is, the ordering source of an obligation does not permit generalizations that describe the action-oriented preferences of the subject of the sentence, an intuition that I will alter slightly below.

An important innovation that has occurred in Cuban Spanish is that the ordering source of *tener que* can, in fact, include generalizations from the subject's preferences (i.e. the action-oriented generalizations of an individual agent). This innovation is what makes the sentences in (159) sound odd to speakers of other varieties of Spanish. How and why this innovation is possible is one of the central themes of this chapter. And as I will show, it is precisely this change which sets the stage for the use of *tener que* as a generalization future construction.

I will characterize the stages of evolution in the following way.

- (160) a. **Stage 1:** OBLIGATION: deontic, teleological
b. **Stage 2:** NON-DIRECTOR NECESSITY: deontic, teleological, epistemic
c. **Stage 2.5:** NON-^{1/2}DIRECTOR NECESSITY: deontic, teleological, epistemic, third-person preference future

d. **Stage 3:** GENERALIZATION FUTURE: teleological, epistemic, disposition

The majority of Spanish varieties allow for deontic, teleological, and epistemic readings of *tener que*—that is, these varieties are in Stage 2. Cuban Spanish is currently in what I will call Stage 2.5 with respect to *tener que*, an intermittent stage that may lead to the eventual use of *tener que* as a future construction. Speakers of this variety can use the construction to express what is expected of agents given generalizations that the speaker holds about the agents' characteristic behavior. Stage 3 above represents the prediction that I make about how the development *tener que* will proceed in Cuban Spanish.

In Stage 3, the expansion of *tener que* into disposition uses means that the ordering source permits the action preferences held by the first and second person subject. This shift necessarily replaces deontic readings.

One of the principal puzzles in understanding the obligation to future grammaticalization process is the fact that obligation constructions like *tener que* are in a sense 'too strong' to talk about the future. To describe what "has to be" the case at a future moment, the speaker must have absolute confidence in the stability of the generalizations that underlie her claim. In this analysis, I will frame this as an ABSOLUTENESS CONSTRAINT on the use of epistemic *tener que*. I will use experimental data in this chapter to show that by Stage 2.5, future-oriented uses of *tener que* in the third person are permitted—across both animate and inanimate subjects—when the context makes clear that the speaker's future-oriented claim rests on a generalization that holds always. Crucially, I will show that the relevant notion of absoluteness in Cuban Spanish appears to be weakening. I will discuss some qualifications to this in more detail.

The picture that emerges is that the question, "How do obligation constructions evolve into future constructions?" is too coarse. Instead, when we study the innovation that is currently occurring in Cuban Spanish, we are led to two more specific questions:

(161) In the obligation to future grammaticalization pathway...

- a. How and why do obligation constructions shift from an ordering source that excludes action-oriented preferences of the subject (or other salient agent) to an ordering source

that excludes the action-oriented preferences of a social group?

- b. How do these constructions become weak enough to support acceptability of assertions about the future without absolute evidence? (as we find with the Synthetic Future in Spanish or *will* in English)

With respect to the first question, (161a), I will argue below that the line between what is customarily done and what must be done is blurry. Furthermore, literature on Essentialism (Gelman, 2003) describes the cognitive tendency for human thinkers to assume that outgroup individuals are essentially the same. This pattern of thought can lead to a shift in the interpretation of obligation constructions in certain contexts. With respect to the second question, (161b), I will argue that at least two pressures weaken the absoluteness constraint. First, speakers overstate confidence in their own knowledge. Second, the pressure to interpret obligations as characteristic behavior (a shift from the preferences of a social group to the preference of an individual), allows for disposition readings of *tener que*, which can rarely be literally absolute, further weakening the absoluteness constraint.

I will begin my analysis with a discussion of the semantics of the various readings presented above in (160). I will then show how a precise understanding of the semantics and of the definition of obligation can provide the tools for a clear explanation of the changes between Stages 1 through 3. Following this, I will describe an experiment that I performed to demonstrate that what is at stake in the acceptability in future-oriented epistemic uses of *tener que* is most centrally the absoluteness constraint. Concluding this chapter, I will provide a hypothesis for the evolution of *tener que* after Stage 2.5, justifying my characterization of Stage 3.

4.2 The evolution of generalization markers

The discussion in the previous chapter allowed me to develop a precise characterization of the modal base and the ordering source. The relevant meaning differences in the present chapter concern modal flavor, that is, the kinds of generalization backgrounds that a modal expression per-

mits. Because modal constructions are sensitive to the kind of generalization background in this way, interlocutors can narrow down the possible interpretations of a sentence and hone in on the communicative intention of the speaker.

In the present chapter, I will use generalization backgrounds to characterize the difference in meaning between sentences that contain the innovative form *tener que* and the default future form *ir a* (cf. Orozco (2005) regarding *ir a* as the ‘default future form’ in Spanish). I will also invoke the notion of modal strength in this chapter, highlighting the distinction between ordering sources and absolute ordering sources.

As a preliminary step, I present the relevant readings of *tener que* throughout its historical development in Table 4.1 below. What is represented in this table is the generalization background that corresponds to each reading.

		Action-oriented Preferences		
<i>Meaning</i>	<i>Universal</i>	<i>Social Group</i>	<i>Director</i>	<i>Modal Base Revision</i>
Deontic		✓		
Teleological	✓			✓
Epistemic	✓			
Disposition			✓	

Table 4.1: Possible readings of *tener que* throughout its historical and future development

As a preliminary indication of why this characterization is useful, the distinction between the readings of *tener que* in the majority of Spanish varieties and in Cuban Spanish can be summarized by saying that the construction in the latter variety permits disposition readings—at least in the third person, as exemplified in (159a) and (159b) above. The only difference between these readings is the nature of the action-oriented preferences: in deontic readings the preferences are held by a social group; in dispositions readings the action preferences are attributed to an individual. In some cases, the difference between these readings is virtually imperceptible, which is precisely what advances the grammaticalization process. One thing that I would like to highlight is that something that is missing from this table is that the epistemic reading carries an ‘absoluteness’ constraint in Stage 2. By Stage 3, this felicity constraint is lost, so I do not represent it in the table above. What I hope to illustrate straightforwardly in this table is that the gamut of readings of *tener*

que throughout its history can be attributed to two main kinds of generalization backgrounds.

4.2.1 Stage 1 to Stage 2

4.2.1.1 The meaning of obligation: Stage 1

The first step in understanding the meaning of *tener que* in the present (in both Stage 2 and Stage 2.5 varieties) is to discuss its transition from a modal expressing obligation readings to a modal that could also express epistemic readings. Previous to its status as an obligation modal, *tener* ‘to have’ was only compatible with readings of possession. Bauman (2013) employing variationist corpus analysis concludes that *tener que* had clear use as a modal by the 18th century, but it was used less frequently than the other two constructions in the obligation domain: *deber (de)* and *haber de*. By the 19th century, Bauman (2013) finds that *tener que* gains considerable use as an epistemic construction, reflecting the cross-linguistically attested deontic to epistemic trajectory. He finds that in contemporary Spanish, obligation readings of *tener que* are more frequent than the epistemic reading, corroborating the claims of the Butt & Benjamin (2004) reference grammar.

As I described in Chapter 1, the deontic to epistemic shift has received a great deal of attention in the grammaticalization literature (Bybee et al., 1994; Narrog, 2012; Nordlinger & Traugott, 1997; Traugott, 1989; Traugott & Dasher, 2001). There are two preliminary points that I would like to make about this literature. First, within this particular body of literature, the definition of ‘deontic’ or ‘obligation’ meaning lacks precise definition and may be the root of many of the disparities that are found in the conclusions of different authors who work on this phenomenon.

Nordlinger and Traugott (1997), for example, structure their discussion of the evolution of *ought to* in English with respect to the following definition of obligation:

- (162)
- a. There is some force (the obliger) that has an interest in an event either occurring or not.
 - b. The event is typically to be performed by a controlling agent (the obligee).
 - c. The event is dynamic and typically leads to a change of state.

- d. If the event does occur, it will do so after reference time.
- e. The event is nonfactual, but there is a certain degree of probability that it will occur.

(p. 297)

Definitions like this run into problems in the case of sentences like the following naturally-occurring example:

- (163) Only about 60 percent of people in clinical studies [of Rogaine hair growth treatment] had good results, so there's a chance it may not work for you at all. If it does work for you, you likely won't grow all of your hair back. It also **becomes a lifetime obligation** if you want to maintain your results.
(<https://www.healthline.com/health/does-rogaïne-work>, Accessed: 4/13/2020)

It is unclear in this example to what extent there is an interested obliger. One could argue that the user of the product obligates himself to use the product, but there is a sense in this example that the “obligation” comes from something beyond, and it is not clear that using the product for a lifetime is actually a preference of the user of product. This leads to the second point that I would like to make about the literature on the deontic to epistemic shift: the authors often conflate deontic and teleological readings of the forms in question.

Consider the following instances of *tener que* extracted from the Corpus del español:

- (164) Desde la San Bartelemy la partida está perdida, y, para ganarla, el rey de los hugonotes **ha tenido que abandonar** la causa.

‘From Saint Barthélemy the game is lost, and in order to win it, the king of Huguenots **has had to abandon** the cause.

(CdE, Title: *Los caballeros de Bois-Doré*, 1840, Author: George Sand, Translator: Madga Donato, 1922)

- (165) Por eso también he visto que estos sujetos **han tenido que representar** al convidado de piedra en las conversaciones de gente instruida.

‘That's also why I've seen that these subjects **have had to act like** the Stone Guest in conversations with learned folks.’

(CdE, Title: *Periquillo Sarniento*, 1802, José Joaquín Fernández de Lizardi)

In both of these examples, the reading of *tener que* can straightforwardly be characterized as obligation, yet in (164) the obligation represents what was necessary to achieve a goal and in (165) the obligation concerns what is necessary given the social conventions in a particular interaction. While both readings constrain the actions of agents in some way, the underlying reasoning process is fundamentally different. In both cases, the prejacent is something like an instruction directed toward an obligee. However the source of the obligation is different in each case.

I propose that (164) is a teleological reading of *tener que* where the ‘obligor’ is the set of generalizations about the way things are, that is, the universal generalization background. The king of the Huguenots was not socially obligated to abandon the cause, but rather the circumstances constrained him to do so in the pursuit of the goal. The *tener que* in (165), however, is a deontic reading in which case the generalization background is the action-oriented preferences of a salient social group. This *tener que* clearly concerns socially appropriate behavior.

Given that both deontic and teleological readings can be subsumed under the meaning of “obligation,” I will define a modal OBLIGATION operator in terms of an obligation ordering source. Grouping these readings together has precedent in the literature; Portner (2009), for example, categorizes both readings as ‘priority modals.’ What is common in universal generalizations and as action-oriented generalizations of social groups is that neither of them concern the action-oriented generalizations of the subject or director of the action described by the prejacent. I will repeat here the meanings of deontic and teleological necessity modal operators as described in the previous chapter:

(166) **Deontic Necessity**

Where $Act.Pref_{sg_c(s)}$ is the set of action-oriented preferences of the contextually given social group sg at reference time s :

$$DEON(p, s) : \{ w \mid \exists s' \subset w : \tau(s') \subseteq \tau(s) \wedge \forall w' \in Best(s', Facts, OS, Act.Pref_{sg_c(s)}) : p(w', [\tau(s'), \infty)) \}$$

(167) **Teleological Necessity**

Where $Univ.(w)$ is the set of universal generalizations in world w and p_c is a contextually

salient outcome:

$$\text{TELEO}(p, s) : \{ w \mid \exists s' \subset w : \tau(s') \subseteq \tau(s) \wedge \forall w' \in \text{Best}(s', \text{Facts}_{\text{rev}(p_c)}, OS, \text{Univ.}(w)) : p(w', [\tau(s'), \infty)) \}$$

In prose, deontic necessity says that the best worlds are those in which the set of relevant circumstances are true and which are ranked highest. The ranking is determined by an ordering source which contains the maximum compatible generalizations drawn from the set of action-oriented preferences of a contextually given social group. In all best worlds, the prejacent is true in a time interval that begins with reference time s and extends indefinitely into the future. Teleological necessity says that the modal base is revised with an explicit (e.g. *in order to* in English) outcome or contextually salient outcome. Modal base worlds are ranked according to an ordering source that draws from a universal generalization background, and the prejacent is true in all of the best worlds.

Something that is common to both of these kinds of necessity is that the utterance of a sentence containing one of these readings does not induce the addressee to expect that the prejacent is the case or will be the case.¹ This differs from epistemic readings and future readings, which do create this expectation. I argue that the reason for this difference in expectation is due to the fact that in both cases there is a contextually salient director (i.e. obligee) of the action described by the prejacent. I use the term ‘director,’ following Copley (2009), who observes that a directing agent can be implicit in sentences with inanimate subjects, as in the following constructed example.

(168) The homework has to be turned in by 11:59pm

In this sentence, the students are obligated to turn in the homework even though they are not explicitly represented as the subject of the sentence. In this sense, the students ‘direct’ the action of turning in the homework. In the majority of sentences that express obligation and intention, the director is the animate subject referent. However, as shown in this example, there are cases

¹There is an exception to this. When the purpose clause contains a perfect construction, the prejacent is expected to have passed. It is necessary in these cases for the predicate in the purpose clause to be in the Common Ground. This is evident in the following example: ‘In order to have won the lottery, you have to have bought a lottery ticket.’

in which there is a salient director that is not aligned with the subject—as in the case for many sentences with an inanimate subject. I argue that obligations do not necessarily induce expectations because human agents are ideally directed by their own preferences. That is, although an agent is constrained to act in a certain way in order to accomplish an outcome or is obligated to act according to a set of social rules, the agent can still refuse to fulfill these obligations.

This holds even when agents are obligated to act a certain way and follow through with this responsibility. Ultimately, when they act in accordance with an obligation, they are reassessing their effective preferences to align with external sources. I attribute the fact that obligations do not induce expectations to the fact that there is a human director. With this in mind, I define an OBLIGATION modal operator as follows:

(169) **Obligation**

Let OS_{Oblig} be an ordering source that excludes generalizations that are the (reassessable) action-oriented preferences of the director in s (i.e. OB_{Oblig} permits only universal and social group action-oriented generalization backgrounds):

$$\text{OBLIG}(p, s) : \{ w \mid \exists s' \subset w : \tau(s') \subseteq \tau(s) \wedge \forall w' \in \text{Best}(s', \text{Facts}, OS_{Oblig}, GB) : p(w', [\tau(s'), \infty]) \wedge \exists x : \text{DIRECTOR}(x, p) \}$$

The intuition behind this definition is that obligations draw on generalizations (be they universal or action-oriented preferences) that are not preferences of the director. I have included here the detail that the obligation ordering source excludes reassessable preferences, a detail that I will discuss in further detail below. More formally, the utterance of a sentence containing an obligation modal expression denotes a set of worlds in which the best worlds with respect to a set of factual premises and a universal or social group generalization background are worlds in which the prejacent is realized. It also stipulates that there is a director of the prejacent. Note that the revision process that is associated with teleological necessity is not explicitly represented in the definition of obligation, a meaning which includes teleological readings. This is because revision is either signaled by a purpose clause or given by the context. To be clear, this definition does not require that the preferences of an individual agent must be incompatible with the generaliza-

tion background, but this is frequently implicated by the use of obligation expressions. What this definition requires is the generalization background (of an obligation modal) is either the set of universal generalizations or the set of action-oriented preferences of a salient social group.

One of the favorable consequences of this definition of obligation is that it accounts for sentences whose reading is both deontic and teleological. Consider the following example:

(170) [Context: Zahara is a high school student who is old enough to drive but is not yet eighteen. One day, while at school she feels sick, so she visits the school office and asks if she can drive herself home.]

‘In order to let you go home, we have to get permission from your parent or guardian.’

In this example, the relevant policy in the social preference generalization background may be paraphrased, ‘School administrators release minor-age students whose parents or guardians give permission for the student’s release.’ With the use of the purpose clause, the set of factual premises is revised with the proposition that the administrators let Zahara go home. Crucially, the generalization background in this case is not universal. This means that the revised Modal Base worlds are ordered by an ordering source containing action-oriented preferences. The resulting reading is a statement about what is necessary in the revised context according to the rules, not according to universal generalizations. Administrators who let students go home must get permission from the students’ parents or guardians; administrators who are not in the position of letting students go home are under no such obligation.

A definition of obligation that includes deontic and teleological readings is supported by the fact that teleological readings of obligation modals appear to be available as soon as obligation modals evolve from their lexical source. This is confirmed by the data in Nordlinger & Traugott (1997).

To summarize, the meaning of *tener que* in Stage 1 is that it contributes an OBLIGATION modal operator to the interpretation:

(171) ***Tener que* Stage 1**

$[[\textit{tener que } \alpha]] = \text{OBLIG}([[\alpha]])$

4.2.1.2 From Stage 1 to Stage 2

With a precise definition of obligation meaning in hand, it is now possible to describe the deontic to epistemic shift. What I will argue is that in terms of the semantics, this shift consists of the loss of the stipulation that there be a human director. As a point of entry into this discussion, I will provide here a definition of Epistemic modal necessity and a more general Non-Director Necessity category of meaning. Epistemic necessity is shown to be identical to deontic necessity except that it draws generalizations from the set of universal generalizations instead of the action-oriented preferences of a social group. Note that this definition allows there to be a director of the action or state described by the prejacent, but it does not require this to be the case.

(172) Epistemic

Where $Univ.Gen_w$ is the set of universal generalizations in world w :

$$EPIS(p, s) : \{ w \mid \exists s' \subset w : \tau(s') \subseteq \tau(s) \wedge \forall w' \in Best(s', Facts, OS, Univ.Gen_w) : p(w', [\tau(s'), \infty]) \}$$

(173) Non-Director Necessity

Let OS_{oblig} be an ordering source that excludes generalizations that are the action-oriented preferences of the director in s :

$$NONDIRNEC(p, s) : \{ w \mid \exists s' \subset w : \tau(s') \subseteq \tau(s) \wedge \forall w' \in Best(s', Facts, OS_{oblig}, GB) : p(w', [\tau(s'), \infty]) \}$$

It may seem odd to define non-director necessity in terms of an obligation ordering source, but I would like to suggest that it may not be so inappropriate in practice. When speakers make epistemic claims like, ‘It must be raining,’ there is a lingering sense that the weather is ‘obligated’ to act a certain way given the facts.² It is clearly a different kind of obligation, but it captures the intuition that there is something that obligation and epistemic readings have in common. Namely, the actions of the subject do not (necessarily) follow from the will of the subject (or salient director).

²This sense is more clear in objective readings of epistemic modals as in the absolute readings discussed in the previous chapter, such as, “The bowling ball has to fall (by the Law of Gravity).” In fact, arguably, such a sense is altogether absent in subjective readings of epistemic modals.

(174) *Tener que* Stage 2³

[[*tener que* α]] = NONSUBJNEC([[α]])

I would like to make one observation before discussing how the transition from Stage 1 to Stage 2 takes place. The definition of *tener que* in Stage 2 rules out sentences like those presented in (159) at the beginning of the chapter, in which the ordering source contains (a subset of) the director's action-oriented preferences. As I said above, in the majority of Spanish varieties, *tener que* is in Stage 2.

The crucial change from Stage 1 to Stage 2 is that *tener que* loses the requirement that there be a director of the prejacent. This is, in fact, closely related the observation that has been reported in the literature (Nordlinger & Traugott, 1997; Bauman, 2013). The essential question is how and why this change takes place: what pressure exists in human cognition or the communication process that causes this change to happen across time and across languages?

In order to answer this question, it is helpful to recall what action-oriented preferences are. Action-oriented preferences are the rules-of-thumb that describe appropriate and/or desirable behavior in a social group. These rules emerge in systems of living agents in order to ensure the preservation and thriving of the system and of the agents within it. Conceivably, any action-oriented generalization can be 'converted' into a universal generalization by formulating it in terms of an outcome: 'In order to ensure the preservation and thriving of our social group, members who X must Y.'⁴

³Rather than arguing that *tener que* has multiple lexical entries, I am claiming that the form has a single lexical entry, which is compatible with a number of more specific sub-readings. In other words, there is not a deontic *tener que* and an epistemic *tener que*; rather, there is a Non-Director Necessity *tener que* that may be ambiguous with respect to these readings in certain contexts. Recall that Non-Director Necessity allows inanimate subjects (although it does not require them). Consider the following example:

- (i) Las llaves **tienen que** estar en el llavero.
the keys *tener que*.3PL be.INF in the key-ring.
'The keys **have to** be on the key ring.'

Depending on the context, the speaker of this sentence means to make one of two claims. Either there is some rule that states that the keys must be on the key ring in the present circumstances (the deontic use) or there is some generalization by which the speaker can conclude that the keys are on the key ring (the epistemic use). While both may be true in a particular circumstance, the meaning of the utterance is not read to be somewhere 'in-between' deontic necessity or epistemic necessity.

⁴It may be tempting to eliminate action-oriented preference altogether in favor of a simpler analysis that includes

While some social rules are made explicit through laws and rules, many more rules remain implicit and subtly direct the normal, invisible behavior of everyday life. These norms are so subtle, in fact, that they may only become noticeable when broken; and when broken, these norms are enforced. Consider for example, the wide variety of conventions that constitute greeting routines or turn-taking, as discussed in literature on Conversation Analysis (see Clift, 2016 for a review). While these conventions exist beneath the conscious awareness of conversation participants, when they are violated the rule-breaker may be interpreted as rude, disrespectful, or ignorant (Goodwin & Heritage, 1990).

The factor that I propose is relevant in the deontic to epistemic shift is *Essentialism* (Gelman, 2003). Essentialism is a well-studied phenomenon in human cognition whereby rational agents tend to assume that the members of a (social) category are essentially the same. Researchers have found, for example, that young children make appropriate inferences about the traits of novel animals when they are told what kind of animal it is (e.g. that a previously unknown bird is likely to fly). One way to think about Essentialism is that it is a cognitive process that ‘flattens’ or ‘erases’ the differences that exist among members of a category, leading us to make—sometimes incorrect—inferences about what to expect from a new member of that category. What I propose is that this ‘flattening’ process is what exerts pressure on speakers to reinterpret modal statements with social preference backgrounds as modals with universal generalization backgrounds. In other words, the prejacent describes a claim that is the logical consequence of the what the speaker knows about the norms and practices of a social outgroup.

Consider the following example:

- (175) [Context: Raisa’s mother lives in the rural town of Plainsville where one of the most important social norms is always to give food to the hungry. The generosity of the people of Plainsville is well-known in the region. Raisa now lives in the nearby city of Metropolis with her best friend Noor. Raisa and Noor recently lost their jobs, and they no longer have money to eat. Raisa says to Noor:]

only universal generalizations. However, it is not desirable to do this because this would presuppose an implicit purpose clause in any deontic utterance. It is unlikely that speakers make all moral statements with respect the survival and thriving of their social groups. Although these rules-of-thumb emerge to preserve social groups, it is not necessarily the case that individual agents orient to these rules in this way. It is, therefore, more realistic to treat these as separate sets of generalizations.

Vamos a la casa de mi mamá. **Tiene que** dar=nos de comer.
go.PRS.1PL to the house of my mom. *tener que*.PRS.3SG give=DAT.1PL of eat

‘Let’s go to my mom’s house. She **has to** give us something to eat.INF’

In this example, *tener que* can receive a deontic or predictive (i.e. epistemic) interpretation. On one hand, it is known that giving food to the hungry is socially expected behavior in Plainsville, yielding a deontic interpretation. On the other hand, there is a clear sense that this action-oriented preference held by the people of Plainsville translates into a generalization about the behavior of the people in the town, yielding an epistemic interpretation. That is, their behavioral preference is part of their essential nature, which literally constrains their actions in certain circumstances.⁵

There are several elements that are present in (175) which make it a particularly good candidate for reanalysis:

- The inference concerns the behavior of a member of a social outgroup, that is, a social group of which the speaker is not a member.
- The inference concerns a social norm that is universal in the social outgroup community.
- The social norm is well-known by individuals in the social ingroup of the speaker, and is perhaps a stereotype.

Something to highlight about this discussion is that at this stage in the research, this transition is theoretical. Ultimately, this claim requires more concrete diachronic evidence and ideally, experimental evidence from a language where such a change is in progress. According to the present account, in such a language, epistemic readings would appear first (or preferentially) with animate subjects prior to being licensed with inanimate subjects.

As an interim summary, when working from generalizations about other social groups, we are more inclined to assume that social norms are part of members’ ‘essential nature.’ A distinction that I will draw is between two types of preferences: REASSESSABLE PREFERENCES and NON-REASSESSABLE PREFERENCES. These describe two different types of generalizations that direct the

⁵Coates (1983) asserts that this kind of example, in which the distinction between deontic and epistemic is difficult to ascertain, can be a deliberate conversational choice made to convey both deontic and epistemic meaning at the same time. But it is important to emphasize that examples like this one are only ambiguous when the modal form permits both a deontic and epistemic reading. What I am proposing is that essentialism explains how the action-oriented preferences of social group can ‘cross-over’ and become predictive generalizations about the behavior of members of that group.

behavior of agents. Reassessable preferences are those behavioral generalizations that may change over time because agents can reassess them; through reflection and differing degrees of effort, they can change these preferences. Non-reassessable preferences are those behavioral generalizations that are ‘written in the DNA’ of agents. In a way, these generalizations connect humans to the rest of Nature, determining their behavior, and they cannot be changed through reflection or effort. Along the lines of the claims of Benveniste (1968), these generalizations predestine agents to behave in a certain way. In other words, although humans are acting in these cases, there is a sense in which they are not directing their actions. I argue that non-reassessable preferences are a type of universal generalization and simultaneously a kind of effective preferences; whereas, reassessable generalizations are prototypical effective preferences.

Through Essentialism listeners reanalyze social preferences in the ordering source of obligation modals as non-reassessable preferences. This process of reanalysis eliminates the requirement for a director and allows speakers to use the construction with universal generalization backgrounds.⁶ It is at this stage that a modal construction allows for epistemic readings, which can concern inferences about inanimate subjects. This change is depicted in Figure 4.1 below.

As I will explain in more detail below, the transition to Stage 3 involves a generalization of the kind of effective preferences that the ordering source permits. At Stage 2, the ordering source only permits non-reassessable preferences. A crucial observation regarding *tener que* in Cuban Spanish is that uses in which reassessable preferences are integrated in the ordering source appear to be emerging.

Before concluding this section, a crucial observation remains to be addressed. In Raisa’s utterance in (175) above, the preadjacent ‘ella nos da comida’ (*she gives us food*) is taken to be an inference about a future state of affairs. However, as I discussed in the previous chapter, the epistemic uses of necessity modals in Stage 2 are generally resistant to such future-oriented readings because at this stage, future-oriented epistemic readings have the strength of absolute necessity,

⁶More precisely, this change allows speakers to use a construction with a non-revised universal generalization background. Recall that teleological readings, a sub-reading of obligation, make use of the universal generalization background.

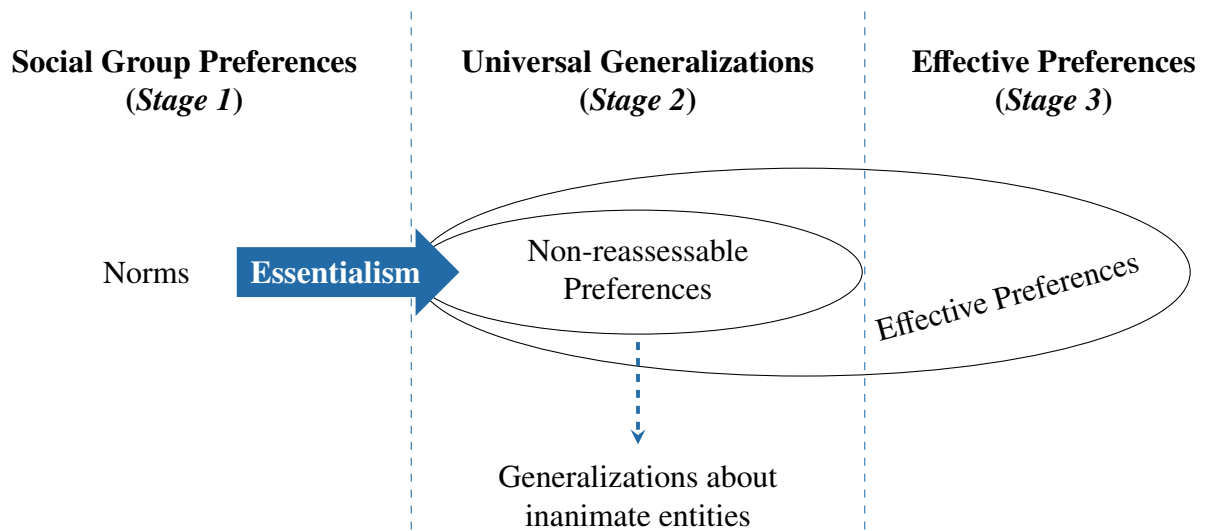


Figure 4.1: A visual depiction of the reinterpretation of the ordering source of *tener que*

introduced in the previous chapter. As I have defined it, absolute necessity means that the ordering source contains exceptionless generalizations. In the previous chapter, I introduced an example which took the Law of Gravity as the relevant absolute generalization. This natural law allows us to predict the behavior of any two (non-quantum) physical objects, without exception. Whether those objects are stars in distant solar systems or a bowling ball and the planet Earth, the objects will be attracted to one another. The key difference between absolute generalizations and non-absolute generalizations is that in the case of the former, further specification of the situation (e.g. specifying an ‘object’ as a ‘bowling ball’) does not change the prediction (e.g. that the bowling ball will move toward the earth).

In Stage 2, I will claim that future-oriented epistemic readings of *tener que* are bound by the absoluteness constraint. I provide the definition of the absoluteness constraint below:

(176) **Absoluteness Constraint**

The ordering source *OS* is absolute with respect to the modal base *MB*, generalization background *GB*, and reference interval *s*:

For all *g* in *OS* :

- a. $g \in GB(s)$
- b. $\forall h \in GB : QUD(g, s) \subseteq QUD(h, s) \rightarrow g \supseteq h$
- c. $g \cap \bigcap MB(s) \neq \emptyset$

This definition, presented in the previous chapter, describes an absolute ordering source. It says that any generalization in the ordering source that is more specific than g settles the question under discussion in the same way. In other words, the addition of information that is compatible with the set of factual premises does not change the prejacent.

This definition of the absolute ordering source can be implemented as absolute epistemic necessity:

(177) **Absolute Epistemic Necessity**

Where $Univ.Gen_w$ is the set of universal generalizations in world w :

$$ABS\text{EPIS}(p, s) : \{ w \mid \exists s' \subset w : \tau(s') \subseteq \tau(s) \wedge \forall w' \in Best(s', Facts, OS_{ABS(Univ.Gen_w)}(s'), Univ.Gen_w) : p(w', [\tau(s'), \infty]) \}$$

While the meaning of future-oriented epistemic *tener que* in Stage 2 can be defined as in (177), I will choose to refer to the absoluteness reading as an absoluteness constraint on the ordering source of future-oriented readings of epistemic uses of *tener que*.

I make this choice because I propose that *tener que* is restricted to absolute epistemic necessity readings in future-oriented sentences due to the existence of grammatical markers of the future that already exist in the language at Stage 2.⁷ In other words, in Stage 2, *tener que* has deontic, teleological, and present-oriented epistemic readings (for both animate and inanimate entities) as well as future-oriented epistemic readings that obey the absoluteness constraint. It is important to note that both absolute and non-absolute readings of necessity modals are available under deontic, teleological, and present-oriented epistemic readings. This is exemplified for teleological readings in the dialogue below between two bickering brothers:

⁷The test case for this proposal is a language without overt future marking in which an obligation marker is undergoing grammaticalization as an epistemic marker. According to this account, in such a language the restriction to absolute epistemic necessity readings in future-oriented sentences should not be present.

(178) Orville: In order to get there on time, we have to leave at 4:00.

Wilbur: Actually, we don't *have to* leave at 4:00; we could leave at 4:05 and still get there on time if you speed.

Orville: Well, I'm not going to speed, so we do have to leave at 4:00.

In this example, Wilbur employs *have to* in the absolute sense, expressing that there are imaginable exceptions to Orville's claim. Orville, however, insists that his first utterance was well-formulated, specifying that he meant his utterance to be interpreted absolutely: he had considered all of the relevant facts. In fact, this dialogue does not make sense unless the necessity modal can be used to express both readings. In future-oriented epistemic readings, however, we find that only the absolute reading is appropriate in Stage 2. My explanation for this phenomenon is that the great majority of statements about the future in everyday conversation rely on non-absolute generalizations, and as a result future grammatical markers are taken to express non-absolute epistemic necessity—defined in (172)—unless modified in some way. When speakers use a Stage 2 necessity modal, such as *tener que*, to express a claim about a future state of affairs, this is a marked form of expression. This marked form implicates a marked meaning, as argued by Levinson (2000). Since both absolute and non-absolute interpretations are available for Stage 2 necessity modals with obligation readings, the use of the marked form implicates that the speaker wishes to express a reading that is not customarily expressed by future markers: absolute epistemic necessity. For this reason, necessity modals in Stage 2 exhibit an absoluteness constraint on the interpretation of future-oriented sentences, a pattern which can be seen in the case of *have to* in English as well as *tener que* in most varieties of Spanish. In languages without future markers, this account predicts that future readings become available as soon as other epistemic readings become available, and in fact, this is precisely what we find in the grammaticalization of the weak necessity construction *ought to* (Nordlinger & Traugott, 1997) as there are no weak-necessity future markers.

To summarize, at Stage 2, the meaning *tener que* is non-director necessity with an absoluteness constraint on future-oriented epistemic readings. In contrast, the ordering source of canonical future constructions permits reassessable effective preferences of the director and non-absolute

readings. This allows speakers to make predictions based on broad generalizations (in the universal generalization background) and to express intentions. The transition to Stage 3 thus involves two changes: the weakening of the absoluteness constraint, and the compatibility of the ordering source with generalizations in an effective preference background.

4.2.2 Stage 2 to Stage 3 (a first look)

In Cuban Spanish, *tener que* is in what I will call Stage 2.5; in this stage the construction is compatible with a reading that I will call third-person preference future. This is the kind of reading that is found in the examples in (159), presented in the beginning of this chapter, and marks the transition into Stage 3. I provide a definition of this reading below:

(179) Third-person Preference Future

Where $Act.Pref_{3rd.director(s)}$ is the set of action-oriented preferences of a third-person subject in s :

$$3RD\text{PREFFUT}(p, s) : \{ w \mid \exists s' \subset w : \tau(s') \subseteq \tau(s) \wedge \forall w' \in Best(s', Facts, OS, Act.Pref_{3rd.director(s')}) : p(w', [\tau(s'), \infty)) \}$$

The intuition behind this reading is that the ordering source permits generalizations from the (full-set) of effective preferences of a third-person director (i.e. not the speaker or addressee) in s . I will also propose that in Stage 2.5 the absoluteness constraint is weakening. Because of this, predictions about inanimate entities are allowed as long as the claim is REASONABLY ABSOLUTE. I will discuss this in further detail below.

As shown above in Figure 4.1, non-reassessable generalizations are both universal generalizations and action-oriented preferences; that is, they describe relationships between facts in the world, but they also describe generalizations that underlie the behavioral decisions of agents. I will argue that in Cuban Spanish *tener que* is being recruited as a conventional form of expression of two related communicative functions. First, because future-oriented epistemic *tener que* carries the absoluteness constraint in Stage 2, speakers can use the construction to make predictions that rest on abstract and supposedly objective generalizations, a stance which rests on a high degree of

epistemic authority. Second, *tener que* allows speakers to talk about the future actions of agents when these actions follow from their fundamental character or essential nature.

I will suggest that both of these functions serve to weaken the absoluteness constraint. The use of *tener que* to express a high degree of epistemic authority is ripe for overuse; speakers that claim to ‘have all of the necessary information’ often turn out not to, weakening the association between *tener que* and absoluteness. The relationship between overuse and weakening has been argued for other phenomena in the literature (Haspelmath, 2000; Dahl, 2001; Kiparsky & Condo-ravdi, 2004). In its use a conventional way to talk about future behavior of agents that flows from their non-reassessable preferences, the use of *tener que* need not obey the absoluteness constraint. These uses are related to the contexts in which obligation constructions are reanalyzed as epistemic constructions, as in (175). In other words, the continued force of Essentialism on the interpretation of *tener que* may significantly challenge the absoluteness constraint as *tener que* becomes a conventional expression of future characteristic behavior.

Whether the weakening of the absoluteness constraint is due primarily to overuse or conventional expression of characteristic behavior is something that I will leave as an open question. As I will show in the data below, the association between future-oriented epistemic uses of *tener que* and absolute generalizations is clearer than its association with characteristic behavior. Because of this, I am inclined to say that overuse of *tener que* as a marker of epistemic authority caused the absolute constraint to weaken enough to allow speakers to discuss the characteristic behavior of other individuals—which further weakens the absoluteness constraint. However, as I will explain below, I explicitly set out to test only the association between *tener que* and absolute generalizations, looking into the association of *tener que* with predictions about the actions of other agents secondarily. I will, therefore, not be making a conclusive claim about which use came first or which is prominent, but I do argue that both functions are important in explaining the use of *tener que* in Cuban Spanish.

A final comment is that the line between non-reassessable generalization and reassessable generalization is quite blurry. What can ‘count’ as non-reassessable for grammatical purposes is vague,

and can lead to the expansion of *tener que* into the domain of modal constructions that accept (re-assessable) effective preference generalizations in the ordering source. I will explore this more in the discussion below.

In the next section, I present the results of an appropriateness judgment experiment with Spanish speakers in Cuba. Using both quantitative and qualitative data, I will aim to show that speakers are recruiting *tener que* as a construction to express predictions based on absolute generalizations. I will also discuss how the presence of a (human) director interacts with absolute generalizations.

4.3 The experiment

One of the great advantages of carrying out experimental studies in communities where a grammatical change is in progress is that we can access the intuitions of speakers in order to better understand the details of semantic change. An empirical approach like this one supplements the conclusions that have been drawn from corpus-based study, a methodology which provides data about grammatical forms across large time-scales but which does not allow the analyst to access the intuitions of the speakers and writers in these time periods. In practice, in corpus study there are ways to demonstrate that certain readings are possible at a given moment in time; however, there are many vague and/or ambiguous cases where the determination of the intended or possible readings of a grammatical form is difficult or impossible to make. Experimental design in a community where a grammatical change is in progress is meant to provide these important details.

This section will present the results and analysis of an appropriateness judgment task that was designed to study the intuitions of speakers regarding the possible uses of *tener que* in Cuban Spanish. What I will show is that speakers accept future-oriented *tener que* more in contexts that make explicit that an absolute generalization underlies the modal claim. I will also show that there is a degree of vagueness about whether the generalization underlying a claim is absolute or not. This vagueness, along with overuse, can explain how the interpretation of *tener que* changes over time.

In more precise terms, the experiment was built to test the following hypotheses:

- (180)
- a. Among Spanish speakers in Cuba, future-oriented uses of epistemic *tener que* are judged as appropriate in at least some contexts that are not clearly absolute.
 - b. Future-oriented uses of epistemic *tener que* are more likely to be accepted when the modal claim is based on an absolute generalization.
 - c. The presence of a director impacts appropriateness judgements of future-oriented epistemic *tener que* where the presence of a director leads to higher judgments of appropriateness.

These hypotheses follow from the theoretical picture described in the previous section. One crucial difference between Stage 2 and Stage 3 *tener que* is that the absoluteness constraint is lost in the transition to Stage 3. The wording of the the first hypothesis in (180a) is meant to reflect the fact that the absoluteness constraint is weakening in this variety. The second hypothesis describes the relationship between *tener que* and absolute generalizations, which I have shown to be fundamental to understanding the semantic evolution of the form. Speakers in a Stage 2.5 variety should exhibit two patterns of judgments: first, there should be evidence that speakers prefer *tener que* in contexts that describe absolute generalizations (hypothesis (180b)). Second, there should also be evidence that future-oriented epistemic *tener que* is acceptable to some extent in non-absolute contexts, showing the weakening of the absoluteness constraint. Finally, the third hypothesis concerns the emergent conventional use of *tener que*, which is to mark predictions based on the characteristic behavior of agents.

4.3.1 Study design and methodology

In order to study the semantics of *tener que*, I followed many of the recommendations for semantic fieldwork developed by Tonhauser & Matthewson (2015). I developed a series of contexts in which I presented a sentence containing the target construction to native speakers of Cuban Spanish, asking them to rate the appropriateness of the sentence in the given context. I also collected

demographic information from each participant. In order to operationalize absolute generalizations in an appropriateness judgment task, I constructed contexts containing explicit mention of a generalization that held ‘always.’ One such context is presented below:

(181) En el país mítico de Lulandia, **siempre** se caen caramelos del cielo unas horas después de que las nubes se ponen azules.

‘In the mythical country of Lulandia, candies **always** fall from the sky a few hours after the clouds turn blue.’

The control set of contexts included contexts that made no mention of a generalization holding always, but which otherwise established that a particular outcome was to be expected, as in the following example:

(182) Una vez el hijo de Yolanda trajo caramelos a la casa y la casa se llenó de hormigas el próximo día. Eso fue en temporada de lluvia. Ahora es temporada seca y el hijo de Yolanda trae caramelos a la casa.

‘One day, Yolanda’s son brought candies to her house, and the house was filled with ants the next day. That was during the rainy season. Now it is the dry season, and Yolanda’s son has brought candies to the house.’

Building on previous a previous pilot experiment of the phenomenon with twenty native speakers of Spanish, I expanded the judgment task to include a minimal pair of sentences for each context: one containing the target construction *tener que* and the other containing the canonical future construction *ir a*. I asked informants to provide a rating according to the following system:

Rating	Description
-2	Suena incorrecto y mal. Nadie lo diría. <i>It sounds incorrect and bad. No one would say it.</i>
-1	Suena poco natural. Un cubano no diría eso en este contexto. <i>It sounds unnatural. A Cuban would not say that in this context.</i>
0	Hay algo aquí que no suena bien, pero no está mal dicho. Hay gente que lo dice, pero yo no. <i>There is something here that doesn't sound right, but it's not wrong. There are people who say it, but I don't.</i>
1	Está bien dicho, pero yo usaría otra forma de expresarla. <i>It's correct, but I would use another way to say it.</i>
2	Está bien dicho. Es como yo expresaría la idea en este contexto. <i>It's correct. It's how I would express the idea in this context.</i>

Table 4.2: System of appropriateness ratings used by informants.

Informants were instructed to rate each sentence in the minimal pair and to distinguish ratings if one sentence sounded better than the other. In the rating system, a rating of 1 or 2 corresponded to a judgment that the sentence is correct (*está bien dicho*). I elected to have two ‘correct’ ratings because in the pilot study I discovered that while one sentence may have sounded better, both sentences were judged as appropriate. That is, I wanted to capture data with respect to a global sense of acceptability as well as a relative sense of acceptability. This was useful because informants sometimes assigned low ratings to sentences for reasons that were not linguistic in nature. Informants occasionally cited sociocultural norms as the reason for lowering a rating, and in many cases this was virtually impossible to control; that is, for a given context perhaps only one or two informants provided lower appropriateness ratings for sociocultural reasons. The advantage of soliciting a rating for a minimal pair of sentences is that the sociocultural intuitions affected both sentences. This meant that the relative appropriateness rating of *tener que* and *ir a* remained intact, reducing quite a bit of noise in the judgment data. While this approach did make informants more aware of the forms under study, distractors were used to draw their attention to other structures. Overall, I judged the benefits to outweigh the drawbacks when making this decision in the experimental design.

I also asked informants to judge whether the pair sentences had the same meaning. In the pilot study, informants indicated that in some contexts both sentences were appropriate but that they meant different things. In response to this, I created contexts that were meant to control for a certain interpretation. In this study, I wanted to prevent informants from reading *tener que* as an obligation, so I indicated explicitly in some cases that the subjects of target sentences had no obligation to realize the prejacent. Even with this control in place, I asked informants to provide a judgment on whether the sentences in the pair had the same meaning. Interestingly, there were many cases in which informants judged that they did not, which I will discuss further below.

For each context, informants were asked to read the description of the context either aloud or to themselves. They were then presented with the first target sentence and asked to provide a rating. Following this, they were presented with the second target sentence and asked to provide a rating relative to the first sentence; if necessary, they were permitted to adjust any previous ratings. Whether the target construction (*tener que*) or canonical construction (*ir a*) appeared first was randomized in order to control for any rating bias related to the order of presentation.

I provided informants with one sentence at a time for two reasons. First, as I found in the pilot study, informants provided richer explanations of their ratings when they were presented with a single sentence. This was likely a result of the fact that the pairs of sentences made immediately clear what grammatical structure was of concern. Second, some informants fell into a pattern of assigning a 1 and 2 to every minimal pair, simply comparing the relative acceptability of the target sentences without taking the global acceptability of the pair of sentences into account. This pattern of response was less likely when informants were presented with one sentence at a time.

After providing acceptability judgments for each of the sentences, I confirmed with informants if the two sentences had the same meaning and gave them an opportunity to explain their judgments. A visual of a context as seen by informants is provided in Figure 4.2 below.

En el país mítico de Lulandia, siempre se caen caramelos del cielo unas horas después de que las nubes se ponen azules. Tomás vive en Lulandia. Sale de su casita y ve que las nubes están azules. **Le dice a sus niños:**

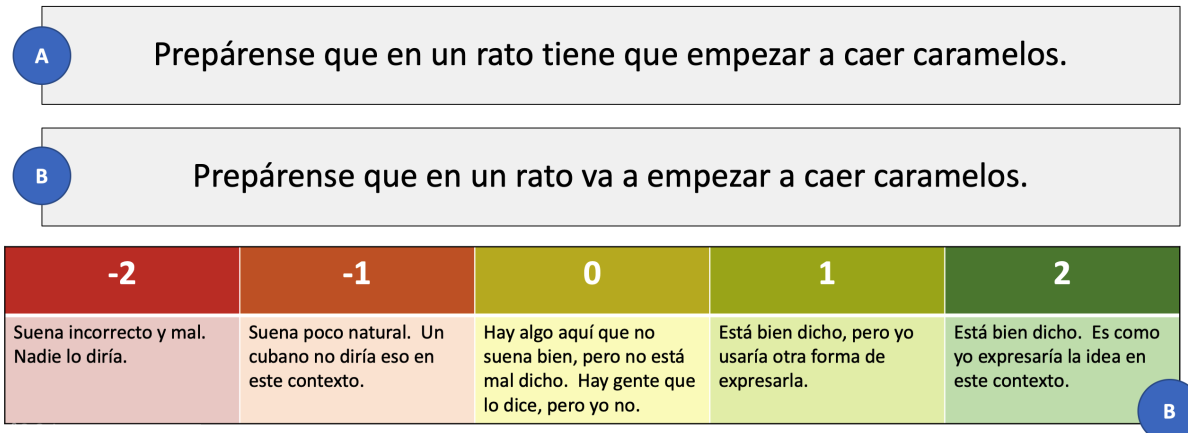


Figure 4.2: The visual organization of a context shown to informants

To summarize, for each context, informants provided four pieces of data:

- (183) a. An acceptability judgment of a sentence containing *tener que*
- b. An acceptability judgment of a minimal pair of this sentence containing *ir a*
- c. An judgment whether the the two sentences in the minimal pair had the same meaning
- d. (Optionally) An explanation of their response(s)

The eight target contexts constructed for this experiment are shown in Table 4.3 below in English.⁸ The original Spanish contexts are presented in Appendix B. Six of these contexts contained a generalization modified by *always* (*siempre*), presented in rows labeled A through 2 in Table 4.3. Of these six contexts, two of the contexts—rows 1 and 2—were formulated to degrade the likelihood or appropriateness of an absolute interpretation of the generalization. In context 2, the generalization does not concern the behavior of a human agent but rather the behavior of an an-

⁸These contexts were constructed in collaboration with a principle informant, who was born and raised in Matanzas, Cuba, the location of the study. The contexts were constructed to be culturally accessible to informants as well as to be sensitive to the unavoidably political nature of an American conducting fieldwork in Cuba. Previous fieldwork in Cuba and the pilot study were essential stages of preparation in order to accomplish the creation of useful contexts.

Label	Contexts and Target Sentences
A	Packages from Spain to Cuba always arrive within six months. Four months ago, Alfredo sent a package from Spain to his mother in Cuba. He says to his mom:
	El paquete [tiene que/ va a] llegar dentro de 2 meses. <i>'The package [has to/ is gonna] arrive within 2 months.'</i>
B	In the magical country of Lulandia, candies always fall from the sky a few hours after the clouds turn blue. Tomás lives in Lulandia. He walks out of his house and sees that the clouds are blue. He says to his children:
	Prepárense que en un rato [tiene que/ va a] empezar a caer caramelos. <i>'Get ready because in a while it [has to/ is gonna] rain candies.'</i>
C	Every year without fail Pánfilo —Paola's favorite actor—appears in the New Year's musical during the last week of December. Today is December first. Paola says to her neighbor:
	Pánfilo [tiene que/ va a] salir en el musical de este fin de año. <i>'Pánfilo [has to/ is gonna] appear in the New Year's musical this year.'</i>
D	Selena works in a law firm. In her office, whenever someone wins a case, the bosses always buy a lunch for everyone the following Monday even though it is not an obligation for them. This week Selena won her case. Her friend says to her:
	Qué bueno, el lunes nos [tienen que/ van a] dar comida. <i>'Great! On Monday, they [have to/ are gonna] give us lunch.'</i>
1	In Australia it always rains in the evening when the sky becomes gray in the morning. Emily lives in Australia. She walks out of her house and the sky is gray. She walks back inside and her son asks her to go to the beach in the afternoon. Emily says to him:
	No podemos ir a la playa, porque [tiene que/ va a] llover esta tarde. <i>'We can't go to the beach because it [has to/ is gonna] rain this afternoon.'</i>
2	Whenever Jorge returns home from the store, he opens the door, walks inside and his dog always runs out. Maykel lives across from Jorge and sees this every day. A friend is visiting Maykel when Jorge comes home with groceries and walks inside, leaving the door open. Maykel says to his friend:
	Mira, el perro de Jorge [tiene que/ va a] salir de la casa corriendo. <i>'Watch, Jorge's dog [has to/ is gonna] run out of the house.'</i>
3	One day, Yolanda's son brought candies to her house, and the house was filled with ants the next day. That was during the rainy season. Now it is the dry season, and Yolanda's son has brought candies to the house. Yolanda says:
	Ay no, la casa [tiene que/ va a] llenarse de hormigas mañana. <i>'Oh no! The house [has to/ is gonna] be full of ants tomorrow!'</i>
4	Yiselys read in the newspaper that Carlos Otero, her favorite host, is going to appear in the New Year's musical this year. Yiselys tells her neighbor:
	Carlos Otero [tiene que/ va a] salir en el musical del fin de este año. <i>'Carlos Otero [has to/ is gonna] appear in the New Year's musical this year.'</i>

Table 4.3: Contexts and target sentences presented to informants

imal. Context 1 describes a generalization about a meteorological event, and weather is widely considered to be impossible to predict absolutely. Note that this differs from meteorological events in fictional worlds, as in B. The final two contexts, which are presented in rows 3 and 4 in Table 4.3, make no reference to generalizations but rather describe expectations that arise based on a single previous experience or outside source of information.

According to the hypotheses presented in (180), those contexts that do not contain generalizations should be judged as less acceptable than those contexts that contain generalizations. The caveat to this is that even contexts containing generalizations that are taken to hold *always* may not be accepted as absolute. Although something has always been the case in the past, this does not mean that it will necessarily continue to be the case going forward. This is particularly relevant in discussion about weather, but it is also relevant when talking about human agents, whose past behavior does not guarantee a future outcome. The quantitative impact of this caveat is the expected gradient in acceptability judgments.

Four of the target contexts from Table 4.3 and ten distractors were presented to each informant. Four of these distractors were target contexts for the study presented in the next chapter. The selection of target contexts and the order in which contexts were presented were randomized in order to avoid bias that might result from the order of presentation.⁹ Prior to providing ratings, informants were trained in the rating process, which included a detailed explanation of the rating scale with examples, followed by two training contexts. The entire session with each informant was recorded in order to document the justifications for ratings. The amount of explanation from participants varied greatly; the shortest recording lasted approximately 19 minutes (after training) and the longest recording lasted approximately 60 minutes with a median session time of approximately 30 minutes.

There were a total of 44 informants who participated in the study, which took place in Pedro Betancourt, Matanzas, Cuba. Informants were recruited through contacts that I had developed in previous fieldwork in Cuba. The demographic distribution of informants is presented in Table 4.4

⁹Because of the randomization process, there were slight differences in the number of times that each target context was rated. Due to this, relative frequencies of ratings will be presented in data below.

below.

Gender					
<i>Male</i>			<i>Female</i>		
18			26		
Age					
<i>18 - 29</i>	<i>30 - 41</i>	<i>42 - 53</i>	<i>54 - 65</i>	<i>66 - 77</i>	<i>78 - 84</i>
6	11	13	10	2	2
Education					
<i>Secundaria</i>	<i>Técnico Medio</i>	<i>Preuniversitario</i>	<i>Universitario</i>		
6	8	10	20		
Percent of Life Outside of Matanzas, Cuba					
<i>0% - 11%</i>	<i>11% - 22%</i>	<i>22% - 33%</i>	<i>33% - 44%</i>		
38	2	1	3		

Table 4.4: Demographic distribution of informants

All informants had a *secundaria* ('secondary') level of education or higher, which corresponds roughly to grade 8. Beyond the *secundaria* level, students take standardized exams to determine if they will continue to vocational education (*Técnico Medio*) or pre-university education (*Preuniversitario*). As the name implies, preuniversitario education is meant to prepare students for success in university-level education. Most students take standardized exams to enter into university programs (*Universitario*), which are available to all students without cost. Students may also gain the right to enter into university programs after four years of military service. These opportunities yield university attendance rates that are quite high when compared to other countries in Latin America and the Caribbean.¹⁰

Of all demographic factors, only gender had any statistically significant impact on the appropriateness ratings. However, this difference only applied to a subset of the target contexts, where males accepted degraded contexts significantly more than females. This pattern did not reveal it-

¹⁰The university attendance rate of my sample of informants was 45.45%. Using the Tertiary School Enrollment (% gross) statistic available through the World Bank (The World Bank, 2018), I calculated that the expected university enrollment rate among my sample of informants (given their ages) is approximately 37%. While the rate of university attendance in the sample is similar to the level expected, the slightly higher rate in the sample may be do to the nature of the social networks that I had access to while conducting research.

self in any other comparisons, and I was unable to draw any explanations for this difference from the qualitative data collected in the study. As a result, I will not explore this result any further here.

In the next section, I will present the results of study. This discussion will include both a presentation of the quantitative data as well as an interpretation of these results given the comments provided by informants.

4.3.2 Quantitative Results

There are two principle measures that provide information about informants' judgments of sentences that contain future-oriented epistemic *tener que*. The first is the overall acceptability rate. Recall from the rating descriptions in §4.3.1 that ratings of both 1 and 2 constituted a judgment that a sentence was correct (*'bien dicho'*). While this measure provides a general picture of the acceptability of *tener que* in target contexts, it is subject to noise that can arise from informants rejecting sentences for reasons other than the use of *tener que* and the possibility that an informant's numerical rating may depart from the interpretations of the ratings provided to informants. For these reasons, I will present more detailed analysis using a different measure described below.

The advantage, of course, in using the overall acceptability rate is that it allows us to see clearly that informants find future-oriented epistemic *tener que* acceptable, especially in certain contexts (hypothesis 1: (180a)). Table 4.5 presents the rate at which informants assigned a 1 or 2 to target sentences containing *tener que* by context. Table 4.6 to the right presents the same set of information after removing ratings in which informants judged that the minimal pair did not express the same meaning. In other words, this set of data represents the acceptability rating of *tener que* when speakers confirmed its interpretation as a future-oriented epistemic modal. In the discussion that follows, I will refer to these as 'synonymous' ratings for brevity.

The adjusted rate in these tables was calculated to roughly account for sentences that received lower ratings due to factors other than the presence of *tener que*.¹¹ The adjusted rate had little to

¹¹To calculate the adjusted rate, I recalculated the acceptability rate assuming that the acceptability rate of the corresponding target sentence containing *ir a* was 100%. For example, in Table 4.5 the acceptability rate of the *ir a* minimal pair in context B was 77.3%. Dividing the acceptability rate of the sentence containing *tener que* with that of

Context	Acceptability	Adjusted
B	72.7%	94.1%
A	72.2%	81.3%
C	63.6%	70.0%
2	57.1%	66.7%
D	50.0%	64.7%
4	39.1%	42.9%
1	28.6%	30.0%
3	0.0%	0.0%

Table 4.5: Overall and adjusted acceptability rate of *tener que* in target contexts

Context	Acceptability	Adjusted
C	90.0%	100.0%
B	75.0%	92.3%
D	66.7%	85.7%
A	64.3%	69.2%
2	63.6%	70.0%
4	53.8%	53.8%
1	20.0%	20.0%
3	0.0%	0.0%

Table 4.6: Acceptability of ‘synonymous’ *tener que* in target contexts

no impact on the ranking of the contexts in each data set, but it is helpful for creating an initial grouping of the data and allows us to see clearly the high rate of acceptability of future-oriented epistemic *tener que*, especially in certain contexts. Taken together, this data alone serves to confirm the hypothesis that among Spanish speakers in Cuba future-oriented epistemic *tener que* is acceptable in some contexts that are not clearly absolute. In fact, in five out of the six contexts that contained a generalization holding always, the majority of informants rated sentences containing *tener que* as correct. The exception to this was the meteorological generalization, which I will discuss in more detail below.

Shown in these tables, I have informally grouped the contexts using a chi-square test as one method to examine the relationship between context and acceptability judgment. Among all judgments provided by informants (i.e. the data set presented in Table 4.5), context B was significantly more acceptable than context 4, $\chi^2(1, N = 45) = 5.14, p = .023$. Context A exhibited the same statistically significant difference, $\chi^2(1, N = 41) = 4.45, p = .035$, but context C did not, $\chi^2(1, N = 45) = 2.70, p = .100$. The data set presented in Table 4.6 was reduced to include only those judgments where the minimal pair sentences were taken to express the same meaning. Because of the reduction in the data set, the chi-square test did not result in any significant differences; however, the differences approached significance in the same pattern as the contexts

ir a yields the adjusted rate: $72.7 / 77.3 = 94.1$.

presented in the larger data set, so I have transposed the grouping from the full set to the data set containing ‘synonymous’ minimal pairs. This method of grouping is by no means definitive, but as I will explore in more detail below, these groupings are informative when taking into account the qualitative data and reflecting on the theoretical claims made earlier in this chapter.

As I explained above, there is a second measure of informants’ judgments of sentences, which is the relative appropriateness of the sentences in each minimal pair. In order to calculate this measure, I converted the ratings given by informants into z-scores—using ratings of target contexts as well as distractors—in order to account for variable rating tendencies among informants. This allowed me to convert each pair of ratings in a context into a single ‘relative acceptability’ value by subtracting the normalized acceptability judgment of the canonical target sentence from the judgment of the target sentence containing *tener que*. A relative acceptability value of zero in a particular context therefore indicates that an informant assigned the same rating to both sentences in a minimal pair. A positive value indicates that the informant found the target construction *tener que* to be more acceptable than the canonical construction *ir a*. This type of judgment was quite rare in the data but there were, indeed, instances in which informants found *tener que* to be preferable to *ir a*. A negative value, of course, indicates the more common judgment in which *ir a* was judged to be more appropriate than *tener que*. It is important to highlight that this type of judgment does not mean that the innovative construction was held to be incorrect, since a rating of 1 was assigned to expressions that were correct yet were less preferred than another expression.

Using the relative acceptability values, I conducted quantitative analysis of informants’ responses using the statistical program R (R Core Team, 2019). A visual representation of the data is given below in Figure 4.3 as a violin plot, which plots the relative acceptability values for each context. Wider areas along the length of each ‘violin’ represent a higher number of observations at that value.

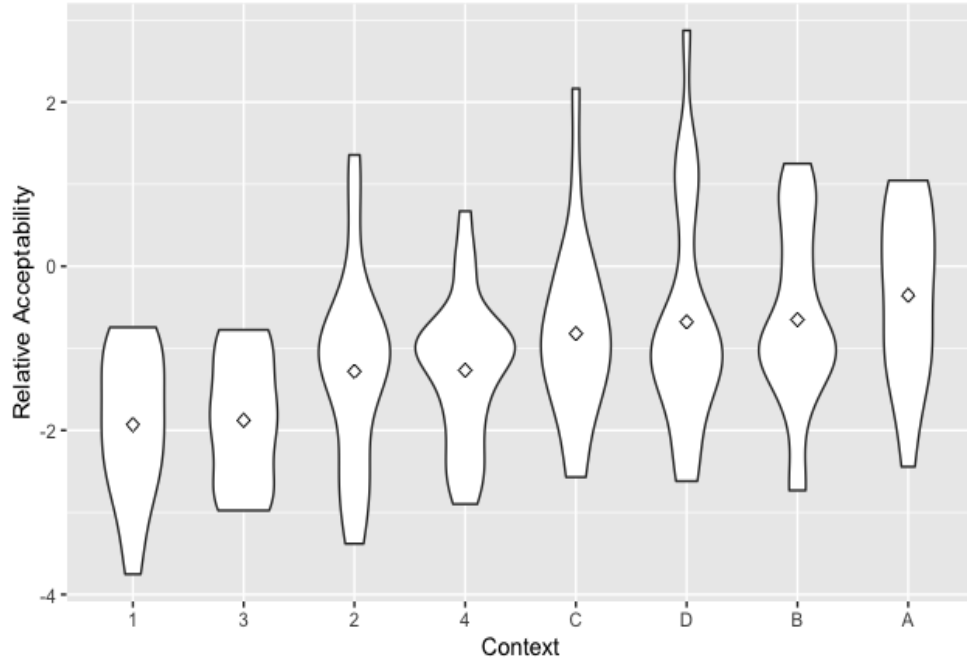


Figure 4.3: A plot of the relative acceptability values by context

As shown in this plot, the ranking of contexts is generally similar to what was given in Table 4.5 above. The lowest rated contexts are those that do not contain generalizations or which contain generalizations that are degraded. A conditional inference tree allows us to see how contexts are grouped with respect to one another. This is represented below in Figure 4.4.

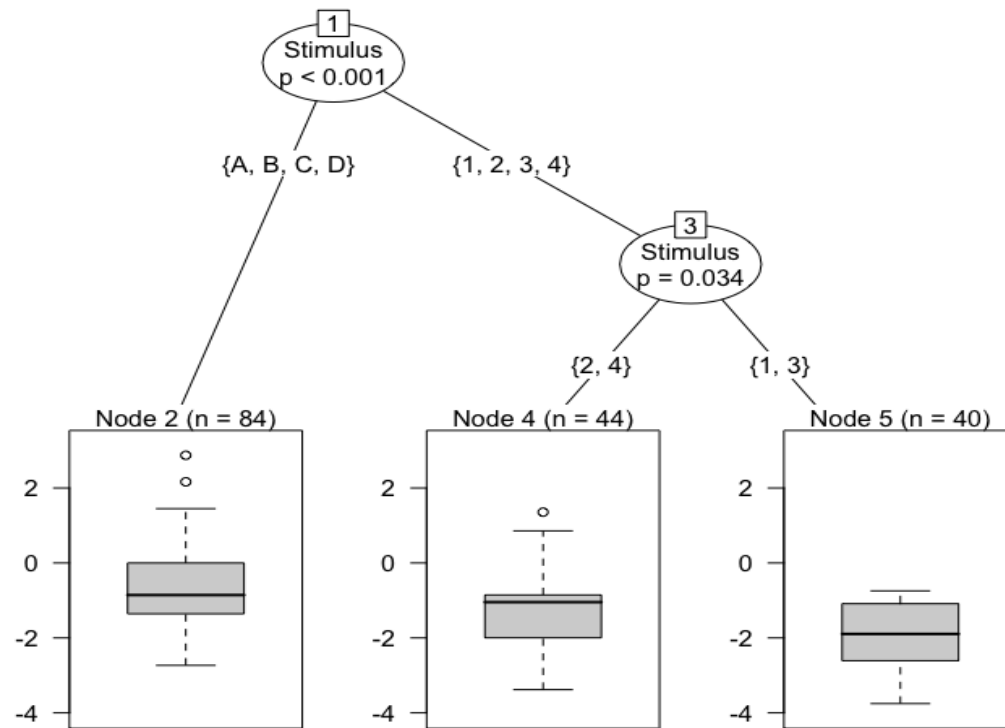


Figure 4.4: Conditional inference tree showing the grouping of contexts

As shown in the inference tree, there are three distinct groupings of the contexts. The group of context with highest relative acceptability contains A, B, C, and D. Informants found *tener que* to be much worse than *ir a* in contexts 1 and 3, and contexts 2 and 4 are somewhere in between. A t-test confirms that the highest grouping ($M = -0.64$) received significantly higher ratings of relative acceptability than the middle grouping ($M = -1.27$), $t(97) = 3.2$, $p = .002$. The middle grouping was also assigned significantly higher relative acceptability ratings than the lowest grouping ($M = -1.91$), $t(81) = 3.1$, $p = .002$.

When analysis is restricted to synonymous ratings, the distinction between the lower two groups disappears. This may reflect a difference in the nature of how contexts group together or this may be a result of the reduction in data points when removing non-synonymous ratings. As above, a t-test confirms that the high grouping ($M = -0.44$) receive significantly higher ratings of relative acceptability than the lower grouping ($M = -1.59$), $t(90) = 5.4$, $p < .001$.

I will refer to the group of contexts that contains A, B, C, and D as the ‘Siempre’ Generalization stimulus type. The term I will use for the group of contexts that contains 1, 2, 3, and 4 is the ‘Degraded and non-generalized’ stimulus type. A violin plot aggregating the responses of the synonymous ratings according to these context types is shown below. This plot contains points to illustrate the number of observations at each level of relative acceptability.

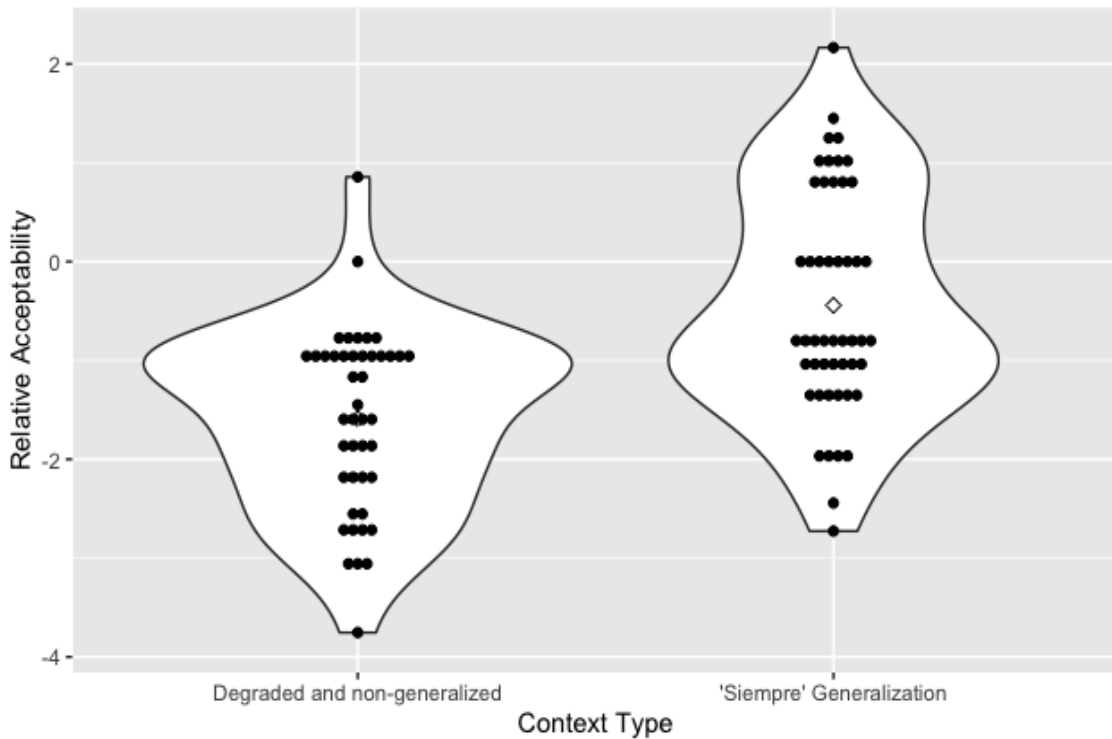


Figure 4.5: Violin plot representing aggregation of responses by stimulus type

An initial observation in this plot is that for both context types the highest concentration of observations is around a relative acceptability of -1. This makes sense. A common response from informants was a judgment of 2 (correct and the best form of expression) for the target sentence containing *ir a* and a judgment of 1 (correct yet not the best form of expression) for the target sentence containing *tener que*. This kind of response yields a relative acceptability of -1; slight deviations from -1 are the result of the normalization of scores.

Another clear observation in this plot is that there were a number of instances in which *tener que* was rated as good or better than *ir a* in the ‘Siempre’ Generalization contexts; however, this

was not the case in the Degraded and non-generalized contexts save two exceptional observations. Recall that Figure 4.5 only includes synonymous observations, confirming that the interpretation of *tener que* in these cases is a future-oriented epistemic modal. What this points to is that among these Spanish speakers in Cuba, there are contexts in which *tener que* used as a future marker is preferable to *ir a*. As I will discuss further below, this is a crucial diachronic semantic development. When innovative forms carve out a sub-meaning within a more general category of meaning, they become useful for efficiently communicating ideas, which encourages their spread in a population.

With the quantitative picture in hand, I will now turn to an explanation of these results, bringing informants' comments to bear on the discussion. What I aim to show is that these results confirm hypothesis 2: (180b)—that absolute generalizations are the explanatory basis of the acceptability of future-oriented epistemic *tener que*—and the results suggest that the presence of a director is a crucial piece as well (hypothesis 3: (180c)).

4.3.3 The Qualitative Results

To begin, I want to point to two contexts that make clear the effect that absolute generalizations have on appropriateness judgments. These are contexts C and 4, which I repeat here for convenience:

- (184) a. **C:** Every year without fail Pánfilo—Paola's favorite actor—appears in the New Year's musical during the last week of December. Today is December first.
- b. **4:** Yiselys read in the newspaper that Carlos Otero, her favorite host, is going to appear in the New Year's musical this year.

In both cases, the speaker tells her neighbor that the celebrity is going to appear in the New Year's musical. The crucial difference between the contexts is that in the first, the prediction of Pánfilo's appearance is based on a generalization that holds every New Year's; whereas, in the second, the future-oriented statement is based on reported information. When the generalization is present, relative acceptability of *tener que* improves.¹²

¹²Statistical tests suggest that the difference in judgments is significant when comparing the contexts independently

Comments from informants suggest that the absoluteness of the generalization is relevant for the acceptability of *tener que* in context C. A number of informants who rejected the use of *tener que* in context C noted that although Pánfilo has appeared in the New Year's musical with absolute consistency in the past, it is not necessarily the case that he will appear this year. Any number of events could intervene and make it so his appearance is not guaranteed. Another participant targeted the expression 'without fail' as the reason for judging *tener que* as acceptable.

This points to the fact that the informants identify a conceptual distinction between generalizations that are useful for making predictions and generalizations that do not fail in their predictive power (i.e. generalizations in which the speaker has all necessary information). This conceptual distinction is precisely the difference between absolute generalizations and non-absolute generalizations, which are maximal, as defined in Chapter 3. In Cuban Spanish it is evident that this difference maps onto grammatical forms.

The sensitivity that speakers had to absoluteness is also illustrated well in another pair of contexts: B and 1. I repeat these here for convenience.

- (185) a. **B:** In the magical country of Lulandia, candies always fall from the sky a few hours after the clouds turn blue. Tomás lives in Lulandia. He walks out of his house and sees that the clouds are blue.
- b. **1:** In Australia it always rains in the evening when the sky becomes gray in the morning. Emily lives in Australia. She walks out of her house and the sky is gray.

Informant 8, a 34-year-old university educated woman, commented that the use of *tener que* signaled a reasoning process in this context. With respect to Tomás in Context B, she said:

- (186) Como que dedujo que si las nubes están azules si va a caer, algo así.

'It's like he deduced that if the clouds are blue that it's going to rain, something like that.'

of the grouping described above. Removing the non-synonymous responses resulted in a non-normal distribution of the data for context 4, so a Mann-Whitney U test was used. The test indicated that relative acceptability was greater for context C (*Mdn* = -0.80) than for context 4 (*Mdn* = -0.99), $U = 99.5$, $p = .035$. It is important to note that after removing non-synonymous responses, the number of responses was low $N = 23$. Nevertheless, the difference is also reflected in the above-mentioned groupings, so I will continue to treat this difference as valid.

Comments such as this were fairly regular among participants: *tener que* was used to express some deductive process. This process of inference, I am arguing, rests on generalizations. Absolute generalizations, especially, tend to be abstract and describe stable processes and principles in the world. Non-absolute generalizations, on the other hand, can be particular and closely associated with concrete experience. It is no surprise, therefore, that informants had a felt sense of ‘deduction’ in relation to the use of *tener que*.

An important observation that arises when comparing these two contexts is that some kinds of contexts could not be coerced into an absolute interpretation. While both B and 1 concern a meteorological event, informants treated them completely differently when rating the appropriateness of *tener que*. As shown in Tables 4.5 and 4.6, context B was among the contexts with highest ratings of acceptability; whereas, context 1 was among the lowest rated. This difference was also evident in comparisons of relative acceptability, as shown in the conditional inference tree in Figure 4.4.

What made *tener que* so acceptable in context B is the description of a natural event. As described above in §4.2.1, absolute generalizations can include Natural Laws that describe the fundamental workings of the universe. Informants were willing to accept that the generalization describing the unusual weather patterns of Lulandia, though a meteorological generalization, could be taken at face value.

For example, Informant 23, a 47-year-old university educated woman, took only slight issue with the use of *tener que* in the Lulandia context, rating it as 1, because the speaker can not know the future. On the other hand, she rejected *tener que* in context 1, rating it -1 because rain is unpredictable. Consider her comments below:

(187) **Context B:** En la segunda lo que está es afirmando que van a caer caramelos. Que no lo sabe.

‘In the second one [*tener que*] what he is is asserting that it is going to rain candies. Which he doesn’t know.’

(188) **Context 1:** Lo que pasa es que en una está afirmando que tiene que llover por la tarde, cosa que es impredecible.

‘The thing is the in one he is asserting that “*tiene que*” rain in the evening, something that is unpredictable’

These comments display a nice contrast between intuitions about statements about the future with *tener que* in general, and statements about the future that concern particularly unpredictable events. In the real world meteorological events are well-known for their unpredictability. So although context 1 describes that a certain weather pattern is ‘always’ the case in Australia, informants did not buy it. That is, their real world knowledge of the weather rules out an absolute interpretation of the generalization described in the context. Informant 41, a university-educated 41-year old male, rated *tener que* as inappropriate in context 1, providing the following explanation:

(189) Está mal hecho con la palabra tiene. Tiene se le indica algo que puedas controlar mejor. **El tiempo no lo puedes controlar.** No puedes aseverar que puede pasar como tal...va a llover esta tarde dice lo mismo, pero no, asevera... **Lo que pasa es que no se le ocurriría a una persona aseverar de esta manera [pointing to *tiene que llover*] con algo que no controla [como] el tiempo.**

‘It’s badly formed with the word “*tiene.*” “*Tiene*” indicates some that you can control better. **You can’t control the weather.** You can’t assert that it can happen like that...“*va a llover*” (‘it is going to rain’) says the same thing, but it doesn’t assert...**The thing is that it wouldn’t occur to someone to assert like this [pointing to *tiene que llover*] with something that they can’t control [like] the weather.’**

I have translated the verb *aseverar* above as ‘assert,’ but other possible translations could be ‘guarantee’ or ‘assure.’ In this justification, it is clear that the use of *tener que* is appropriate when claims about the future amount to an assertion or guarantee; however, because claims about the weather can never be made with this force, *tener que* is inappropriate in this context.

There are two points to be made about this response. First, informants brought their knowledge about the workings of the world to bear on their ratings. So much so that a meteorological

generalization about a fictional land is an ideal context to use future-oriented epistemic *tener que*, but a meteorological generalization about the actual world is among the worst contexts to use *tener que* as a future marker. That is, world knowledge is an important piece in understanding the results. Despite the explicit description that rain in Australia ‘always’ followed a certain pattern, informants did not buy it.¹³

Second, this comment brings out a crucial factor in the use of *tener que* in Cuban Spanish. Informant 41 says that *tener que* is appropriate in contexts that one can ‘control better’ (*controlar mejor*). The intuition expressed is that because weather patterns are inherently unpredictable, the use of *tener que* is inappropriate in this context. In fact, this comment suggests that for this informant, there is a relationship between agentive control and absolute generalizations, an observation that I will discuss in further detail below.

As an interim summary, informants’ comments made clear that they were sensitive of the absoluteness distinction when evaluating the appropriateness of *tener que* with respect to different contexts. But importantly, in practice there is a degree of vagueness regarding what kinds of predictions are compatible with absolute ordering sources. The evaluation of what claims can possibly rest on objective generalizations is, in part, related to world knowledge and social convention.

However, this vagueness did not mean that speakers accepted any use of *tener que* whatsoever. In fact, one of the most interesting class of comments concerned the relationship that informants drew between the use of *tener que* and the personality of the speaker. Informants indicated that the use of *tener que* in the target contexts expressed a greater sense of confidence in the prediction than did *ir a*. Informant 41 was among informants who attributed the use of *tener que* to the personality of the speaker:

(190) Context 2: Quizás el significado de aseverar **depende un poco de [patrones de conciencia] de la persona** ¿no?...le está informándole a alguien con más confianza y siguiendo un patrón que ve todo los días.

¹³It is also worth noting that in the fictional land of Lulandia the connection between falling candies and blue clouds is not arbitrary (as imposed by the context); whereas, in the Australian case, informants may have taken the connection between the gray sky and rain to be arbitrary. As suggested by Ashwini Deo, informants may have been more likely to accept the following sentence, ‘It always rains in the evening if the air pressure is low in the afternoon.’

‘Maybe the meaning of asserting **depends a little on the [patterns of thinking] of the person**, right?...he is informing someone with more confidence and following a pattern that he sees every day.’

(191) Context B: [Va a] es algo **más modesto**. Que pasa, pero bueno tolera que pudiera o no pasar. El segundo es un poco más impositivo en que tiene que pasar de preámbulo y si no pasa puede existir otra reacción, eso **depende del temperamento de la persona**.

‘[Va a] is something **more modest**. [The event] happens, but of course [va a] tolerates that it may or may not happen. The second [*tener que*] is more of an imposition in that it has to happen as something predetermined, and if it doesn’t happen there could be another reaction [on the part of the addressee]. That **depends on the temperament of the person**.’

As expressed in these comments, informants relate the choice to use *tener que* to the personality of the speaker. The reason for this attribution is clear in light of the present analysis. Recall that the difference between an absolute generalization and a non-absolute maximal generalization is that the former describes an unchanging, objective relationship between facts in the world. Non-absolute generalizations, on the other hand, are formed by human thinkers through experience. They are generalizations that are ‘good enough’ for making predictions about the world when exhaustive information is not available. A speaker who uses an absolute generalization in a conversation is claiming privileged knowledge. This is why physics professors can talk about what ‘has to happen’ to a bowling ball when dropped (cf. Chapter 3).

The comments in (190) reflect this: speakers who use *tener que* to discuss claims about the future are more confident of their claims and have the kind of personality to claim objective knowledge about the way that the world works.¹⁴ The reason that this observation is important is that it can provide us a path for understanding why Stage 2 obligation modals progress to Stage 3 obligation modals. Speakers can recruit the absoluteness constraint associated with future-oriented epistemic *tener que* for interactional purposes. I will discuss this further in the following section.

¹⁴To confirm this point even more thoroughly, I followed up with a key informant about this analysis. He told me that future-oriented epistemic *tener que* sentences sounded like certain individuals he knew who he would call ‘know-it-all’s’ (*sabelotodo*).

A related observation that I would like to bring to light is the association between the use of *tener que* and the desires of the speaker. Consider the following comment made by Informant 8 with respect to the context that describes Carlos Otero's upcoming appearance in the New Year's musical—a context that makes no mention of an absolute generalization.

(192) El primero, ella quiere que salga. Y en el otro ella dice que va a salir.

'The first [*tener que*], she wants him to appear. And in the other she says that he is going to appear.'

(Informant 8, *F*, 34 years, university)

The informant described that the use of *tener que* is associated with the speaker's desire. This was something that a key informant signaled to me in discussions following the interviews. He said that in such utterances, speakers are 'forcing the world' to be a certain way. Something that was clear is that such utterances exhibit prosodic differences that can cue interlocutors into this 'bouletic framing' of the utterance. It is perhaps the prosodic material that provides the bouletic framing and the grammatical material that then operates as normal within this type of framing.

The takeaway from this class of comments is that such enrichment of the context (e.g. a bouletic framing) can impact the quantitative picture. While the context describing the appearance of Carlos Otero did not contain a description of an absolute generalization in the context, it is clear that he is the "favorite host" of the speaker, and this emotional factor may have increased the ratings. If this is indeed the case, Context 4 patterns more similarly with Context 1 and 3, which makes the quantitative story a bit cleaner, if not detracting slightly from the argument that the presence of a director has a significant influence on ratings. I will discuss this in more detail below.

Overall, the qualitative data corroborates the claim that the quantitative differences can be attributed to absolute generalizations. In their comments, participants consistently pointed to intuitions that were related to absolute generalizations as their justification for their ratings: generalizations that hold 'without fail,' processes of deduction, inherently unpredictable events, agentive control, modesty, and emotion. I will discuss these further below, but it is clear that future-oriented uses of epistemic *tener que* are more likely to be accepted when the ordering source is absolute.

4.4 Discussion

The experiment that I designed was built to test three hypotheses about the use of *tener que* in Cuban Spanish described in (180). I abbreviate them here below for convenience:

- (193)
- a. Future-oriented epistemic *tener que* is not restricted to Stage 2 readings.
 - b. *Tener que* is more acceptable in absolute generalization contexts.
 - c. The presence of a director increases acceptability of *tener que*.

The clearest picture of the acceptability of *tener que* in ‘new’ readings with respect to Stage 2 varieties of Spanish is in Tables 4.5 and 4.6. The informants assigned ratings of 1 or 2 to target sentences containing *tener que* which were not embedded in the Natural Law contexts that license future-oriented epistemic readings in Stage 2 varieties. Future research can replicate the study design with speakers from other varieties of Spanish to demonstrate the quantitative distinction between a Stage 2 variety and Cuban Spanish. Because many of the *tener que* target sentences are so unusual with respect to most varieties of Spanish, the first purpose of the present research was to demonstrate that such readings are indeed possible in Cuban Spanish.

With respect to the second hypothesis, a comparison of relative acceptability of target sentences containing *tener que* vis à vis sentences containing *ir a* revealed a grouping of contexts that mapped onto the presence or absence of absolute generalizations. The most robust categorization existed between ‘Siempre Generalization’ contexts and ‘Degraded and non-generalization’ contexts. As described above, some ‘degraded’ contexts contained generalizations that were intentionally constructed to detract from absolute interpretations. As I will discuss further below, the apparent exception to absoluteness that exists in Cuban Spanish is the use of generalizations that describe outcomes that are the result of human direction. The ‘degraded’ contexts contained target sentences that described future events that were not directed by human agents or Natural Laws. The comments about the weather patterns in Australia, in particular, made clear that the lack of predictability of weather was a key factor in the designation of the *tener que* target sentence as inappropriate in this context.

The pair of contexts C and 4 illustrate this phenomenon particularly well. Both of these contexts describe a speaker's prediction about the appearance of a celebrity in the New Year's musical on television. The only substantive difference between the contexts is that C describes a generalization about the celebrity's behavior that is 'always' the case; whereas, context 4 explicitly avoids mentioning such a generalization as forming the basis of the speaker's reasoning process. The target sentence containing *tener que* in context C had higher ratings of acceptability relative to *ir a* than in context 4, supporting the hypothesis that absolute generalizations form the explanatory basis of the differences in judgments.

While the second hypothesis is related to the acceptability of future-oriented epistemic *tener que* in both Stage 2 and Stage 2.5 varieties, the final hypothesis concerns the way that Cuban Spanish differs from other varieties of Spanish. An observation in the quantitative results is that Contexts 2 and 4 are found to be more acceptable than 1 and 3. In context 4, the speaker voices a statement about the future actions of Carlos Otero, a human agent, but the context describes that this assertion is not based on a generalization about the agent's behavior but rather an announcement in the newspaper. In context 2, the relative acceptability is degraded for the converse reason: the context describes a generalization about the subject's behavior, but in this case, the subject is not a human agent and there is not a human directing the behavior of the dog. That is, this statistical pattern may be attributed to what is an interaction between absolute ordering sources and the presence of a director. As I illustrated in the comment from Informant 41, the ability of an agent to control an outcome may be a necessary or sufficient condition for the licensing of future-oriented epistemic *tener que*.

Taken together, these hypotheses support a story of obligation to future that goes like this: in Stage 1, obligation markers are licensed when the event described by the prejacent has a human director who may or may not ultimately choose to realize the obligation. In other words, obligations do not entail or guarantee that a certain action will take place, and therefore do not necessarily induce the expectation that an obligation will be realized. Through contexts like (175) above in which the value systems of outgroups are well-known, action-oriented preferences of social groups

in the ordering source are reinterpreted as non-reassessable generalizations of agents. Essentialist thinking ‘flattens’ the diversity within social outgroups, and social norms that exist in outgroup communities are reinterpreted as Natural Laws that are absolutely predictive of the behavior of agents in these communities. This leads to Stage 2, in which the original construction is licensed in claims about the behavior of inanimate objects. In this stage, epistemic readings become available, but future-oriented epistemic readings are restricted to contexts in which the generalization underlying the reasoning process is absolute. This restriction is a result of the layering of epistemic markers in the grammar. Because future markers already exist in Stage 1, future-oriented uses of epistemic constructions are taken to express a marked meaning. Natural Laws that describe agents’ fundamental nature are absolute, so future-oriented epistemic readings of (formerly) obligation markers are restricted to cases in which the generalization underlying the reasoning process is absolute. In the transition to Stage 3, the absoluteness constraint is lost, but the loss of this constraint is gradual.

There are two conclusions that can be drawn from the data that show how the absoluteness constraint is lost. First, a clear conclusion that can be drawn is that *tener que* is understood by speakers to communicate objective statements about the future—‘objective’ understood as a statement that rests on a fully-informed (i.e. absolute) generalization. The recruitment of *tener que* to express this elevated epistemic stance, can lead to overuse of *tener que*: when speakers do not show constraint in their use of the construction, their claims turn out not to be as well-informed as a truly ‘objective’ statement about the future would demand. The more frequently these uses surface in conversation, the ‘wider’ the understanding of ‘objective’ becomes until *tener que* is used in what may be called REASONABLY OBJECTIVE CONTEXTS. Recall that I define objectivity as a situation in which the addition of information to the set of factual premises does not change the truth of the prejacent in all best worlds. A reasonably objective statement may be defined as a modal statement that rests on a set of factual premises that can realistically be obtained by a human being. In the data, there is clear evidence that *tener que* is being used in this way: speakers accepted future-oriented epistemic *tener que* in contexts that were clearly not literally absolute, but they nevertheless insisted

that *tener que* is appropriate in contexts where an outcome was guaranteed, and the presence of *siempre* generalizations in the context had a significant impact on the ratings of informants.

Furthermore, as shown by informants' comments, speakers who use future-oriented epistemic *tener que* may be perceived as having a certain temperament that leads them to be seen as less 'modest' and 'more confident' in their claims about future eventualities. This is closely related to accounts, such as Haspelmath (2000) in which speaker "extravagance" is taken to advance semantic change. When speakers overuse *tener que*, their predictions inevitably fail. Language learners thus acquire *tener que* as a typical future marker that allows for predictive failure—as stated by Informant 41, the canonical future *ir a* "tolera que pudiera o no pasar" (*tolerates that it could happen or not*).

The second conclusion that can be drawn is more weakly represented in the data because the study was not explicitly designed to test it. However, I will propose it now as a hypothesis for future research, and suggest that it is a reasonable hypothesis given the theoretical picture. The quantitative data and comments from informants suggest that the presence of a director makes the use of *tener que* more acceptable. I will propose that this is the case because, when agents are involved, absolute generalizations are easier to come by. A prediction about the action of an agent is absolute when the agent's relevant effective preferences are non-reassessable. This guarantees that the preferences of an agent will not change between utterance time and the realization of the prejacent. Agents have the ability to respond to a changing environment in order to achieve an outcome despite unexpected interruptions, so it is easier to guarantee that a prejacent will be realized when an agent is directing its realization. The result of this is that speakers are able to use *tener que* more freely when voicing predictions about the actions of agents whose patterns of behavior they are familiar with. This is the case for example in context A, in which the employees of a shipping company work to guarantee the timely arrival of packages. As I have suggested above, the line between non-reassessable and reassessable generalizations is blurry and may be exaggerated. The result is an expansion of *tener que* into a stage where the ordering source permits REASONABLY NON-REASSESSABLE generalizations, or what I have referred to as generalizations which

describe the ‘characteristic behavior’ of an agent.

These two pressures are complementary and lead to the loss of the absoluteness constraint on future-oriented epistemic readings of *tener que*. Overuse ‘weakens’ the absoluteness constraint by expanding the set of circumstances under which speakers can claim objective knowledge about the course of events through the use of a form that is licensed only in absolute contexts. This expansion makes way for future-oriented epistemic uses of *tener que* that concern the outcomes of human action, which serves to weaken the absolute constraint further. The unavoidable truth about human behavior is that humans thinkers can reassess their own preferences, and human agents are not omnipotent. So ultimately, the behavior of human agents can be seen as absolute—if the speaker trusts in the capability of the director(s) and the stability of their action-oriented preferences—or as non-absolute—if the speaker considers that the limitations on predicting human behavior override a guarantee. Because this degree of vagueness exists between absolute and non-absolute interpretations when human behavior is concerned, frequent use of *tener que* construction to describe inferences about human behavior weakens the absoluteness constraint.

It is important to note that the pressure that resists the transition from Stage 2 to Stage 3 is the presence of canonical future expressions in the language, the source of the absoluteness constraint in the first place. Interestingly there does not appear to be resistance to future-oriented epistemic readings of weak necessity modals such as *deber* and *ought to* when these gain epistemic readings (Nordlinger & Traugott, 1997). When these reinterpretations took place, there was no weak-necessity future marker that did not also allow deontic interpretations. In fact, there may be no weak-necessity future salient category of meaning.

I have described Cuban Spanish as a Stage 2.5 variety with respect to the semantic evolution of *tener que*, and I would like to comment briefly about this choice. I have hesitated to assign a single lexical entry to *tener que* at Stage 2.5 because it is not clear that third-person preference future constitutes a natural category of meaning. Third-person preference future is the additional reading that I assign to *tener que* in Stage 2.5, and if arguing for a unified semantics of *tener que* at this stage, the resulting meaning would be something like “Non-first/second director necessity.”

I repeat the definition of third-person preference future below as well as this hypothetical unified meaning at this stage.

(194) **Third-person Preference Future**

Where $Act.Pref_{3rd.director(s)}$ is the set of action-oriented preferences of a third-person subject in s :

$$3RDPREFFUT(p, s) : \{ w \mid \exists s' \subset w : \tau(s') \subseteq \tau(s) \wedge \\ \forall w' \in Best(s', Facts, OS, Act.Pref_{3rd.director(s')}) : p(w', [\tau(s'), \infty]) \}$$

(195) **Non-^{1/2}Director Necessity**

Let $OS_{Non-1/2}$ be an ordering source that excludes generalizations that are the action-oriented preferences of the first or second person director in s :

$$NON^{1/2}DIRNEC(p, s) : \{ w \mid \exists s' \subset w : \tau(s') \subseteq \tau(s) \wedge \forall w' \in Best(s', Facts, OS_{Non-1/2}, GB) : \\ p(w', [\tau(s'), \infty]) \}$$

As shown in the definition of Non-^{1/2} Director Necessity, the relevant ordering source is determined through a rather inelegant stipulation that excludes the preferences of the speaker or the addressee. It is for this reason that I do not propose a unified for semantics of *tener que* in Stage 2.5 but rather argue that it is in a transitional stage to a more ‘stable’ category of meaning. Such characterizations reflect other evolutionary processes of linguistic phenomena such as the evolution of phonological systems, which tend to evolve ‘towards’ well-organized classes of phonemes (Bybee & Beckner, 2015) but which may never settle into a well-organized arrangement due to the constant forces that exert pressure on linguistic systems. Real languages in the process of change often have rather ‘messy’ phonological inventories. I argue that there is no reason that grammatical evolution should not proceed in the same fashion, so I will propose that *tener que* is evolving toward a more stable meaning that I will call GENERALIZATION FUTURE. I argue the third-person preference future, is moving to settle on the more general DISPOSITION meaning, which describes a modal expression which takes the effective preferences of the salient director as the generalization background. I define disposition below:

(196) **Disposition**

Where $Act.Pref_{director(s)}$ is the set of action-oriented preferences of a salient director in s :

$$DISP(p, s) : \{ w \mid \exists s' \subset w : \tau(s') \subseteq \tau(s) \wedge \forall w' \in Best(s', Facts, OS, Act.Pref_{director(s')}) : p(w', [\tau(s'), \infty]) \}$$

I want to highlight two important observations about disposition readings. First, there is no restriction that the action-oriented preferences are non-reassessable. In this sense, disposition constitutes a generalization of the kind of propositions that can be included in the ordering source (only non-reassessable effective preferences in Stage 2 \gg any effective preferences in Stage 3). Second, disposition conflicts directly with deontic readings. Obligation readings of modals highlight the consequences of generalizations that are specifically not action-oriented preferences of the director. While there is no confusion in the case of universal generalizations (i.e. teleological readings), it would be odd for a single lexical item to index a reasoning process based on the action preferences of a social group or the action preferences of the subject. In fact, this is what makes uses of *tener que* in Cuban Spanish, sound so odd to speakers of other varieties. The unified definition of *tener que* at Stage 3 is in some senses a mirror image of obligation meaning.

(197) **Generalization Future**

Let OS_{Fut} be an ordering source that excludes generalizations that are the action-oriented preferences of a social group in s (i.e. OS_{Fut} permits only universal generalization and effective preference backgrounds):

$$GENFUT(p, s) : \{ w \mid \exists s' \subset w : \tau(s') \subseteq \tau(s) \wedge \forall w' \in Best(s', Facts, OS_{Fut}, GB) : p(w', [\tau(s'), \infty]) \}$$

As in the case of the obligation ordering source in the case of obligation meaning, I argue that a future ordering source is a natural category of meaning. This ordering source allows generalization backgrounds that induce expectations. Generalization future meaning includes teleological,¹⁵ epistemic, and disposition readings, and is comparable to *will* in English or the Synthetic Future

¹⁵It is important to note that this teleological reading is different than the obligation teleological reading. This is clear in the English sentence, “In order to get a good grade, I’ll study for one hour per day.” In this sentence, studying for one hour per day is not a necessary precondition of getting a good grade but rather a sufficient precondition. This interpretation is consistent with a disposition reading in which the circumstances are revised by the *in order to* clause.

paradigm in Spanish. The details of the transition from Stage 2.5 to Stage 3 is a question that must be left to future research. In my fieldwork in Cuba, I did not find that speakers used *tener que* in the first or second person to express any meaning other than obligation, except for one instance, presented below.

(198) [Context: Yuniel goes to the grocery store every Thursday. Today is Thursday, and there is plenty of food in the refrigerator and pantry; nothing is missing. Yuniel says:]

Tengo que ir a la tienda hoy.
tener que.PRS1SG GO.INF to the store today

I **am going to** go to the store today.

In this context it was clear that Yuniel was not obligated to go to the store, and upon following up, he expressed that voicing an obligation was not his intention. He used *tener que* simply because it was what he did every Thursday. Further investigation can confirm whether or not disposition uses are becoming available with *tener que* in Cuban Spanish and, if so, what this means for the obligation interpretation of the construction. Furthermore, it remains to be seen whether the grammaticalization scale has ‘tipped,’ so to speak, such that the development of *tener que* into Stage 3 is inevitable in Cuban Spanish. It may be that the innovative uses of *tener que* that currently exist in this variety actually disappear as the variety develops a more stable lexical representation of the construction with the meaning of non-director necessity. Ultimately, only time will tell, but this is certainly a compelling case to track in future years.

4.5 Conclusion

To conclude, I want to highlight some of the main points of this chapter and to highlight how the content of this chapter advances what we understand about the evolution of obligation modals in language. I have argued that there are at least three stable stages in the grammaticalization pathway of obligation modals: obligation, non-director necessity, and generalization future. Obligation includes teleological and deontic readings, two readings which concern events that are directed by

human agents. Non-director necessity describes the use of *tener que* in the majority of varieties of Spanish today where the construction has deontic, teleological, and epistemic readings. The name for this stage of meaning represents the observation that the ordering source does not permit the effective preferences of the director. At this stage, future-oriented epistemic readings are prohibited unless the generalization underlying these sentences is absolute. This absoluteness constraint exists because of the presence of canonical future forms in the language. Finally, generalization future constructions, of which English *will* and the Spanish Synthetic Future are examples, are compatible with teleological, epistemic, and disposition readings.

I have argued that in Cuban Spanish the meaning of *tener que* is in a stage between non-director necessity and generalization future. I have shown that like in other varieties of Spanish, future-oriented epistemic *tener que* is judged as more acceptable when absolute generalizations underlie the reasoning process. However, unlike most varieties of Spanish, speakers of Cuban Spanish speakers are willing to accept *tener que* in ‘weaker’ contexts where generalizations are not clearly absolute, and in particular, where these generalizations describe the behavior of human agents. I have thus argued that in Cuban Spanish, *tener que* is being recruited as a marker of ‘reasonably objective’ future claims. The key pieces of data presented in this chapter included statistical differences between contexts that made absolute generalizations explicit and contexts which mentioned no generalization or which mentioned generalizations that were implausibly absolute.

Regarding ‘reasonably objective’ generalizations, future research can explore more systematically how features of the context and predicate influence the likelihood that future-oriented epistemic *tener que* is judged as appropriate. Another relevant avenue for future research is the exploration of how speakers of this variety exploit the meaning of *tener que* for social purposes. This research can help highlight the expressive utility of constructions at different (even-intermediate) stages of the grammaticalization process. While a number of pressures in the process of change have been discussed in this chapter, one of the most compelling reasons for an innovation to take hold in a population is the communicative advantage the new interpretations afford.

In a more general sense, this chapter has illustrated the utility of the generalization-based or-

dering source account presented in the previous chapter, which has allowed me to characterize the evolution of obligation markers in a precise way. Distinguishing modal flavors in terms of the nature of the generalization backgrounds that an ordering source permits allows us to characterize the transitions between stages in an intuitive way. I have shown, for example, that in certain contexts the distinction between action-oriented preferences of social groups and universal generalizations about individuals in social outgroups virtually disappears. It is precisely in these contexts that both deontic and epistemic interpretations of necessity modals are available. I have also illustrated that non-reassessable effective preferences are both a universal generalization and an effective preference, which allows the transition into disposition readings to occur. Furthermore, I was able to suggest that it is because agents are able to respond to changing circumstances that contexts in which there is a salient director play an important role in the evolution of these modal expressions.

Current literature on modality can account for objectivity in terms of metaphysical necessity, but it does not currently have a principled account for the ‘weakening’ that occurs between Stage 2 and Stage 3. As discussed in previous chapters, current literature makes use of normal or stereotypical orderings sources, which present the issues that I have discussed previously. The present account uses the concept of maximal generalizations to describe uses of modals whereby normality is accounted for by underspecification of generalizations—which represent speakers’ default reasoning processes when faced with incomplete information. The present account has been able to show that the bridge between objective and subjective interpretations of future claims involving agents’ actions is a matter of assumptions about the circumstances in which an agent can be taken to have ‘all the information necessary’ to guarantee that a future event will happen. Interestingly, this story aligns well with Traugott’s process of subjectification (Traugott & Dasher, 2001; Traugott, 2010), and I have been able to characterize this process in a precise way. Subjectification is a ‘weakening’ in the sense that speakers using modals that permit non-absolute generalizations are not claiming an epistemic authority with regard to the persistence of their inference in the face of additional information.

A final methodological point that I would like to make is that the key data that led to the

analysis in this chapter was obtained from speakers of a variety in which a grammatical change is in progress, and it shows how essential speaker intuitions are in understanding grammatical change. This claim in no way invalidates corpus-based work on grammaticalization, but rather illustrates how speaker intuitions—both quantitative ratings and qualitative commentary—provide a rich source of data for gaining an even deeper understanding of diachronic semantic phenomena. By interviewing speakers in varieties where change is in progress, we eliminate the guess work: we can ask speakers what certain grammatical forms mean to them. It is through such a variety of approaches that we can support an ever-deepening understanding of semantic change.

Chapter 5

Iba a: From past prospective to hypothetical

5.1 Introduction

As in the previous chapter, I will begin this chapter with naturally occurring examples of the construction under study. Here I will be analyzing how Spanish speakers in Cuba use the past prospective construction *iba a*. The past prospective construction is a composition of the periphrastic prospective *ir a* inflected with past imperfective morphology *-ba* (as well as morphology that signals person and number). In other words, the past prospective construction is an example of what a number of studies refer to as a past + future construction (e.g. Iatridou, 2000; Anand & Hacquard, 2010; von Stechow, 2011; Ippolito, 2013). There are three types of conditional sentence in which the Cuban Past Prospective is found in the apodosis (also called the conditional consequent); these are presented below. The first two types—‘embedded under past attitudes’ and ‘past hypotheticals’—are also sentences in which the English Past Prospective *was gonna* can appear in the consequent. This is not the case for the third type, present hypotheticals, in which the English Past Prospective is ungrammatical.¹

¹The claims here about English rely principally on the native intuitions of the author, a speaker of (a particular variety of) American English. It appears that the present hypothetical uses of the Past Prospective discussed in this chapter may be present in certain varieties of English as well. Consider the following data from Twitter, which suggests that the uses discussed in the present analysis may be available in South African English:

- (i) [*In reference to a photo showing a brick sitting in a round hole in the sidewalk*]
‘This must be “the stone that a builder refused”! Nami if I was the builder, I **was gonna** refuse it.’

All of the following examples have been extracted from the Corpus del español Dialects corpus (Davies, 2016):

(199) **Past prospective²**

a. *Además, nos prometió que si le presentamos una idea bonita, él **iba a conseguir** los materiales.*

‘Furthermore, he promised us that if we presented him with a pretty idea, **he was gonna get** the materials.

(CdE, Source: cubasolar.cu)

b. *Le advirtieron que si continuaba con la construcción, **iba a ser multado**.*

‘They warned him that if he continued with the construction, **he was gonna be fined**.’

(CdE, Source: observacuba.org)

(200) **Past hypothetical**

a. *El sabe que si hubiera venido paa ca no **iba a poder ver** en largo tiempo a su familia y no ir a su patria.*

‘He knows that if he had come here he **wasn’t gonna be able to see** his family or return to his homeland for a long time.’

(CdE, 2009, Source: elduke.wordpress.org)

b. *Si me hubieras preguntado si lo veía en el televisor **te iba a decir que no**, porque en mi casa [no] tuvimos televisor.*

‘If you had asked me if I saw it on television **I was gonna tell you no**, because in my house we didn’t have a television.’

(CdE, Speaker: Orlando Hernández, 2012, Source: cafefuerte.com)

(Author: @GezindabaZA; Date: April 22, 2019; Accessed: April 24, 2019)

(ii) [In response to a user asking ‘Who wanna try these’ in reference to an imaginary hygiene product]

‘If I was not on NaCl status, **I was gonna try**.’

(Author: @madisemadia; Date: April 20, 2019; Accessed: April 24, 2019)

²The most common manifestation of this reading is when the conditional is embedded under a past attitude, as shown in the examples here. These conditionals are essentially present tense conditionals that have been shifted to the past.

(201) **Present hypothetical**

- a. *Estoy segura que si este reportaje lo ponen en Cuba pues **iba a ver** hasta protestas, mitines y manifestaciones.*

‘I’m sure that if they show that report in Cuba, well **there would be** protests, meetings, and demonstrations.’

(CdE, Author: María Elena, 2008, Source: cubalagrannacion.wordpress.com)

- b. *Carlitos, si yo lo fuera, **no te lo iba a decir**, pero soy más que eso, soy cubano y Revolucionario.*

‘Carlitos, if it was me, [**I wouldn’t tell you/ #I was gonna tell you**], but I am more than that; I am Cuban and a Revolutionary.’

(CdE, 2012, Source: argosisinternacional.com)

- c. *Necesito tener los tres entornos funcionando. Si no, **iba a compilar** en windows.*

‘I need to have the three environments functioning. If not, [**it would compile/ #it was gonna compile**] in Windows.’

(CdE, Source: zonaqt.com)

By far the most common occurrence of the Spanish Past Prospective in conditional sentences is that of past prospective uses, shown in (199). These are essentially conditional sentences that report perspectives or predetermined outcomes with respect to a moment in the past. In Cuban Spanish, the most common verb form in the antecedent of these sentences is the Imperfect (past imperfective). This parallels unembedded conditionals in the present, which typically carry Simple Present (present imperfective) inflection on the verb in the protasis (also called the conditional antecedent). These kinds of sentences are not of interest in this chapter because the interpretation of the verb in the consequent in these cases is unambiguously past prospective.

The second type of sentence, the past hypothetical, is of interest to the present discussion because there is potential for reanalysis of the meaning of the tense marking in the conditional consequent. This is something that I will explore in §5.2.2, arguing that a past temporal interpretation of the consequent is equivalent to a present interpretation of the consequent in terms of the

information that it asserts.

The most interesting type of sentence here is the final kind: the present hypothetical interpretation of *iba a*, which I have translated *would* in the examples above, marking *was gonna* as infelicitous. While the relationship between past + future and hypothetical or counterfactual meaning is relatively well-known among linguists, speakers of most varieties of Spanish find utterances like those presented in (201a) through (201c) to be strikingly odd, if not uninterpretable. One of my aims in this chapter, is to demonstrate that from a diachronic semantic perspective, such uses of *iba a* are in reality, a predictable development of this construction. Through a study of this phenomenon in Cuban Spanish, my goal is to better understand this process of change.

The three central questions that will drive my discussion are quite simple:

- (202) a. What is the change that takes place?
b. How does this change take place?
c. Why does this change take place?

The most salient difference between past prospective and hypothetical readings of *iba a* is that in the case of the former, the past tense marking on the construction is interpreted temporally; whereas, in the case of the hypothetical reading, there is some sense in which the past tense marking is interpreted as counterfactual.³ The relationship between past tense morphological inflection and counterfactual interpretation has been thoroughly discussed in the literature (Iatridou, 2000; Schulz, 2011; Ippolito, 2013). I will argue in this chapter that past temporal meaning and counterfactual meaning are both specific instances of a more general category of meaning which I will call exclusion meaning after Iatridou (2000). The intuition behind Iatridou's account of exclusion meaning is quite simple: present tense assertions concern the circumstances that hold in the actual moment at the time of speech (i.e. in the here-and-now of the speaker), while both past temporal and counterfactual interpretations are removed (or excluded) from the set of circumstances that hold at the time of utterance. I will characterize tense marking in terms of the metaphysical alter-

³Below, I will revisit the term counterfactual and discuss whether it is an appropriate description of the meaning we are after.

natives of the worlds in the Context Set at speech time (that is, the intersection of all propositions in the Common Ground, which I take to be the set of worlds that ‘as far as conversation participants know’ could be the actual world). As I will describe below, the change that takes place when *iba a* becomes compatible with present hypothetical readings is a generalization of past tense marking from a marker of temporal past to a more general marker of exclusion that is compatible with both temporal past and counterfactual readings.

I will show below that the contexts of reanalysis are hypothetical statements about alternative states of affairs that would have resulted from alternative past circumstances (i.e. what would have been the case). And it is with these contexts, that I will show how the change took place.

I argue that the reanalysis has propagated throughout the population of speakers of Spanish in Cuba because of its communicative utility. The *iba a* construction is used to express a particular subset of meanings in the hypothetical domain. In particular, I argue that the *ir a* periphrastic construction is a modal expression whose generalization background is an environmental state (i.e. a subset of a salient generalization background), defined in Chapter 3. The past prospective construction is being recruited by speakers to express hypothetical statements that use environmental state generalizations. Generally speaking, I will characterize the stages of grammaticalization as shown in (203) below. I will discuss the definition of each stage in more detail throughout this chapter.

- (203) a. **Stage 1:** ENVIRONMENTAL STATE PAST PROSPECTIVE
- b. **Stage 2:** ENVIRONMENTAL STATE EXCLUSION: environmental state past prospective, environmental state hypothetical

In this chapter, I will use experimental data that I collected in Matanzas, Cuba to demonstrate that the speakers of Spanish in Cuba are more likely to accept (or even prefer) *iba a* as a hypothetical marker in contexts where environmental states are salient. This experiment included an appropriateness judgment task with the same design as the task presented in Chapter 4. In addition to this task, I presented informants with a short sequence of sentences, which were designed to test for the sensitivity that speakers had to the syntactic constraints of the form.

Following my discussion of the experimental results, I will consider how *iba a* may be expected to change in the future, and I will reflect on the utility that the theoretical framework presented in Chapter 3 has for characterizing this change.

5.2 The evolution of hypothetical markers

5.2.1 Past and counterfactuality

As I have said, a great deal of literature has observed the connection between past tense and counterfactuality and has worked to explain this connection (Anderson, 1951; Iatridou, 2000). Generally speaking, there are two competing perspectives about the interpretation of past tense marking in counterfactual markers: *past-as-past* and what I will call the *past-as-artifact* point of view.

As the name suggests, proponents of the past-as-past perspective maintain that past tense marking found in counterfactual markers is interpreted temporally. The strongest supporters of this view hold that any counterfactual or conditional marker, such as English *would*, always carries temporal past meaning. Anand & Hacquard (2010), for example, evoke a past “forking event” at which point the course of history is divided into alternative branches; consider their example below. We might suppose that the sentence was uttered in March 2009 when the federal government took over GM.

(204) ‘If McCain were President, GM would be bankrupt.’ (p. 46)

In this sentence, the “forking event” is taken to be the U.S. Presidential election of 2008. There are two classes of historical alternatives on the morning election day: one set in which Barack Obama would be elected and the other set in which John McCain would be elected. The election thus constitutes a forking event which divides the historical alternatives into two branches. According to the authors what (204) asserts is that in all historical alternatives that begin with the election of John McCain as the President of the United States and continue into the future, John McCain would be President and GM would be bankrupt at a time index that is identical to the time of utterance. The past-marking in the counterfactual conditional in (204) is thus taken to refer

temporally to the past forking event.

A similar approach is taken in Schulz (2011) who argues that counterfactual conditionals assert that the antecedent is causally related to the consequent. Because the consequent is taken to hold in the present, speakers must ‘go back’ to a reference time in which the antecedent would causally yield the consequent. While Schulz’s account offers an insightful perspective on causality, she insists that all counterfactual expressions entail that speakers make their claims with respect to alternative past circumstances.

In natural language, however, we find that this purely temporal interpretation of the past tense marking in hypothetical expressions is not always what speakers mean. Schulz argues that we must consider alternative histories in counterfactual conditional expressions because there are no miracles; that is, she argues that an alternative reality in the present is only possible if the past would have gone differently. However, miracles need not be real for human beings to speak as if they are. In other words, I am in the fortunate position of needing to make no remarks on the ontological status of miracles in order to develop a linguistic account of hypothetical expressions. As human beings, we can imagine alternative states of affairs in the present without considering how the history of the world must have been different in order to yield an alternative present. On the other hand, we *can* talk about alternative present states of affairs in terms of alternative histories. We find both perspectives in the following conversation.

(205) *Juan*: If I had a larger house, I would be so much happier (today).

Paul: Not necessarily. In order to have a larger house, you would have to have worked much longer hours for the past number of years to be able to afford it. That would certainly make you less happy today.

Juan: That’s not what I meant. I meant, if by some miracle, I magically had a larger house today, I would be happier today.

What (205) illustrates is that Juan and Paul are approaching the interpretation of Juan’s counterfactual utterance differently. Paul interprets Juan’s sentence temporally, considering how the history of Juan’s life would have needed to be different in order for Juan to have a larger house in

the present. Juan, on the other hand, is making a ‘miraculous’ statement; in his response to Paul, Juan makes clear that his counterfactual claim rests only on facts that hold at the moment of utterance. Such an account is seriously considered by Kratzer’s account of counterfactual conditionals, which argues for a premise-based account of these kinds of expressions (Kratzer, 1989).

In this chapter, I will argue for a view in which past tense marking is an artifact of an earlier stage of grammaticalization. In other words, just as grammatical forms undergo reanalysis in other domains, past tense constructions can be reinterpreted as hypothetical or counterfactual constructions. I will call this the *PAST-AS-ARTIFACT* point of view. Here I will aim to provide an account of past tense meaning and counterfactual meaning that demonstrates the relationship between the forms and shows why the cross-linguistic connection between past and counterfactual exists.

To begin, I will be defining tense marking in terms of metaphysical alternatives. A great deal of literature has invoked metaphysical alternatives in the definition of modals (among these are Condoravdi, 2001; Kaufmann et al., 2006). As explained in Chapter 1, possible worlds can be understood as entire histories that span from the beginning of the universe to the end of time. At any given moment in time, there many possible ways that the course of events might develop, but the past is already set in stone. The metaphysical alternatives of a world w at time t are those possible worlds that are indistinguishable from w at time t (and because they are indistinguishable, they share identical histories). As time advances and the actual course of events is realized, the set of metaphysical alternatives shrinks. That is, the set of ways that the world *could be* is reduced.

I illustrate this in Figure 5.1 below. In this figure, I have chosen to refer to the metaphysical alternatives of the worlds in the Context Set. I make this decision because in conversation, our concern is with refining the Common Ground—we do not have access to the metaphysical alternatives of the *actual* world because we are not omniscient and can not possibly know enough to identify this set of possible worlds.

To use a concrete example to illustrate, I will consider a set of metaphysical alternatives that are identical in all ways at all times except for the weather.⁴ Suppose that yesterday at t_{-1} it was rainy in

⁴I say this to emphasize that metaphysical alternatives of a world at a time are indistinguishable from one another. I will be describing changes in the weather, and I highlight that this is the only distinction between the possible worlds

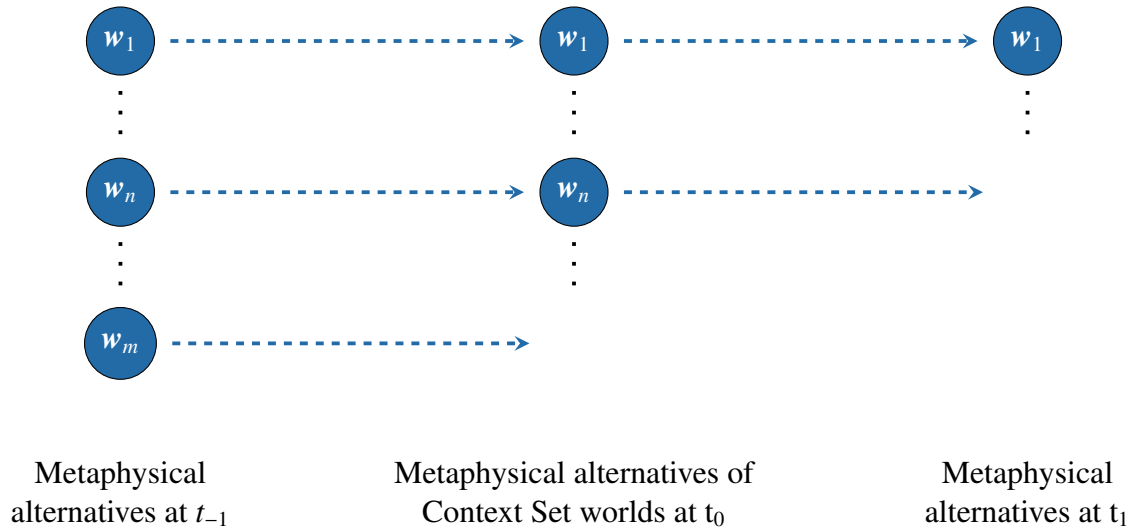


Figure 5.1: The set of metaphysical alternatives shrinks over time

Columbus, Ohio, and suppose that at t_{-1} the set of metaphysical alternatives is $\{w_1 \dots w_n \dots w_m\}$. This means that at t_{-1} it was raining in w_1 , w_n , and w_m (as well as in all other metaphysical alternatives of w_1). Suppose also that in both w_1 and w_n it is sunny in Columbus at t_0 ; whereas in w_m it is cloudy in Columbus at t_0 . Today (i.e. at t_0) it has turned out to be sunny, so the Context Set of any group of speakers in Columbus today will exclude w_m . Finally, we might imagine that at t_1 it is sunny in w_1 and cloudy in w_n . According to Figure 5.1 it is sunny tomorrow in w_1 , but only time will tell if the actual world might be w_1 . In other words, although w_1 and w_n are indistinguishable today, their futures are distinct. From the perspective of t_0 , the actual world may be w_1 or w_n . The actual weather in t_1 will rule out one of these worlds as a possible candidate for the actual world.⁵

We are thus shedding possibilities over time, and it is this crucial fact that I use to define tense operators. As illustrated in Figure 5.1, the metaphysical alternatives of the worlds in the Context Set at t_{-1} are a superset of the worlds in the Context Set at t_0 . I will use this observation to define temporal meanings, defining tense in terms of the relationship that holds between the metaphysical alternatives at two different points in time. I will use CS_{i_u} to represent the set of worlds in the

in this example.

⁵I set aside here any debate about whether the future is literally indeterminate or epistemically indeterminate. Ultimately, this question is orthogonal to the present discussion, and the account presented here is compatible with both points of view.

Context Set at utterance time, and I use the notation $Meta_{\langle w,t \rangle}$ to stand for the set of metaphysical alternatives of world w at time t .

(206) **Present Temporal**

$$PRES_{TEMP}(p) : \{ w \mid \forall w' \in CS_{i_u} : \exists t : Meta_{\langle w',t \rangle} = Meta_{\langle w',\tau(i_u) \rangle} \wedge \exists s \subset w : \tau(s) \subseteq t \wedge p(s) \}$$

What this says in prose is that for all worlds w' in the Context Set at i_u there is a time in which the metaphysical worlds of w' are equal to the metaphysical alternatives of the Context Set worlds at utterance time. In this case, t must be the time of utterance. A present tense utterance denotes a set of worlds w in which p is true at some subinterval of w such that the run time of this subinterval is contained within t . In other words, p must be true at the time of speech. I define past and future similarly; what changes in each is the relationship that holds between the sets of metaphysical alternatives $Meta_{\langle w',t \rangle}$ and the sets of metaphysical alternatives of Context Set worlds.

(207) **Past Temporal**

$$PAST_{TEMP}(p) : \{ w \mid \forall w' \in CS_{i_u} : \exists t : Meta_{\langle w',t \rangle} \supset Meta_{\langle w',\tau(i_u) \rangle} \wedge \exists s \subset w : \tau(s) \subseteq t \wedge p(s) \}$$

(208) **Future Temporal**

$$FUT_{TEMP}(p) : \{ w \mid \forall w' \in CS_{i_u} : \exists t : Meta_{\langle w',t \rangle} \subset Meta_{\langle w',\tau(i_u) \rangle} \wedge \exists s \subset w : \tau(s) \subseteq t \wedge p(s) \}$$

In the past temporal interpretation, t is necessarily a moment in time in the past because for any set of metaphysical alternatives to be a superset of another, it must be a set that is accessed from a prior moment.⁶ In other words, “past” can be defined as a point in time where there were more open possibilities for the course of events than there are at the moment of utterance. To restate from the concrete example given above: yesterday, it could have been sunny or cloudy today in Columbus. Today, however, it has turned out to be sunny, so it is no longer possible for it to be a cloudy day today. The relevant relationship in the case of future temporal meaning is that there is a time at which there is a set of metaphysical alternatives that is a subset of each of sets of metaphysical alternatives of Context Set worlds; in other words, p is true at a future moment.

⁶I want to emphasize here why this is the case. The set $Meta_{\langle w',t \rangle}$ does not contain arbitrary possible worlds because I assume that metaphysical alternatives have identical histories at a certain point in time and branch out into all possible alternative futures (given the Natural Laws, circumstances, etc.). The only way to add worlds to a set of metaphysical alternatives is by shifting backwards in time.

I now turn to a definition of hypothetical meaning. To accomplish this I will introduce a new operator ω whose input is an index of evaluation s and whose output is the world coordinate of the index. Recall that I have only defined indices of evaluation in terms of a constant world coordinate. This is parallel to the operator τ which returns the run-time of an index of evaluation.

(209) **Hypothetical**

$$\text{HYP}(p) : \{ w \mid \forall w' \in CS_{i_u} : \exists t, w'' : \text{Meta}_{\langle w', t \rangle} \cap \text{Meta}_{\langle w', \tau(i_u) \rangle} = \emptyset \wedge \exists s \subset w : \tau(s) \subseteq t \wedge \omega(s) = w'' \wedge p(s) \}$$

The intuition behind this definition is that there is a set of worlds that is incompatible with the Context Set, and in this set of worlds the prejacent is true. In prose the definition above says that for all Context Set worlds there is some incompatible set of metaphysical alternatives, and p is true in this set. Notice that t is not restricted to present tense interpretation; in other words, there may be past, present, and future hypothetical expressions. As I will discuss further below, p is not held to be true in an arbitrary set of worlds w'' . I will ultimately describe these worlds w'' as belonging to the intersection of a premise set that is a minimal revision of the Common Ground (or modal base).

This definition should make clear why I have opted for the term ‘hypothetical’ instead of ‘counterfactual.’ Hypothetical claims merely implicate counterfactuality just as past temporal claims do. For example, if a speaker says, “Mrs. Kieler was a great teacher,” she implicates that Mrs. Kieler is no longer a (great) teacher—she may have retired, for instance, and is no longer a teacher. But this implicature can be cancelled: “Mrs. Kieler was a great teacher when I took her calculus class in high school. I’m sure she still is a great teacher.” In the hypothetical case, to go through the (grammatical) trouble of making a claim about a set of metaphysical alternatives that is incompatible with the Context Set implicates that the claim is false in the actual world, but it does not require it. This account is compatible with von Stechow’s (2011) argument that past-marked conditionals do not entail that the speaker believes antecedent to be false. He illustrates this, citing the following example (from Anderson, 1951) in which two doctors are engaging in a disagreement:

(210) If Jones had taken arsenic, he would have shown just exactly those symptoms which he does in fact show.

That is, the doctor in this utterance believes that Jones has taken the arsenic. The use of the counterfactual conditional indexes the disagreement between the two doctors.

The definitions of the tense and hypothetical operators provided above are familiar categories of meaning that can be grouped into more general meanings. The connection between past and counterfactual can be captured by defining the meaning of past tense morphemes in terms of a more general meaning: exclusion. This semantic representation captures the intuition behind the proposal presented in Iatridou (2000) that PAST marking actually means exclusion in many languages, accounting for the cross-linguistically stable observation that counterfactual expressions recruit past tense marking (e.g. ‘I wish I had a million dollars.’). I will also propose a definition of present tense morphemes as non-past to represent the fact that present tense statements can be used to describe the present and the future. I exemplify this below in terms of English *-ed* and *-s* :

(211) $[[\text{-ed}]] = \text{EXCL}(p) : \{ w \mid \forall w' \in CS_{i_u} : \exists t, w'' : \text{Meta}_{\langle w'', t \rangle} \not\subseteq \text{Meta}_{\langle w', \tau(i_u) \rangle} \wedge \exists s \subset w : \tau(s) \subseteq t \wedge \omega(s) = w'' \wedge p(s) \}$

(212) $[[\text{-s}]] = \text{NONPAST}(p) : \{ w \mid \forall w' \in CS_{i_u} : \exists t, w'' : \text{Meta}_{\langle w'', t \rangle} \subseteq \text{Meta}_{\langle w', \tau(i_u) \rangle} \wedge \exists s \subset w : \tau(s) \subseteq t \wedge \omega(s) = w'' \wedge p(s) \}$

In prose, the definition of the EXCLUSION operator says that a sentence with exclusion marking is true if for all metaphysical alternatives of Context Set there is a world w'' —which may be w' —whose set of metaphysical alternatives at time t are not a subset of the metaphysical alternatives of the Context Set world. The proposition p is true at time t in world w'' . This definition is satisfied if the interpretation of the sentence is temporal past or hypothetical. Note that because metaphysical alternatives are worlds with identical histories, there are no non-empty intersections among the sets of metaphysical alternatives of the Context Set worlds, so the EXCL operator only yields past and hypothetical readings.

In the case of NONPAST, I have included the variable w'' for consistency, but note that in order

for $Meta_{\langle w'',t \rangle}$ to be equal to or a subset of $Meta_{\langle w',\tau(i_u) \rangle}$, w'' must be equal to w' . The non-past meaning expresses the intuition that Present Tense marking is compatible with both present and future interpretations. This definition is consistent with many other semantic accounts, which define English Present Tense as ‘non-past’ (Quirk et al., 1985; Hamm & Bott, 2018). However, as explained by Kaufmann (2005), future temporal interpretations of the English Present carry the constraint that p is settled at the moment of utterance. I not will address this here further as it departs from the focus of the present discussion, which is the interpretation of past tense constructions.⁷

What is most important to note here is that the exclusion meaning that is contributed by the English Past Tense is a generalization of past temporal meaning. This observation responds to the first essential question of the present chapter in (202a): What is the change that takes place? Here it is clear that when past tense constructions evolve to have hypothetical readings, the semantics of the construction generalizes from a past temporal construction to an exclusion construction. In the next section, I will address how this change takes place. To do so, I will present a bridging context in which the truth conditions of past temporal readings and the truth conditions of hypothetical readings are both satisfied.

5.2.2 The bridge from past to hypothetical

In order to understand how past prospective constructions evolve into hypothetical constructions, it is helpful to compare the expressive possibilities of *iba a* in Cuban Spanish to *was gonna* in English. Generally speaking, *if-clauses* are used by speakers to invoke a state of affairs that is not taken for granted by the participants in a conversation; that is, *if-clauses* indicate that an assertion is made with respect to a revised set of factual premises, just as in the case of *in order to* clauses. I attempt a formal implementation of this in Appendix C. The intuition behind this implementation

⁷Another intriguing area for future research is the relationship between future constructions and subjunctive constructions. As defined here, future temporal meaning is evaluated as a subset of the metaphysical alternatives of the Context Set. Recent research on the meaning of the subjunctive has suggested that subjunctive may be best defined in terms of a shift or restriction of the topic worlds (see Portner (2018) for review and discussion).

is that *if-clauses* serve to ‘add’ facts to the modal base in non-hypothetical conditionals, and they ‘replace’ facts in the modal base in hypothetical conditional sentences. I will argue that whether or not facts are ‘added’ or ‘replaced’ is signaled by tense marking in the conditional sentence. It is important to highlight that many accounts of counterfactual reasoning depend not on the revision of a premise set but on a similarity relation (Lewis, 1973; Ippolito, 2013, and many others). I opt for an analysis that depends on the revision of a set of factual premise due to some of the issues that Kratzer raises with the process of defining ‘most similar worlds’ (Kratzer, 1981b, 1989, 2012).

Present tense conditionals—also called “Indicative Conditionals”—are generally held to refer to claims that are possible from the perspective of the speaker, and past tense conditionals—also called “Subjunctive Conditionals”—are generally taken to make claims about worlds in which the antecedent describes an impossibility (Adams, 1970; von Stechow, 2012). However, other researchers suggest that there may be additional distinctions, which are distinguished grammatically (see, for example Harris, 1971, 1986). I follow this research and propose a tripartite distinction, which describes how speakers orient to the content of an *if-clause*:⁸

- (213) a. It is possible and consistent with what is generally expected.
- i. If my mom comes home early, I’ll be able to go to the movies.
- b. It is possible but inconsistent with what is generally expected.
- i. If the governor came to my house, I would have some choice words for him.
- c. It is impossible (and therefore inconsistent with what is generally expected).
- i. If had the opportunity to talk to Martin Luther King Jr., I would ask him for advice.

Both English and Spanish use past tense constructions in the antecedent to express the orientations described in (213b) and (213c). But antecedents can describe states of affairs in the past,

⁸Quechua conditional sentences appear to distinguish grammatically between facts and default generalizations, making a likely, possible, and impossible distinction grammatically. In conditional sentences where the antecedent is taken to be consistent with facts and generalizations, the consequent carries future marking. For antecedents that are inconsistent with default generalizations, both clauses are marked with the verb ending *man* (this may, of course, mark inconsistency in general). For antecedents that are inconsistent with facts, the subordinate adverb (i.e. “if”) changes from *chayqa* to *chayri*.

present, or future, and this does not map onto the tense marking in the antecedent because speakers use past tense to mark any antecedent which is inconsistent with expectations, regardless of its temporal perspective. Consider the constructed examples below, which illustrate this fact in English.

(214) Past

- a. If I (had) had the money (yesterday), I would have bought it.
- b. If he (had) found out (yesterday), he would have been really mad.

(215) Present

- a. If I had the money (right now), I would buy it.

(216) Future

- a. If he (ever) found out, he would be so mad.

What these examples illustrate is that past tense marking in the antecedent can have the purpose of indicating that the proposition described in the antecedent is impossible or unexpected. I have formalized this above in terms of the *Excl* operator, claiming that in such cases past tense marking means that the proposition described by the antecedent is true in a set of metaphysical alternatives that are incompatible with the Context Set.⁹

An important ambiguity arises when conditional sentences refer to states of affairs that are both instantiated in the past and incompatible with the Common Ground. It is precisely these cases in which the past meaning of the Past Prospective construction can be reinterpreted as hypothetical. For this discussion, it is helpful to consider a linguistic system whose Past Prospective construction does not permit present hypothetical interpretations as in (215a). That is, it is useful to see what is possible in a linguistic system that only allows the temporal interpretation of past marking for a Past Prospective marker.

For this, I will use an example in English. While in (at least most varieties of) English it is

⁹Recall that generalizations are included in the Common Ground, so in a given set of circumstances, an unexpected outcome is incompatible with the Common Ground.

impossible to say (217a) (compare to (217b)), there are cases in which the English Past Prospective can be used in hypothetical conditional sentences.

- (217) a. # ‘If I had a better job right now, I was gonna have a bigger house.’
b. ‘If I had a better job right now, I would have a bigger house.’

The relevant grammatical formulation consists of the English Past Perfect in the antecedent and the English Past Prospective in the consequent. The presence of the Past Perfect in the antecedent guarantees that the state of affairs described by the antecedent is in the past. The following examples are taken from the *Corpus of Contemporary American English (COCA)* (Davies, 2017).¹⁰

- (218) Andrews’ uncle, Shelton Morris, said at a vigil that Andrews wasn’t perfect, but **if he had had time, he was going to make things right.**

(COCA, Title: ‘We are heartbroken.’ (2017), Source: *Charlotte Observer*)

- (219) The shock faded after a few weeks, and so did the audience. Then FOX yanked the series. **“If it had stayed on, I was going to ask the FCC to take some action,”** says Sen. Joseph Lieberman (D-Conn.), a leading advocate of tougher TV restrictions.

(COCA, Title: ‘Turned off’ (2000), Author: Michael A. Lipton, Source: *People*)

- (220) “All I wanted was to be with Bethany. **Even if this hadn’t happened, I was going to quit after Messalina anyway.”**

(COCA, Title: ‘The last don’ (Vol. 221, Issue 5), Author: Mario Puzo, Source: *Cosmopolitan*)

In all of these examples, the state of affairs described by the antecedent is a past situation that was not realized (i.e. is both temporal past and counterfactual). What I argue is that in sentences like these, it makes no difference whether the revised set of circumstances (i.e. the modal base) is accessed from the present or the past. That is, there is no meaning difference if the past tense

¹⁰As exemplified in Cuban Spanish above, there is another use of the Past Prospective construction in conditional consequents in English. This occurs when the conditional sentence is embedded under an attitude verb in the past, as in the constructed example, ‘She told me that if I showed up on time, she was going to give me a present.’ I will assume that this use is not relevant in the grammaticalization of Past Prospective constructions, so I will not be discussing them here.

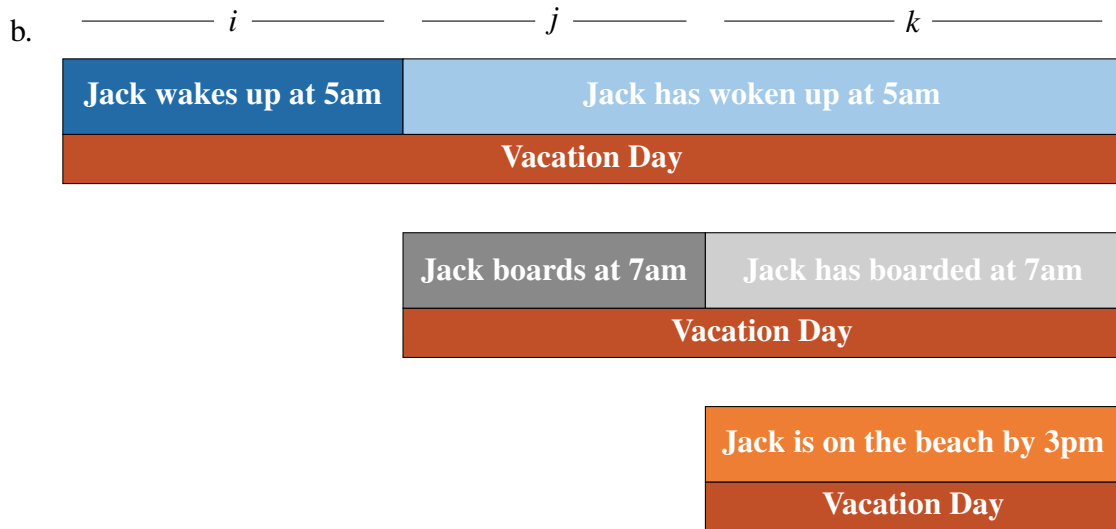
marking on the auxiliary ‘have’ is interpreted as temporal marking or hypothetical marking. To illustrate this, I will use a constructed example, in order to make the context as explicit as possible. Note in this example that I make reference to Jack’s vacation routine. This is not necessary for the semantics to work out, but I have constructed it in this way to illustrate an intuitively accessible example of an environmental state. Furthermore, an different environmental state, such as a one-time plan, could also yield the same result.

(221) [Context: Jack is a hard-working fellow who loves routines almost as much as he loves going to the beach. When Jack takes vacation time from work, he follows a consistent Vacation Plan: he wakes up at 5am in the morning in order to be in time for his 7am flight to the coast. Jack loves his sleep, so he wakes up with just enough time to make his flight. By 3pm, he is at the beach ready to relax. One morning, Jack has taken vacation, but the power went out the night before, so he missed his alarm and woke up at 7am (two hours late). As a result, Jack missed his flight. Determined to get to the beach, Jack drove to the airport and purchased an outbound flight for 3:30pm. While standing in line to board, he describes his woeful day to another passenger and says:]

- a. If I had woken up on time, I wouldn’t have missed my flight this morning.
- b. If I had woken up on time, I was gonna be on the beach right now with my feet in the ocean.

The utterance in (221a) represents an instance of the most common formulation of hypothetical statements with respect to alternative past circumstances, where English *would have* appears in the consequent. The second utterance in (221b) is modeled off of the naturally occurring examples presented above in (218) through (220). While the English Past Prospective construction does not permit a present hypothetical interpretation—except, perhaps in specific varieties—it can be used in hypothetical sentences that refer to alternative past circumstances, as in (221b). The Past Tense marking on the English Past Prospective obligatorily contributes past temporal meaning to the interpretation of the sentence, so the reference time for the main clause in (221b) is in the past. I illustrate the generalization representing Jack’s routine on the morning of his vacation days below in (222).

(222) a. *g*: ‘When Jack is on vacation, he wakes up at 5am to board a 7am flight and arrives at the beach at 3pm.’¹¹



In this example, the time of Jack’s utterances in (221) occurs at some time inside of interval *k*.¹² The utterance of main interest is (221b). As I said above, the Past Tense marking in the English Past Prospective, which appears here in the conditional consequent, is obligatorily interpreted as temporal past. This means that the tenseless predicate ‘I be gonna be on the beach at 3:30pm’ is true at (and interpreted with respect to) a moment in the past—given the definition of past temporal in (207)—under some set of revised circumstances. We might take the past reference time to be time interval *j*. In the situation of Jack’s lament to his fellow passenger, at time *j* the proposition ‘I have woken up at 5am’ was not true—that is, it was not in the set of salient circumstances.

In Jack’s statement, he uses an *if-clause* to hypothetically revise his unfortunate set of circumstances. In uttering the *if-clause*, ‘If I had woken up on time,’ he is revising the relevant set of circumstances at (past) time *j* with the proposition, ‘I have woken up on time.’ That is, Jack imagines a world where at time *j* instead of having woken up at 7:00am, he had woken up at

¹¹The truth-conditional definition of the generalization: $\lambda w.\forall i, j, k \subseteq w : i < j < k : \text{Jack-wake-5am}(i) \wedge \text{It-be-Jack's-Vacation-Day}(i) \Leftrightarrow \text{Jack-board-flight-7am}(j) \wedge \text{It-be-Jack's-Vacation-Day}(j) \Leftrightarrow \text{Jack-on-beach-3pm}(k) \wedge \text{It-be-Jack's-Vacation-Day}(k)$

¹²For concreteness, we might assume that interval *i* begins at 5:00am and ends at 6:59am, *j* begins at 7:00am and ends at 2:59pm, and *k* begins at 3:00pm and ends at 6:00pm. For the sake of the example, these precise details are not necessary, but I add them here to be precise.

5:00am.

Looking at this revised time interval j , if it is vacation day and it is also the case that Jack has woken up on time, it is the case that Jack boards at 7:00am in interval j . If it is the case that Jack boards the flight at 7:00am, it is also the case that he is on the beach by 3:00pm. In other words, at time j in this revised set of circumstances, Jack was going to be on the beach at 3:30pm. What I aim to show in this example is that a standard analysis of counterfactuals is already well-equipped to address the meaning of Jack's utterances, and in particular, that the temporal interpretation of the modal in the consequent determines the time at which the set of relevant circumstances (i.e. the modal base) are taken to be true.

I go through all of this in detail to show why it possible for utterances like (221b) to occur. Past prospective constructions can appear in the consequents of hypothetical conditionals because the salient reference time is a time interval that precedes the utterance time. Furthermore, because Jack's vacation day routine (i.e. an environmental state) is part of the reasoning process, the English *be going to* future is licensed in this context.

What I would like to highlight here is that the proposition that Jack asserts in (221b) is a set of worlds in which there is some generalization in the ordering source (i.e. in Jack's set of effective preferences) such that his waking up on time puts him on the beach at 3:30pm. Now consider what happens if the Past Tense marking on the utterance in (221b) is interpreted as a hypothetical construction, as defined in (209). This means that the consequent is true in some set of Topic Worlds that is incompatible with the modal base accessed from the present. The natural candidate for this set is one which is created by revising the modal base such that the proposition in the antecedent replaces a single fact in the salient set of circumstances at speech time. In other words, the reference time of a hypothetical sentence is most naturally taken to be the time of speech.

Returning to Jack's utterance in (221b), the time of utterance is some moment inside of k , which I will call i_u . At i_u , Jack has woken up at 7:00am. On a present hypothetical interpretation of this utterance, Jack revises the present set of circumstances with the proposition 'I have woken up on time.' That is, under the present interpretation, the set of relevant circumstances are the

present circumstances. This stands in contrast to the past temporal interpretation in which the set of relevant circumstances are the circumstances at (the past) time interval j . Both modal bases are revised with the same proposition, 'I have woken up at time,' but one set of circumstances is accessed from the present (i.e. from i_u), and the other is accessed from a moment in the past (i.e. some time within j).

Because the proposition in the antecedent carries (hypothetically-interpreted) Past Tense marking, the listener understands that the modal base in which the consequent is true is incompatible with the actual state of affairs. This implicates that 'I have woken up on time' is counterfactual at the moment of utterance. Taken together Jack's utterance says that there is some generalization in his effective preferences (in the actual world) which entails that Jack is on the beach at 3:30pm in the hypothetical topic worlds.¹³ I will assume that at k , if it is vacation day and Jack has woken up at 5am, the generalization is maximal (i.e. Vacation Days in which Jack wakes up at 5am and does not board a flight at 7am are not typical), so the generalization depicted in (222b) above entails both that Jack has boarded at 7am and that Jack is on the beach at 3:30pm.

The main point here is that the proposition that Jack asserts under the hypothetical interpretation is a set of worlds in which there is some generalization such that his waking up on time puts him on the beach at 3:30pm. In other words, whether the Past Tense marking on *was gonna* is interpreted as past temporal or hypothetical, the informational content is the same. However the Past Tense marking may be interpreted in contexts like this, the utterance asserts that the actual world is in a set of world where Jack has a certain preference when an environmental state is active.

The proposition asserted under past temporal or hypothetical interpretations is the same for conditionals which contain past perfect marking in the antecedent and past prospective marking in the consequent. This means that these kinds of sentences are a bridge for reanalysis. When such sentences are uttered, interlocutors have the potential to reinterpret the Past Tense marking on *was gonna* as marking hypothetical meaning. The next step in studying the evolution of past

¹³A stipulation that I make in both temporal and hypothetical interpretations of the past is that the set of topic worlds, whether this be a super-set of the Context Set or a revised version of the Context Set at the moment of utterance, is the same with respect to the tense marking in the antecedent and the consequent. Conceivably, because each clause carries tense marking, the set of topic worlds could be different, but I take this to be communicatively counter-productive.

prospectives into hypothetical markers is to understand why reanalysis occurs. A bridging context on its own does not mean the grammaticalization happens. I will argue that in Cuban Spanish *iba a* is being recruited by speakers to express a specific kind of hypothetical meaning.

5.2.3 The motivation for the change

As a preliminary entry into the discussion of why this change is occurring, I consider the two examples of past hypothetical sentences presented in the introduction, which I repeat here:

(223) a. *El sabe que si hubiera venido paa ca no **iba a poder ver** en largo tiempo a su familia y no ir a su patria.*

‘He knows that if he had come here he **wasn’t gonna be able to see** his family or return to his homeland for a long time.’

(CdE, 2009, Source: elduke.wordpress.org)

b. *Si me hubieras preguntado si lo veía en el televisor **te iba a decir que no**, porque en mi casa [no] tuvimos televisor.*

‘If you had asked me if I saw it on television **I was gonna tell you no**, because in my house we didn’t have a television.’

(CdE, Speaker: Orlando Hernández, 2012, Source: cafeuerte.com)

Note that the antecedents of these sentences contain a the Pluperfect Subjunctive verb form, which is composed of the perfect auxiliary *haber* inflected with past (imperfective) subjunctive verb morphology. This is the same kind of conditional sentence that was discussed in the previous section. While the Spanish Past Prospective appears in the consequent of these sentences, the Conditional Perfect construction is also permitted. The Conditional Perfect is a composition of the *haber* + past participle perfect construction where the auxiliary is inflected with Conditional morphology. I present these constructed alternatives below:

(224) a. *Él sabe que si hubiera venido paa ca no **habría podido ver** en largo tiempo a su familia y no ir a su patria.*

‘He knows that if he had come here he **wouldn’t have been able to see** his family or return to his homeland for a long time.’

- b. Si me hubieras preguntado si lo veía en el televisor **te habría dicho que no**, porque en mi casa [no] tuvimos televisor.

‘If you had asked me if I saw it on television **I would have told you no**, because in my house we didn’t have a television.’

The question central question is why speakers should choose to express past hypothetical conditionals with the Past Prospective construction, as in (223), instead of the more typical Conditional Perfect construction, as in (224). What I propose is that the Past Prospective construction, a motion-derived prospective construction, allows speakers to signal that the ordering source is drawn from an environmental state. More concretely, I propose that there are at least two pragmatic readings that emerge in the examples.

In the English past hypothetical examples presented in (218), all of the sentences presuppose that the subject of the verb in the consequent made a PREMEDITATED CHOICE and had the capability to put this choice into practice.¹⁴ Recall from Chapter 3 that this is description of a plan, which is a kind of environmental state: when plans are in effect, specific generalizations about the behavior of agents who are committed to those plans can be made.

In the Spanish past hypothetical examples presented in (223), the common theme is that the subjects face a CONSTRAINED CHOICE. In this reading temporary facts about the world—a political policy in the case of (223a) and the lack of a television set during childhood in the case of (223b)—determine the outcome described in the consequent. For example, in (223b), we might imagine that the speaker’s action-oriented preference would be to say a popular show on television, but since he did not own a television as a child, he was constrained to say that he hadn’t seen popular shows.

The premeditated choice and constrained choice readings oppose disposition readings in which

¹⁴To be clear, this was not the only interpretation of past hypothetical sentences with *gonna* in English. However, it was a clear pattern that emerged in the data. The constrained choice readings found in the Spanish data, for example, are available for English as well.

agents' actions described in the consequent are in line with agents' general effective preferences. Under the premeditated choice reading, agents have both made a decision and calculated that the processes that are active in the environment allow them to proceed with putting that decision into effect. This differs from the disposition reading, which describes behaviors that carry across states of the environment. In the case of the constrained choice, processes like political policies predetermine the outcome of agents' decisions, leading them to take decisions that might conflict with their typical dispositions.

I summarize the acceptability pattern of the use of *was gonna* and *iba a* in conditional consequents in Table 5.1 below. Note that the interrogative mark '?' represents 'marginally acceptable.' Also note that there are additional environmental state readings that I will discuss below that pattern with premeditated and constrained choice readings.

	Author's English	Normative Spanish	Cuban Spanish
<i>Past Hypothetical Sentences</i>			
Premeditated Choice	✓	✓	✓
Constrained Choice	✓	✓	✓
Non-environmental State	?	?	?
<i>Present Hypothetical Sentences</i>			
Premeditated Choice	#	#	✓
Constrained Choice	#	#	✓
Non-environmental State	#	#	#

Table 5.1: A summary of the kinds of sentences that license *was gonna* or *iba a* in the conditional consequent

I argue that the choice to use a past prospective construction is communicatively useful in past hypothetical sentences. In §5.2.1 above, I have defined the reanalysis of past as a generalization to exclusion meaning: in the past prospective to hypothetical pathway, the meaning of past prospective constructions generalizes to be interpreted as exclusion modal constructions. The pressure that causes this reanalysis to take place and spread through a speech community is the communication utility of environmental state exclusion modal constructions (defined below in (226), which allow speakers to invoke environmental states when making hypothetical claims.

To explain this change precisely, I detail the definitions below. Note in the definitions below that I have changed the meaning of modal operators slightly: they are no longer sets of worlds w but sets of indices of evaluation s . The first, shown in (225), defines the meaning of past prospective constructions whose generalization background is an environmental state, like English *was gonna* and Spanish *iba a* in normative varieties (i.e. in Stage 1). The second, shown in (226), defined the meaning of the Past Prospective construction in Cuban Spanish (i.e. in Stage 2), which can be used to express both past prospective meaning as well as hypothetical claims that presuppose an environmental state.

(225) **Environmental State Past Prediction**

Where $Univ.Gen_w$ is the set of universal generalizations in world w and $ES_{Univ.Gen(w)}$ is a subset of these generalizations that correspond to an environmental state:

PASTTEMP(ESPRED(p, s)) :

$$\{ w \mid \forall w' \in CS_{i_u} : \exists t : Meta_{\langle w', t \rangle} \supset Meta_{\langle w', \tau(i_u) \rangle} \wedge \exists s \subset w : \tau(s) \subseteq t \wedge \forall w' \in Best(s, MB, OS, ES_{Univ.Gen(w)}) : p(w'', [\tau(s), \infty)) \} \}$$

(226) **Environmental State Exclusion**

Where $Univ.Gen_w$ is the set of universal generalizations in world w and $ES_{Univ.Gen(w)}$ is a subset of these generalizations that correspond to an environmental state:

EXCL(ESPRED(p, s)) :

$$\{ w \mid \forall w' \in CS_{i_u} : \exists t, w'' : Meta_{\langle w'', t \rangle} \not\subseteq Meta_{\langle w', \tau(i_u) \rangle} \wedge \exists s \subset w : \tau(s) \subseteq t \wedge \omega(s) = w'' \wedge \forall w''' \in Best(s, MB, OS, ES_{Univ.Gen(w)}) : p(w''', [\tau(s), \infty)) \} \}$$

Note that the definition of environmental state exclusion meaning is compatible with both past and present hypothetical readings, so when the Spanish Past Prospective construction is reanalyzed, it can be used in present hypothetical sentences. This makes *iba a* useful for communicating premeditated choice and constrained choice readings in all hypothetical conditional sentences, and it is for this reason that reanalysis of *iba a* propogates through a speech community.

There is one crucial issue with this discussion: it is difficult to determine these kinds of subtle meaning differences in corpus data. How do we know what speakers were thinking or intend-

ing when electing to use a certain grammatical form? In reality, we do not have access to this information in corpora, so we must apply other methods to gather this kind of data.

It is for this reason that I have designed an appropriateness judgment task experiment in order to test the prediction that readings that are associated with environmental states improve the acceptability of *iba a* in present hypothetical sentences. As in Chapter 4, this is valuable data because it allows us to access speaker intuitions at a stage where a grammatical change is in progress. Such information allows us to test the hypotheses that we generate from corpus data—in particular, those hypotheses that concern the semantics and pragmatics of grammatical constructions. In the next section, I will present the results of an experiment that I conducted with native speakers of Spanish in Matanzas, Cuba.

5.3 The experiment

The experiment that I present in this chapter consists of two main components: an appropriateness judgment task of pairs of utterances in context, and an appropriateness judgment task of isolated sentences with differing syntactic structures. The first component consisted of an identical methodology to the experiment described in Chapter 4, as I presented participants with target contexts to test my hypotheses about *tener que* and about *iba a* within the same session. The second component allowed me to test informants' sensitivity to the syntactic position of *iba a*.

The experiment was built to test the following hypotheses:

- (227)
- a. Among Spanish speakers in Cuba, *iba a* is appropriate in at least some present hypothetical utterances.
 - b. Present hypothetical uses of *iba a* are more likely to be accepted when the generalizations underlying the reasoning process are contingent on an environmental state.

The first hypothesis is meant to test whether or not *iba a* is indeed a grammatical candidate in present hypothetical sentences. Because this use of *iba a* is not normative in the Spanish-speaking world, it is important to lay the ground-work and show that this is an expressive possibility

in Cuban Spanish. Second, I aimed to test whether environmental states had an impact on the acceptability of *iba a* as a hypothetical construction. In order to operationalize this, I constructed contexts which imposed certain meanings on the target utterance. Because environmental states are more abstract than absolute generalizations (cf. Chapter 4), constructing these contexts was not as straight-forward; however, the strategies that I implemented to force environmental state readings did significantly impact the ratings given by informants.

5.3.1 Study design and methodology

The design and implementation of the appropriateness judgment task of utterances in context was identical to that presented in Chapter 4, so I will not explain it in detail here; however, I will explain in detail how I implemented environmental state readings of target utterances through the contexts. In all contexts, the target utterances were present hypothetical expressions that were minimal pairs differing only in the use of the innovative *iba a* or the canonical Spanish Conditional.

The two experimental conditions were contexts that imposed environmental state readings and contexts which did not. Within each of these two conditions, I created three readings, which I exemplify further below:

- (228) Environmental State
 - a. Premeditated Choice
 - b. Constrained Choice
 - c. Environment-Contingent Emotion
- (229) Non-environmental State
 - a. Emotional Reaction
 - b. Active Reaction
 - c. Disposition Choice

I created a total of ten target contexts distributed across these readings. These were randomized among informants so that each target context was evaluated approximately the same number

of times (with some minor variations). As in the previous chapter, I will present the English translations of the stimuli shown to participants, here categorized by reading. The original contexts are included in Appendix D. The first set were premeditated choice readings, which were directly contrasted with disposition choice readings, so I will present these two in succession. In premeditated choice readings, an agent is presented with a hypothetical decision, and the context describes that the agent has spent a lot of time thinking about the decision previously.¹⁵

Label	Contexts and Target Sentences
A	Raúl lives in Canada. Spain fascinates Raúl, and he dreams about traveling there some day, but he works as a nurse and doesn't have time to travel. His friend asks him, "Where would you travel if you weren't so busy with work?" Raúl responds:
	[Iba a ir/ iría] a España. 'I [was gonna go/ would go] to Spain.'
B	Yudit is a girl who dreams about being a teacher, but she has vocal cord problems and can't talk much because the pain is unbearable. One of Yudit's neighbors asks her mom, "What would Yudit do if she could do whatever she wanted?" Her mom replies:
	[Iba a ser/ sería] maestra. 'She [was gonna be/ would be] a teacher.'

Table 5.2: Contexts and target sentences testing premeditated choice readings

In the disposition choice readings, the context does not provide explicit mention that the subject has thought specifically about the decision posed in the context. The hypothetical utterance is a consideration in the moment and may be based on the general inclinations of the subject.

¹⁵Note that although Table 5.2 contains premeditated choice contexts, it is not necessarily the case that the English examples are acceptable in these contexts because the contexts have been created to force present hypothetical readings. While English allows *gonna* in the consequent of past hypothetical sentences that express premeditated choices, this does not carry over to present hypothetical interpretations.

Label	Contexts and Target Sentences
4	Raúl lives in Canada. He works as a nurse and doesn't have time to travel. His friend asks him, "Where would you travel if you weren't so busy with work?" Raúl doesn't think about traveling much, but considering it for a moment he responds:
	[Iba a ir/ iría] a España. <i>'I [was gonna go/ would go] to Spain.'</i>
5	Yudit is a girl who is fascinated by the idea of teaching, but she has vocal cord problems and can't talk much because the pain is unbearable. One of Yudit's neighbors asks her mom, "What would Yudit do if she could do whatever she wanted?" Her mom replies:
	[Iba a ser/ sería] maestra. <i>'She [was gonna be/ would be] a teacher.'</i>

Table 5.3: Contexts and target sentences testing disposition choice readings

The next environmental state reading that I implemented was the constrained choice reading. In these contexts, agents' choices are constrained by routines and processes that direct how agents must act in order to achieve desired outcomes. In one case, the process involves school graduation policies. In the other context, the routine of a family's day-to-day life directs how family members make decisions.

Label	Contexts and Target Sentences
C	Robert is planning to graduate in May, and he feels confident that he is going to pass all of his final exams in order to graduate. A friend asks him, "And what would happen if you got sick and you didn't pass your final exams?" Robert responds:
	Bueno, [no me iba a graduar/ no me graduaría] en mayo entonces; [iba a seguir/ seguiría] estudiando un año más. <i>'Well, I [was not gonna graduate/ wouldn't graduate] in May, then; I [was gonna keep/ would keep] studying for one more year.'</i>
D	Every day, Yunier goes to school to pick up his son. A friend of Yunier asks him, "What would happen if one day for some reason you couldn't pick him up?" Yunier answers:
	Si yo no pudiera, mi mama lo [iba a hacer/ haría]. Ella está jubilada. <i>'If I couldn't, my mom [was gonna do it/ would do it]. She's retired.'</i>

Table 5.4: Contexts and target sentences testing constrained choice readings

The final context that I designed in the environmental state category is one which I am calling Environment-Contingent Emotion. This context was designed to test the emotional state of a hu-

man agent—something not under the agent’s direct control—that was contingent on properties of the environment. Adding this context had the purpose of demonstrating that environmental state readings can be active in additional readings beyond the two prominent readings discovered in the corpus data.

Label	Contexts and Target Sentences
E	Dariel moved to Germany because he found a job as a Spanish teacher. Dariel feels sad because where he lives, people don’t go out to the street to chat, so he doesn’t know any of his neighbors. He is complaining about this to his mom on the phone and he tells her:
	Si la gente acá no fuera tan cerrada, yo [iba a estar/ estaría] feliz. <i>‘If the people here weren’t so closed, I [was gonna be/ would be] happy.’</i>

Table 5.5: Context and target sentences testing the environment-contingent emotion reading

The final two non-environmental state contexts that I implemented were reactive contexts. In these contexts, the canonical Spanish Conditional is the expected form in the conditional consequent—in Cuban Spanish as well as in other varieties. One type is the emotional reaction context presented in Table 5.6, and the second is the active reaction context presented in 5.7. These contexts were designed to describe the reactions of agents in the face of sudden changes; in other words, they do not describe actions that are premeditated or contingent on a routine. In the final context presented below, the subject is inanimate and responds to gravity, a result that is clearly not contingent on a particular state of the environment.

Label	Contexts and Target Sentences
1	Yadira’s son lives in another country. Marta asks her friend Yadira how she would feel if her son suddenly came home to surprise her. Yadira tells her:
	[Iba a estar/ Estaría] muy feliz. <i>‘I [was gonna be/ would be] very happy.’</i>

Table 5.6: Context and target sentences testing the emotional reaction reading

Informants followed the protocol described in the previous chapter, providing ratings for two target sentences associated with each context: one containing the innovative *iba a* construction and the other containing the canonical Spanish Conditional. They also provided a judgment about whether the two target sentences had the same meaning as well as commentary about their choices.

Label	Contexts and Target Sentences
2	Melissa and Yeni live in Puerto Rico. Melissa is from Uruguay and Yeni is from Puerto Rico. In Puerto Rico, the price of clothing almost never falls. Melissa asks Yeni, “What would happen if one day the price of clothing fell?” Yeni responds:
	La gente [iba a correr/ correría] a la tienda <i>‘People [were gonna run/ would run] to the store.’</i>
3	Juan has a very old shelf in his living room that is about to fall over. It doesn’t fall because a bar holds it against the wall. A visitor to John’s place asks him, “What would happen if you took away that bar?” John responds:
	El estante [se iba a caer/ se caería]. <i>‘The shelf [was gonna fall/ would fall].’</i>

Table 5.7: Contexts and target sentences testing active reaction readings

As the participants were the same in this data set as the set described in Chapter 4, demographic data can be found there.

In addition to the judgment of sentences in context, I also asked participants to judge a series of sentences containing present hypothetical uses of *iba a*. These sentences were constructed to vary the syntactic position of the construction and are listed below in (230) in order of acceptability, with the most acceptable sentences overall listed first. These sentences were constructed in order to be natural sounding and culturally accessible to Cuban informants. Seven sentences were constructed with different syntactic structures in order to provide a rough picture of informants’ structural knowledge.¹⁶ All participants rated all seven sentences according the same rating scale (from -2 to 2) used in the previous rating task. The order of the sentences was randomized to control for order of presentation, which it turned out, had an important influence on the ratings. The stimuli above were designed to test different scope positions of *iba a*, represented semi-formally below:

(230) EPIST(ROOT(ASPECT(ATTITUDE(P))))

a. *iba a*(ROOT(P)):

Si yo pudiera hablar francés, me **iba a poder comunicar** con los franceses.

‘If I could speak French, **I was gonna be able to communicate** with the French.’

¹⁶In order to keep the interview length manageable for participants, I limited the study to seven sentences of this type. Future study can explore this in more careful detail, but this was not the central purpose of the present investigation.

b. *iba a*(ATTITUDE(P)):

Si Franco fuera de acá, **iba a saber** que no se hace eso.

‘If Franco were from here, **he was gonna know** that you don’t do that.’

c. *iba a*(ATTITUDE(P)):

Si tuviera más tiempo, **iba a querer viajar** más.

‘If I had more time, **I was gonna want to travel** more.’

d. *iba a*(P):

Si yo ganara la lotería, **me iba a comprar** un televisor nuevo.

‘If I won the lottery, **I was gonna buy myself** I new television.’

e. *iba a*(PERF(P)):

Si yo no hubiera perdido mi celular, **te iba a haber llamado** anoche.

‘If I hadn’t lost my cell phone, **I was gonna have called you** last night.’

f. *iba a*(EPIST(P)):

Si el culpable no fuera Sandro, **iba a tener que ser** Rutilio

‘If the guilty person wasn’t Sandro, **it was gonna have to be** Rutilio.’

g. *iba a*(ROOT(P)):

Si quisieras saber el precio, **ibas a tener que preguntárselo** al señor.

‘If you wanted to know the price, **you were gonna have to ask** the man.’

Of particular interest was the comparison between root modals, like the ability modal *poder* and the deontic use of *tener que*, and epistemic modals, like the epistemic use of *tener que*. Many authors have suggested that epistemic modals are higher in scope than deontic modals, which has been a crucial detail in explaining the grammaticalization of modal constructions (e.g. Hacquard, 2011; Nordlinger & Traugott, 1997).

The order of the stimuli above represents the overall relative acceptability according to respondents where (230a) received the highest ratings of acceptability. Generally speaking, informants rated *iba a* as less acceptable in higher scopal positions. I will discuss these results in more detail

below.

In addition to obtaining a general picture of informants' response to the syntactic position of *iba a*, I was interested in the effect that a series of judgments may have on informants' intuitions. In particular, there is research that shows that repeated exposure to a linguistic structure can lead to a 'satiation effect,' where informants' judgments increase with subsequent exposure (Goodall, 2011). Crucially, not all structures are subject to a satiation effect; in some cases, informants persist in negative judgments despite repeated exposure (Pratt & Grinstead, 2008). By presenting informants with a series of sentences containing the *iba a* construction in conditional sentences, I sought to identify whether this construction was subject to a satiation effect in this context. Satiation effects were evident in a subset of informants, a finding that I will discuss in more detail below.

5.3.2 Quantitative Results

As in the previous chapter, I will begin my presentation of the results with the overall acceptability rate. This statistic represents the average number of 'acceptable' ratings for each context—here grouped by reading of the target context. Per the descriptions of ratings provided to informants, a 1 or 2 (on a -2 to 2 scale) constitute a judgment that the sentence is correct (*bien dicho*). As in the previous chapter, I present both the overall rate, and the 'adjusted' acceptability rate, which takes into consideration any reduction in acceptability of the canonical (Conditional) target sentence. Generally speaking, informants rated the canonical target sentences favorably, so the adjusted rates do not differ drastically from the unadjusted acceptability rate.¹⁷

This statistic can address the first hypothesis that this experiment set out to test: that speakers judge *iba a* as appropriate in at least some present hypothetical utterances, like the sentence presented in (227a). As shown in Table 5.8 below, this is clearly confirmed. When adjusted for the acceptability of sentences containing the Spanish Conditional, 92.6% of informants accept present hypothetical interpretations of *iba* in Premeditated Choice contexts (presented above in Table 5.2).

¹⁷The likely reason for this difference vis-à-vis the results in the *tener que* data set is that many of the contexts testing *tener que* described the future actions of agents, and informants frequently took such claims to be presumptuous, reducing acceptability ratings of the canonical *ir a* in these contexts.

Furthermore, nearly half of informants accepted *iba a* in the lowest rated contexts. In other words, it is clear that *iba a* is compatible with present hypothetical readings in Cuban Spanish.

Reading	Acceptability	Adjusted
Premeditated Choice	80.6%	92.6%
Constrained Choice	77.8%	81.4%
Environmental Emotion	54.5%	60.0%
Emotional Response	56.3%	56.3%
Action Response	43.5%	47.6%
Disposition Choice	44.1%	44.1%

Table 5.8: Overall and adjusted acceptability rate of *iba a* by reading of target context

Shown in Table 5.8, I have grouped contexts according to category of reading. The first three contexts were designed to test the acceptability of *iba a* in contexts that presupposed an environmental state; the bottom three were designed to present readings that did not.

As in the previous chapter, in order to gather paired information about the relative acceptability of *iba a* and the Spanish Conditional in these contexts, I converted ratings given by informants into z-scores, using the full set of ratings given by each informant. I then converted the pair of ratings given in each target context into a single ‘relative acceptability’ value, subtracting the normalized acceptability rating of the target sentence containing *iba a* from the normalized acceptability rating of the sentence containing the canonical hypothetical expression. In interpreting these ratings, a relative acceptability score of zero for a given target context means that an informant gave the same rating to both sentences. A positive score indicates that an informant preferred *iba a* to the Spanish Conditional in a target context; such ratings are notable because they indicate contexts where informants prefer the innovative hypothetical marker. A negative score indicates that an informant preferred Spanish Conditional, but it is important to note that a relative acceptability score of (approximately) -1 may be assigned to pairs of ratings in which informants rate the canonical form as 2 and *iba a* as 1. Recall that a score of 1 is defined as correct (*‘bien dicho’*) but not the best form of expression in the context.

Below in Figure 5.2, I present relative acceptability ratings for each reading in a violin plot. Like a box plot, a violin plot presents the mean ratings for each type of context, but this visualiza-

tion allows us to see where certain ratings are concentrated.

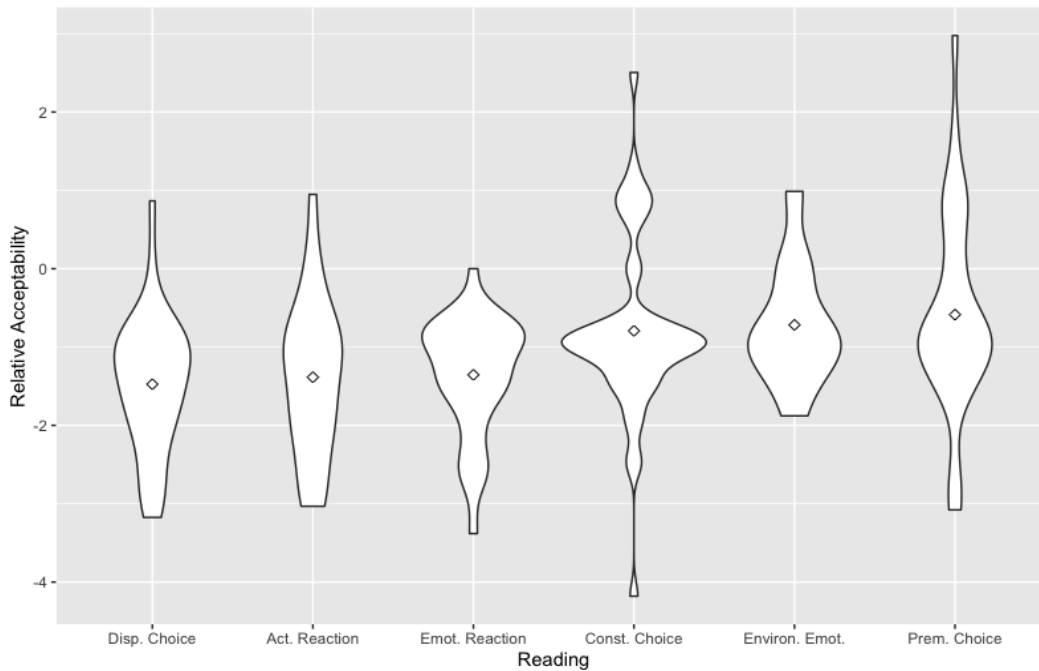


Figure 5.2: A plot of the relative acceptability values by context

As seen in this plot, the contexts which integrate an environmental state have higher average relative acceptability than those that do not. Additionally, we can see that, while relative acceptability tends to collect around -1 (as expected), in the environmental state contexts, a number of informants preferred *iba a* to the Spanish Conditional. This only occurred sparingly when environmental states were absent.

The difference between relative acceptability in environmental state contexts and non-environmental state contexts was statistically significant. This can be seen at a glance in a conditional inference tree, which generates a grouping of the data based on ratings. This is presented below in Figure 5.3. Note the following abbreviations in this figure:

- (231) a. PC: Premeditated Choice
- b. CC: Constrained Choice
- c. EE: Environment-contingent Emotion
- d. AR: Active Reaction

- e. ER: Emotional Reaction
- f. DC: Disposition Choice

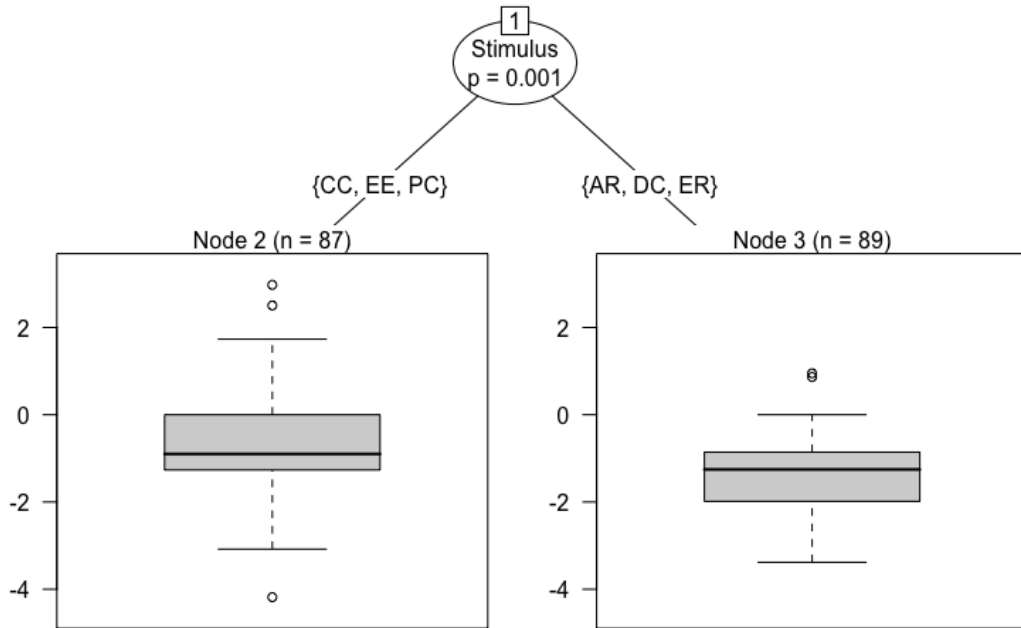


Figure 5.3: Conditional inference tree showing the grouping of contexts

Shown in the inference tree, the grouping of contexts aligns with the environmental state design: those contexts that integrate an environmental state received higher ratings of relative acceptability than those that did not. Taken as a whole, a t-test confirms that the higher grouping ($M = -0.71$) was rated with significantly higher relative acceptability than the lower grouping ($M = -1.41$), $t(159) = 4.5, p < .001$.

Comparing the context types individually, a one-way ANOVA was conducted to analyze the impact of context type on average rating of relative acceptability, and a significant effect was found $F(5, 170) = 4.334, p < .001$. A post hoc Tukey HSD test was performed to tease out particular differences. Because there were many comparisons, I present the relevant statistics in Appendix E. Below, I will consolidate this information in a visual representation.

It was also necessary to test whether the mean relative acceptability between different context

types was the same. For this I used a Two One-Sided Tests (TOST) analysis using the “equivalence” package in R (Robinson, 2016). The epsilon level—that is, the extent to which a test statistic must exceed the threshold for difference between means—was set to $\epsilon = .75$. The relevant statistics are presented in Table 5.9 below.

	PC (M = -.59)	CC (M = -.79)	EE (M = -.72)	AR (M = -1.39)	ER (M = -1.36)	DC (M = -1.47)
PC		df = 59 [-.27, .69] p = .031	df = 29 [-.43, .70] p = .036	df = 52 [.28, 1.32] p = .562	df = 48 [.32, 1.22] p = .528	df = 51 [.42, 1.35] p = .691
CC			df = 21.33 [-.58, .43] p = .015	df = 49 [.14, 1.04] p = .279	df = 75 [.20, .92] p = .191	df = 77 [.31, 1.05] p = .380
EE				df = 25 [.12, 1.21] p = .398	df = 17 [.16, 1.11] p = .342	df = 18 [.27, 1.24] p = .509
AR					df = 39 [-.45, .39] p = .003	df = 42 [-.34, .52] p = .007
ER						df = 63 [-.21, .45] p = .001
DC						

Table 5.9: Results of the Two One-Sided Tests (TOST) to determine equivalence ($\epsilon = .75$)

Setting the significance level to $p = .05$, the results of the TOST analysis yield the same grouping that is shown in the conditional inference tree. In other words, the relative acceptability ratings of environmental state contexts are statistically equivalent, and the relative acceptability of non-environmental state contexts are statistically equivalent.

I represent this in Figure 5.4 below. Solid lines between readings indicate statistical equivalence according to the TOST analysis. The absence of a line between two given readings indicates statistical difference according to the Tukey HSD test. Dashed lines represent cases in which the two statistical tests made no distinction either way; in other words, in these cases there may be equivalence or difference, but more data is required to make this determination.

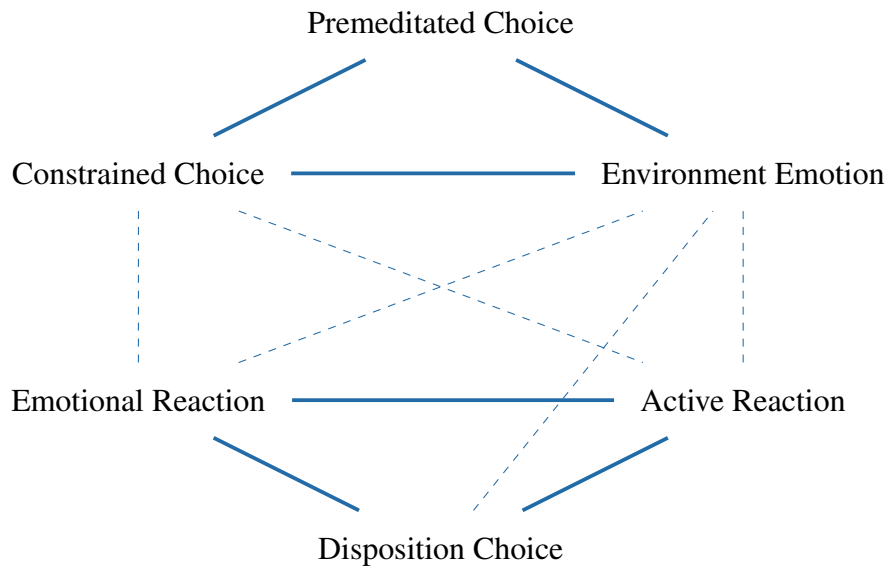


Figure 5.4: A visual representation of the grouping of contexts based on an ANOVA and post hoc Tukey HSD analysis and a TOST analysis

As shown in this diagram, the Environment-contingent Emotion context was not shown to receive significantly higher ratings than the non-environmental state contexts when considered individually. Likewise, the only non-environmental state context that the Constrained Choice contexts were significantly higher than were the Disposition Choice contexts. Nevertheless, in a broad sense, these statistical results confirm the second hypothesis that this experiment set out to study: present hypothetical uses of *iba a* are more likely to be accepted in contexts that invoke an environmental state.

When aggregated, a violin plot shows a remarkably similar pattern to the overall results of *tener que*. This is presented in Figure 5.5. In this figure, in both groups, there is a concentration of ratings around -1; recall that due to the normalization of scores, there is slight variation in these ratings, so the ratings do not line up cleanly with the rating scale provided to informants. The concentration of ratings in -1 represents the tendency of informants to evaluate *iba a* as acceptable in the contexts presented, but as slightly degraded with respect to the canonical Conditional form.

There is clear evidence that some informants prefer the innovative *iba a* to the Conditional form when the context invokes an environmental state. There is not a clear pattern of this preference in contexts where an environmental state is absent. Furthermore, there is a higher concentration of

relative acceptability ratings below -1 in non-environmental state contexts. This represents cases where *iba a* was assigned a rating of zero or below. That is, even when *iba a* was not preferred in environmental state contexts, *iba a* was more likely to be rated as *acceptable* in these contexts. This finding is reflected, of course, in Table 5.8 above.

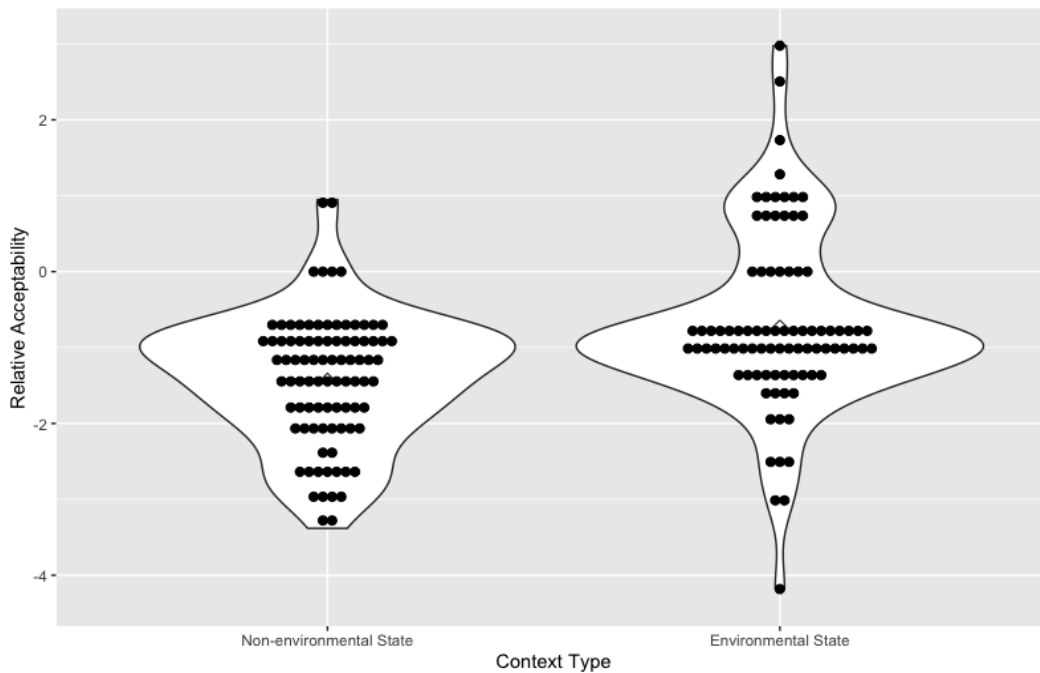


Figure 5.5: A plot of the relative acceptability values by context

There is one final set of data that I would like to highlight in order to suggest that the innovation of *iba a* represents a change that is in the process of propagating through the speech community. As I described above, the final task in the experiment was the rating of a series of sentences containing *iba a* forced into different scope relationships by specific grammatical material in the sentence. There were some sentences where the use of *iba a* was predicted to be unacceptable, as in (230f) where the construction scopes over a modal of epistemic necessity. I asked informant to judge a series of sentences containing *iba a* in different syntactic positions in order to measure the degree to which the satiation effect impacted informants' ratings. Many informants' ratings improved over the course of the task, suggesting that their perception of the appropriateness of *iba a* was subject to the satiation effect. Interestingly, some informants' rating become worse over the course of the

task; it is possible that, in recognizing that *iba a* was the common construction in the sentences, informants lowered their ratings due to an awareness of the non-canonical construction. About a quarter of participants did not seem to exhibit any response to a satiation effect. Their rating of the appropriateness of *iba a* in different scope positions remained clear throughout the task.

In order to study this effect in more depth, I developed a ‘satiation statistic’ for each informant, which was a simple linear regression, correlating their ratings to the linear progression of the task. I use actual satiation statistics from two participants to illustrate these different patterns of response in Table 5.10 below. Note that the ‘Sentence Number’ represents the number of the sentence by order of presentation. Target sentences were randomized for each informant.

	Informant 19	Informant 1
1	1	0
2	-2	1
3	-1	1
4	-1	2
5	0	2
6	-2	2
7	1	2
Satiation Statistic	$r = 0.06$	$r = 0.88$

Table 5.10: Calculation of the ‘satiation statistic’ of two informants’ responses

The median satiation statistic was near zero ($r = .08$), suggesting that a typical informant had rather clear intuitions about the appropriateness of *iba a* in different scope positions. When grouping informants by satiation statistic, however, it became clear that patterns of response to the rating of sentences in rich contexts was related to informants’ satiation statistic. In particular, informants with *low, positive* satiation statistics also expressed clear judgments about the use of *iba a* with respect to environmental states. In other words, informants who had clear intuitions about the scope relationships of *iba a* resisted the satiation effect, and these same informants also had clear intuitions about the semantic and pragmatic conditioning of the innovative uses of this construction.

This is illustrated well in the violin plot depicting the relative acceptability ratings by context type, shown below in Figure 5.6. “Low satiation” informants were those individuals whose satia-

tion statistic was in the third quartile; that is, this set of individuals had a satiation statistic above the mean ($r = .08$) and below the 75th percentile ($r = .40$).¹⁸

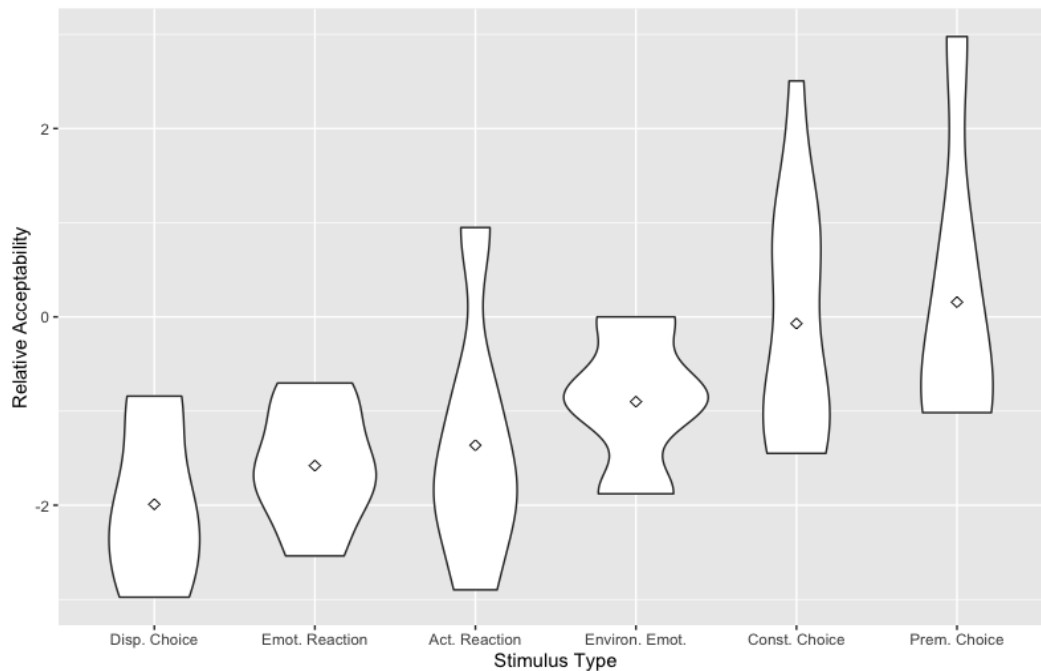


Figure 5.6: A plot of the relative acceptability values by context of low satiation informants

Comparing this representation with the results of all participants shown in Figure 5.2, the judgments of low satiation participants are much more differentiated between context types, yet much more consistent within context types. Furthermore, despite reducing the number of participants to a quarter of the total sample, a one-way ANOVA showed that context type had a statistically significant effect on the relative acceptability ratings of this group of informants, $F(5, 34) = 3.92, p = .007$.

Crucially, when amalgamating the data from the rest of informants (from the first, second, and fourth quartiles in terms of satiation statistic), a one-way ANOVA did not show a statistically significant effect of context type on relative acceptability, $F(5, 130) = 1.96, p = .090$. This, of course, does not prove that mean ratings of different contexts are statistically equivalent, and in

¹⁸Note that this set of informants excludes those informants with satiation statistics that are equal to zero. This is deliberate: informants who provided a uniform rating to all sentences in the final task were assigned a satiation statistic of zero. Such a pattern of response is not consistent with the clarity of response found in informants with low, positive satiation statistics.

fact, the general effect of environmental state is still seen among high satiation participants—the relative ranking of mean relative acceptability is the same for both groups except for the case of Environment-contingent Emotion, which is ranked highest for high satiation informants. What appears to be the case is that the low satiation informants seem to be pulling much of the ‘statistical weight’ in the analysis.

Demographically, there was no statistical difference found in the gender and age of low satiation informants with respect to the rest of informants. However, there was a statistical difference in the level of education of informants, as demonstrated by a chi-squared test, $\chi^2(3, N = 44) = 19.42$, $p < .001$. The principle difference between these two sets of informants is that individuals with the education level of *preuniversitario* (approximately equivalent to high school in the United States) were absent from the set of low satiation informants, despite making up approximately 22% of the sample.

There are a number of alternative interpretations to explain these observations. One possibility is that the low satiation informants were a particularly honest bunch that were not afraid to tell a foreigner what they really thought about the sentences under study, reducing the noise in the data. Another possibility is that low satiation informants were a group of individuals that had a higher than average level of metalinguistic awareness and were more ‘in tune’ to subtle differences in linguistic structure and meaning.

Based on my field experience, I tend to lean toward the latter. I noticed that certain informants seemed to have a great deal of clarity about their judgments and their reasons for making judgments. While they did not always have the metalinguistic terminology to articulate their intuitions, they were consistent in their judgments and tended to immediately focus on linguistic forms as a justification for their ratings—instead of attending to the social or cultural appropriateness of an utterance in a particular context.

With regard to the demographic finding, one possible explanation resides in the structure of education in Cuba. Individuals who have a *preuniversitario* level of education tend to be ‘in between’ in terms of their academic pursuits. Individuals with a *universitario* level of education are

securely in the ‘studied’ class of Cuban society, usually obtaining jobs that require a higher degree. Individuals with a *secundario* or *técnico medio* level of education are those who are not usually bound for tertiary education and typically hold trade and labor jobs. Individuals who ended their education at the *preuniversitario* level were likely university-bound but were prevented from doing so. It is possible that individuals in this education category are the least likely to be at ease in an experiment where they are asked to judge appropriate use of language. This may mean that they recognize *iba a* as a non-prescriptive form of expression and judge it especially harshly (akin to the hypercorrection of Bourdieu’s “petite bourgeoisie” (Bourdieu, 1991)), or they rely on cues in the experiment design—and not in the target context—as indicators of the best answer. I should note that I consulted with one of my informants about this potential social explanation, and he judged it plausible.

Ultimately, more research is required to determine whether *iba a* may hold sociolinguistic weight in conversation. What I will tentatively suggest is that present hypothetical uses of the Past Prospective construction is sociolinguistically salient, which is part of the dynamic of its spread in Cuban Spanish. There is plenty more to examine here, including the rating behaviors of particularly high satiation informants. Unfortunately, that discussion would lead too far from the central point. However, a notable take-away is that it is worth testing informants’ susceptibility to satiation effects, if nothing else, to identify informants with the clearest intuitions. I now turn to a brief discussion of the qualitative results.

5.3.3 Qualitative Results

I would like to begin this section with an exchange I had with Informant 23, a university educated woman who was 47 years old at the time of the experiment. I present this exchange to highlight that many informants truly understood the Past Prospective construction to have the same meaning as the Conditional. The following exchange occurred in regard to context D, presented in Table 5.4. In this context, Yunier picks up his son from school every day, and he is asked what would happen if he were unable to do so.

(232) [*James presents the first target sentence containing the Spanish Conditional*]

- Informant 23: Está bien también, un dos. Y esa también está bien. ‘Si yo no pudiera, mi mamá lo iba a hacer.’ Sí, pero está bien, pero la otra suena mejor.
‘It’s good, too. A two. And that is also good. “I couldn’t, my mom iba a do it.” Yes, but it’s good, but the other one sounds better.’
- James: [*pointing to iba*] Le pongo ‘uno’ a esta?
[*pointing to iba*] ‘I should mark this one as ‘one’?’
- Informant 23: Sí.
‘Yes.’
- James: Hay una diferencia de significado?
‘Is there a difference in meaning?’
- Informant 23: No, no. Tienen el mismo significado.
‘No, no. They have the same meaning.’

As shown in this conversation, while the Spanish Conditional ‘sounds better’ than the Past Prospective, both are acceptable forms of expression in this context, and they have the same meaning. I provide this example as tangible evidence of how natural present hypothetical interpretations of *iba a* sound to informants in this study.

I now turn to examples which demonstrate that the justifications that respondents gave for their responses demonstrate that the motivations underlying their ratings target characteristics of an environmental state readings. The first intuition that I will highlight is the sense of imposition that accompanies constrained choice readings with third person subjects.

With respect to the same context just presented (context D), Informant 20, a 46 year old woman with a *técnico medio* level of education, had the following interpretation:

(233) Está imponiendo que tu mamá lo haga obligado. ‘Mi mamá lo iba a hacer, ella está jubilada.’ ¿Qué sabe si lo iba o no lo iba?

‘It is imposing on your mom that she must do it, obligatorily. ‘My mom was gonna do it, she is retired.’ Who know if she iba or if it were not that case that she iba?’

The mention of imposition surfaced in a number of informants' responses to this context. In a subsequent conversation with an informant, I was told that certain contextual factors would remove the sense of imposition. For example, if the only two members of the household were Yunier and his mother, she would be the obvious substitute should Yunier be unable to pick up his son. Alternatively, if there were other, non-retired members in the household, the fact of her retirement would put her 'second in line' to pick up Yunier's son. In such a context, the use of *iba a* does not constitute an imposition on the part of the speaker. If anything, it is the state of affairs that imposes an obligation on Yunier's mother. And, in fact, this is the definition of an environmental state: a temporally-delimited state of affairs in which a set of generalizations is active. It is the fact that there are two members of the household that yields a routine of behaviors in which Yunier's mother steps in to fulfill responsibilities when he is unable to.

The sense of imposition arises from the fact that one kind of environmental state is plan. A plan is only effective when the planner has the authority to direct the actions of other agents. On this reading of the target sentence, when Yunier uses the periphrastic construction, he is claiming authority over the actions of his mother, leading some informants to consider the Past Prospective as inappropriate in context D.

A crucial observation is that the Spanish Conditional is perfectly acceptable for speakers who rejected *iba a* on the grounds that it constituted an imposition on the actions of Yunier's mother.¹⁹ As I will discuss in more detail in the next section, this is consistent with an analysis in which disposition readings are available for the Spanish Conditional because it does not obligatorily invoke an environmental state.

The next observation that I will highlight is the importance of premeditation in premeditated choice contexts. Consider the following two comments with respect to context B, shown in Table 5.2. In this context, Yudit has vocal cord problems, so she is unable to realize her dream of being a teacher. Informants highlighted that the use of *iba a* is acceptable in these contexts precisely

¹⁹I note here that the rating behaviors in response to an interpretation of imposition differed among informants. Some provided a rating of zero or below, citing the social inappropriateness of such a statement. Others provided a rating of one, indicating that the target sentence with *iba a* is something that someone might say, but it is not ideal.

because she had dreamed about being a teacher before speech time.

(234) El dos porque iba a ser maestra. Porque tiene—en las cuerdas vocales, iba a ser. Era con lo que soñaba.

‘Two because she *iba a* be a teacher. Because she has—in her vocal cords, she *iba a* be. It was what she dreamed about.’

(Informant 28, *F*, 50 years, university)

(235) Como ella nace no...existió ese problema. [Fue] después de la conciencia y después de que tuvo el gusto. Sí, cabe la posibilidad de decir...de que iba a ser maestro en caso de que no tuviese este problema.

‘When she was born...this problem didn’t exist. [It was] after her awareness, and after she had the interest. Yes, it’s possible to say...that she *iba a* be a teacher if she didn’t have this problem.’

(Informant 41, *M*, 41 years, university)

In these comments we find that informants accept *iba a* when there is explicit indication of Yudit’s intention to be a teacher at a past time. In fact, we find that Informant 41 conditions the acceptability of *iba a* in this context on the assumption that Yudit was interested in being a teacher before she had vocal cord problems. In other words, Yudit had a plan in place to be a teacher, and that plan was interrupted by her vocal cord pain. This interpretation, of course, is consistent with past prospective meaning: Yudit had an intention at some past moment. Crucially, however, Informant 41 indicated that the Past Prospective construction and the Conditional form have the same meaning in this context.²⁰ In other words, Informant 41 found *iba a* to be acceptable in a context—that he enriched from the text given—that is compatible with both past prospective and present hypothetical interpretations, and it is in this context that he accepted the innovative interpretation of *iba a*. This was the only target context in which he gave *iba a* an acceptable rating, which may suggest that his individual grammatical system is one in which present hypothetical

²⁰Note that a past prospective interpretation of the Conditional is not possible in this context because it is not embedded under a past tense attitude predicate.

readings of *iba a* are restricted to bridging contexts.²¹

Generally speaking, what we find in these comments is that acceptable ratings were attributed to premeditation. This contrasts with the final comment that I will present, which pertains to an emotional reaction. Informant 20 offered the commentary below about context 5. In context 5, Yadira explains how she would react if her son, who lives abroad, surprised her with a visit.

(236) ‘Estaría’ era que cuando llegara de repente podía estar feliz.

‘“Estaría” [the conditional form] was that when [the son] would arrive suddenly, [Yadira] would be able to be happy.’

(Informant 20, F, 46 years, *técnico medio*)

In this context, Informant 20 judged *iba a* as inappropriate and in her comment cited the sudden nature of the son’s arrival as the reason that the Conditional form is preferred in this context. With respect to *iba a* she commented that its use would mean that there are circumstances in which Yadira may not be happy at her son’s arrival.

(237) El ‘iba’ puede ser que si pudiera estar feliz o no pudiera estar. Pudiera ser las dos cosas.

‘The “iba” can be that she could be happy or not. It could be both things.’

(Informant 20, F, 46 years, *técnico medio*)

What these comments point to is a distinction between a reaction that is contingent on a set of circumstances and a reaction that follows from the character or emotional disposition of an individual. The sudden arrival of the son means that Yadira’s reaction is not premeditated and instead follows from her natural tendencies. In other words, her reaction follows from the action-oriented generalizations that describe her behavior. For informants, it was clear that a mother’s response in this context would naturally be happiness. If anything, many had the criticism that Yadira’s response—that she would be very happy—was not sufficiently strong to describe the

²¹Arguably, all informants could be categorized according to putative micro-stages of the evolution of *iba a* if we assume that grammatical systems are not uniform in a population of speaker. However, not all informants provided such detailed feedback about their judgments, so it is not possible to attempt this in the current data set. But one can imagine a methodological approach in which informants are explicitly asked to imagine contexts that license grammatical forms under study in order to gather this information.

reaction of a mother at her son's sudden arrival.

The comments of Informant 20 are consistent with an environmental state analysis. To use *iba a* in the context implicates say that Yadira's reaction of happiness does not carry across environmental state—that there are some situations in which she would be happy at her son's arrival and some in which she would not be. Because this is an odd idea for a mother to express, Informant 20 assigned *iba a* a rating of -1 in this context. The use of the Conditional on the other hand signals that the generalization underlying the reasoning process is a (non-environmental state contingent) action-oriented preference.

What I have aimed to show in the comments presented above is that the justifications of ratings provided by informants show that the reasons behind their ratings follow from an environmental state analysis. In other words, they confirm that the ratings assigned to the target sentences are sensitive to the distinctions that the contexts were designed to target. In the next section, I will discuss the results and reflect on how the evolution of *iba a* may proceed in following stages.

5.4 Discussion and Conclusion

The experiment described in this chapter set out to test the following hypotheses, repeated from (227) above for convenience.

- (238)
- a. Among Spanish speakers in Cuba, *iba a* is appropriate in at least some present hypothetical utterances.
 - b. Present hypothetical uses of *iba a* are more likely to be accepted when the generalizations underlying the reasoning process are contingent on an environmental state.

The purpose of this experiment was to prove that the meaning of *iba a* in the present hypothetical sense is (being recruited to be) that of an Environmental State Hypothetical construction. In demonstrating this, I argue that *iba a* is recruited into the hypothetical domain in order to fulfill a communicative function: to distinguish between hypothetical sentences whose modal background contains environmental state generalizations and ones that whose modal background does not. Be-

cause the periphrastic prospective construction *ir a* invokes a modal background with environmental state generalizations, the Past Prospective construction *iba a* can be recruited to the hypothetical domain for this communicative purpose.

The contexts presented in this study were designed to operationalize the generalizations that I found in conditional sentences in Spanish and English corpus data. I observed that the motion-derived past prospective construction was used in past hypothetical sentences to convey premeditated choices (i.e. plans made in the past) and situations in which the outcome or a director's choice was constrained by the circumstances. Both of these readings follow from an ordering source that draws from an environmental state. In the case of premeditated choices, the environmental state is usually a plan, and in the case of constrained choices the environmental state may be a plan or other set of mutually-sustaining generalizations. In addition to these two readings, I included a third operationalization to test a non-agentive consequence: the environment-contingent emotion context.

These three types of contexts were contrasted with readings that follow from generalizations that are not associated with an environmental state. This included disposition choice contexts, which described hypothetical choices of agents that were not premeditated. Such choices would follow from the action-oriented preferences of agents. The two other operationalizations were types of reactions: emotional reactions and active reactions. These contexts described sudden interventions whose consequences depended on action-oriented generalizations or universal generalizations that were not tied to an environmental state.

The first hypothesis in this study was a prerequisite hypothesis: I first needed to demonstrate that *iba a* has present hypothetical readings among Cuban speakers of Spanish. There were two ways that I demonstrated that this is the case. First, the contexts were constructed such that the target sentences were all responses to present hypothetical questions. As a consequence, past prospective readings of *iba a* would be infelicitous responses, yielding low ratings by informants, if informants did not accept present hypothetical interpretations of this construction. Thus, if the grammatical system of a particular informant did not permit present hypothetical readings of *iba*

a, she would theoretically assign a rating of zero or below to all target sentences containing *iba a*. In fact, in the majority of cases overall, informants assigned a score of 1 or 2 to *iba a* target sentences, demonstrating that informants do allow present hypothetical readings of *iba a*. Second, I paired target sentences containing *iba a* with sentences containing the Spanish Conditional, the canonical form of present hypothetical expression. In each target sentence, I asked participants to confirm that the sentences shared the same meaning. They provided positive confirmation 78% of the time. I did not remove non-synonymous ratings from the statistical analysis—as I did in Chapter 4—because in most of these cases it was the fact that informants interpreted *iba a* as a past prospective construction that led to low ratings, so there was a close relationship between non-synonymy and ratings.²²

The quantitative data robustly demonstrated that *iba a* is licensed as a present hypothetical construction in Cuban Spanish. As I described in the introduction, this is in fact not surprising given the cross-linguistically stable tendency for past prospective constructions to evolve into hypothetical constructions. A closely related example is that the use of the Portuguese Past Prospective construction *ia + infinitive* is used widely in Brazil and to an even greater extent in Portugal to express present hypothetical meaning.

The second hypothesis that the experiment set out to test is whether the *iba a* is rated as more acceptable in contexts that invoke environmental state conversational backgrounds. This finding supports the claim that the meaning of *iba a* for Spanish speakers in Cuba is that of Environmental State Exclusion, repeated from above:

(239) **Environmental State Exclusion**

Where $Univ.Gen_w$ is the set of universal generalizations in world w and $ES_{Univ.Gen(w)}$ is a subset of these generalizations that correspond to an environmental state:

EXCL(ESPRED(p, s)) :

$$\{ w \mid \forall w' \in CS_{i_u} : \exists t, w'' : Meta_{(w'', t)} \not\subseteq Meta_{(w', \tau(i_u))} \wedge \exists s \subset w : \tau(s) \subseteq t \wedge \omega(s) = w'' \wedge$$

²²This was not the case in the *tener que* contexts. While I attempted to design contexts so as to make obligation readings inappropriate, informants nevertheless interpreted *tener que* as a marker of obligation and rated it highly. For this reason, it was necessary to remove these ratings from the data set.

$$\forall w''' \in \text{Best}(s, MB, OS, ES_{\text{Univ.Gen}(w)}) : p(w''', [\tau(s), \infty)) \} \}$$

$$(240) \quad \llbracket \text{iba } a \ \alpha \rrbracket = \text{EXCL}(\text{ESPRED}(\llbracket \alpha \rrbracket))$$

There were two ways that the results of this experiment support the second hypothesis. First, the quantitative results show that the relative acceptability of *iba a* increases in the contexts that invoke an environmental state. And second, the justifications given by informants support the assumption that the constraints on interpretation imposed by environmental states are what impact their ratings. For example, commentary from informants demonstrates that *iba a* is licensed as a hypothetical construction when the context provides evidence that the director of the hypothetical action had previously decided to undertake that action in the appropriate circumstances. This premeditated decision—also known as a plan—is an environmental state. In other words, the informants were directly invoking environmental states to justify their acceptance of *iba a* in target sentences. Taken together, the quantitative and qualitative data support the conclusion that the conversational background of *iba a* contains environmental state generalizations.

Now considering the qualitative data in a bit more depth, we find evidence that when *iba a* is recruited as an environmental state hypothetical construction, the felicity conditions of the canonical Conditional form may change. For example, in the justification offered by Informant 20 in (236), we find that the Spanish Conditional is associated with a particular type of situation in which the director of the hypothetical action is surprised, and her response is taken to be the typical or expected outcome of the situation. This type of situation, of course, describes disposition meaning, in which the ordering source contains generalizations that describe the action-oriented preferences of an agent. In other words, the qualitative data suggests that for some informants, the Conditional is not a hypothetical construction, but rather a disposition hypothetical. As shown in the discussion of quantitative results, a number of informants held that *iba a* was preferred to the Spanish Conditional in environmental state contexts. This suggests that for some speakers the use of *iba a* is obligatory in certain contexts.

These findings are consistent with what has been observed upon the recruitment of grammatical material into a new domain of meaning. This process was described for the progressive and

imperfective aspectual domain in Deo (2015a:p. 19-20). Because the innovative form expresses a subset of the readings that are compatible with the older, more general form, the use of the more general form implicates that the speaker does not have enough information to express the more specific meaning. In the present case, the use of the Conditional in Cuban Spanish implicates that a speaker means not to make hypothetical claim based on an environmental state generalization. This leads to the *categoricalization* of *iba a*, where the increased use of the Conditional in disposition contexts results in the obligatory use of *iba a* in environmental state hypothetical contexts. As shown by the data in Table 5.8, *iba a* has not reached categorical status in Cuban Spanish, but it appears that the process of categoricalization is underway.

What I have thus proposed, is that past prospective constructions have the potential to grammaticalize into hypothetical constructions because past prospective constructions are permitted in the consequent of past hypothetical sentences, as shown in both English (218) - (220) and Spanish (200). What causes speakers to use past prospective in these sentences in the first place is the communicative utility afforded by the use of the construction. In the case of the motion-derived English *be going to* and Spanish *ir a*, I have argued that the communicative utility of motion-derived futures is an environmental state generalization background. This background allows speakers to communicate particular meanings in the hypothetical domain, like premeditated choices and constrained choices.

Above, I demonstrated that the informational content of past hypothetical sentences does not change if the past tense marking on the past prospective construction is interpreted as (present) hypothetical. This bridging context provides the opportunity for speakers and addressees to reanalyze the past tense marking in the past prospective marking as the more general cognitively salient category of exclusion marking. There is evidence that this context is the ground of reanalysis in the data collected in this study. Premeditated choice contexts received the highest rating of acceptability overall. More data is required to determine whether this difference is statistically significant, but premeditated choice present hypotheticals are the most similar to past hypotheticals. This was found in the response of Informant 41 shown in (235). In his justification, Informant 41 described

his own enrichment of the context, which made it remarkably similar to a past prospective. Nevertheless, he accepted the present hypothetical interpretation of *iba a* in this context (and, in fact, only in this kind of context).

I have argued that the communicative utility of the new hypothetical form is what drives the recruitment process, but I would like to suggest that two additional other forces may drive the recruitment of *iba a* as a hypothetical construction in Cuban Spanish. The first is a pressure for the interpretation of modal expressions with respect to the present. This may be a cognitive or communicative pressure, where taking the relevant set of circumstances to be a present set of circumstances may be cognitively less demanding, simply more common in communication, or both. A pressure to interpret modal expressions with respect to the present would create a pressure for reanalysis of past hypothetical conditionals that contain past prospective expressions. Because the interpretation of the reference time does not influence the truth conditions of the sentence, no information is lost when reinterpreting in this way. The only pressure resisting this change is the convention to interpret the past tense marking on the past prospective construction temporally.

The second suggestion that I would like to make is particular to Cuban Spanish. Given the variety of pressures that seem to work in favor of the reinterpretation of *iba a*, it might start to seem surprising that there is not a higher incidence of hypothetical *iba a* in the Spanish speaking world. It is important to recall that the Past Prospective construction Spanish is frequently used in the language with past temporal meaning, which heavily biases the interpretation of the Imperfect marking in *iba a* as temporal past. But it might be that all that is needed is a little push for the change to begin on a path no return. I propose that this push may have come from contact between Cuban Spanish and the African language Yoruba. There is general agreement Cuban Spanish had extensive contact with Yoruba (Lipski, 2018), a language which is closely tied with religious traditions whose practice continues into the present day.²³ It just so happens that the construction used to mark past hypothetical sentences in Yoruba is *ibá*, translated ‘would/should/could have’ (Bamgbose, 2000). And while demonstrating the influence of language contact of Yoruba on

²³I am indebted to Luana Lamberti Nunes for making this connection for me.

Cuban Spanish will require a complete study of its own, there is a distinct possibility that Yoruba influence was the push that the grammar of Cuban Spanish needed to set *iba a* down the past prospective to hypothetical path.

Looking forward, the data in this study suggest that the categorization of *iba a* has begun. Following the cyclic diachronic pattern described in Deo (2015a), we might expect *iba a* to become an obligatory marker of environmental state hypothetical meaning and proceed onto generalizations, eventually overtaking the use of the Spanish Conditional completely in hypothetical sentences. There are two caveats that I would like to add to this picture. First, the diachronic pattern described in Deo (2015a) was designed to account for the evolution of significant cognitively salient categories of meaning. Whether environmental state hypothetical constitutes a salient category of meaning in the same way that progressive does may influence whether *iba a* is required in certain contexts. Furthermore, the consequents of hypothetical sentence are grammatically heterogeneous in Spanish, as has been the case throughout its history (Harris, 1971, 1986). Forms that appear in the consequent of hypothetical sentences include the Imperfect, the Imperfect Subjunctive, and the Pluperfect Subjunctive. It may be that similar to the Degree Modifier domain, the hypothetical domain permits a great deal of grammatical layering (Brems, 2003). If this is the case, it is possible that the innovation of *iba a* will not lead to the loss of the Spanish Conditional. Ultimately, only time will tell.

But as a strategy to ‘jump ahead’ a bit in the process, it would be informative to study the Portuguese Past Prospective. The evolution of *ia + infinitive* in European Portuguese appears to be further along than the Spanish Past Prospective in Cuba, showing up much more frequently with present hypothetical interpretations in corpus data.²⁴ In fact, the Past Prospective in Brazilian Portuguese appears to be somewhere in between, so a comparative study of Cuban Spanish and both varieties of Portuguese has the potential to provide rich data about the past prospective to hypothetical grammaticalization pathway. Many exciting avenues exist for this rich question, and perhaps most importantly, when we ask these questions, the solutions that we find for them help

²⁴Scott Schwenter, personal communication.

us understand meaning more generally.

Chapter 6

Conclusion

6.1 The story in the present analysis

My goal in this final chapter is to take a step back from the details and look at the story that emerges from the data and theory that have been presented in this dissertation. I believe the best place to start is by summarizing the changes analyzed in the form of two new clines:

(241) *iba a*

MOTION >> ENVIRONMENTAL STATE PAST PROSPECTIVE >> ENVIRONMENTAL STATE EXCLUSION

(242) *tener que*

OBLIGATION >> NON-DIRECTOR NECESSITY >> (NON-^{1/2}DIRECTOR NECESSITY >>) GENERALIZATION FUTURE

Generally speaking, at each stage in a cline, I have worked to develop a unified meaning of the construction at that stage, such that meanings in previous stages are subsumed under the categories at later stages. There are two exceptions to this. First, in the case of *iba a*, the motion readings have remained available up until contemporary Spanish such that *iba a* is polysemous throughout the cline in (241). Second, in the evolution of *tener que*, obligation and disposition are mutually incompatible: generalization future constructions can access the action-oriented preferences of the director, whereas obligation readings expressly do not.

In terms of the big picture, *iba a* is an environmental past prospective construction that is recruited into the hypothetical domain so that speakers can efficiently express environmental state readings in conditional sentences. The *tener que* construction is an obligation and epistemic necessity modal in which there exists an absoluteness constraint for future-oriented epistemic readings. In Cuban Spanish, this constraint is weakening, and speakers are beginning to use the construction to describe the dispositions of human agents. These changes in parallel lead to the shift towards a generalization future interpretation.

These clines, of course, do not tell the much richer story of the evolution of these constructions. Beginning with *iba a*, I argued in Chapter 2 that the traditional grammaticalization cline of future meaning was flawed:

(243) MOTION >> INTENTION >> PREDICTION

I argued that the explanation behind the grammaticalization of motion constructions into prospective constructions is found in futurate uses of the construction through which speakers express their intention to *go* in order to accomplish a task. Crucially, the use of the futurate allows speakers to express that this *going* is settled, and it is this felicity constraint that leads to the reanalysis of the construction as a particular type of future construction—an environmental state future construction.

Through a variationist corpus analysis, I was able to show that in the earliest stages (an indeed at any stage) of the grammaticalization of the motion construction, an intention interpretation was never a significant predictor of variation in the future domain. This suggests that although there are significant morphosyntactic correlates with intention at early stages, the Periphrastic Future in Spanish was not an intention construction early on, but was fulfilling a different communicative function. That function was an environmental state prospective meaning, a cognitively salient category of meaning that I have proposed in this dissertation.

In Chapter 3, I proposed that an environmental state is a subset of a generalization background and that modal constructions can be restricted such that their ordering source draws from environmental states. An environmental state can be described as a set of generalizations that hold for

limited periods of time—as opposed to ‘normal’ ordering source generalizations that hold in all situations in history that have certain properties. The intuition behind an environmental state is that the generalizations in this set are mutually reinforcing, allowing rational agents to look for outcomes of the environmental state to confirm that the state is intact and to trust that the state will stay intact. This is the case for plans, routines, and societies.

In Chapter 5, I argued that speakers of Cuban Spanish are recruiting the past prospective *iba a* to invoke environmental states in hypothetical sentences. I showed that past hypothetical and present hypothetical interpretations of *iba a* yield the same proposition (i.e. are true in the same set of possible worlds), which allows the past prospective construction to be reinterpreted as a hypothetical construction. In being reinterpreted as a hypothetical construction, the unified meaning of the *iba a* construction is generalized to ‘environmental state excluded’: a necessity modal whose modal base and environmental state ordering source is accessed either from the past or from a set of hypothetical worlds. Through experimental research with speakers of Spanish in Cuba, I showed that *iba a* is more likely to be accepted in contexts that force environmental state readings, supporting the conclusion that the communicative function of *iba a* in the hypothetical domain is that of an environmental state hypothetical. This result also lends support to the characterization of the environmental state that I have built throughout the dissertation. As I have shown, there is a body of literature that has observed that hypothetical markers are related in some way to past + future meaning, but there is none that I am aware of that has studied the evolution of a past prospective construction into a hypothetical construction with this level of granularity.

To summarize this broadly, the *ir a* construction in Spanish was recruited as a prospective construction in the 1600s, yielding future readings when conjugated in the Simple Present, and past prospective readings when conjugated in the Imperfect. It was recruited as an environmental state prospective construction, which Cuban Spanish speakers are now recruiting as an environmental state hypothetical construction. As a broader hypothesis about the evolution of hypothetical (i.e. Conditional) markers, newer prospective markers are recruited into the ‘future’—more appropriately, the ‘prospective’—domain in order to express particular kinds of future meaning. Because of

the transmutability between past prospective and present hypothetical interpretations in past hypothetical sentences, these particularities can be recruited into the hypothetical domain. In English, for example, the same differences that exist between the *be going to* construction and *will* should distinguish present hypothetical uses of *was going to* and *would* if and when this change takes place.

Turning to *tener que*, in Chapter 3 I developed a generalization-based account of the Kratzerian ordering source, which aimed for a greater degree of definition of the ordering source by proposing that there are two principle types: universal generalizations and action-oriented preferences. In addition, I argued for the existence of environmental states, which constitute subsets of these larger sets. As I showed in Chapter 4, when strong obligation modals like *tener que* develop into epistemic modals, this change involves the development of an absoluteness constraint wherein future-oriented epistemic uses of the modal are prohibited unless an absolute (i.e. objectively reliable) generalization underlies the modalized claim. I proposed that this constraint may evolve from the competition that the addition of a new epistemic modal has with existing future modal expressions in the language. Alternatively, the constraint may emerge from the perception that the rules that underlie strong obligation statements are ‘objectively’ moral.

The result of this constraint is a process of semantic change that looks quite different from that of *iba a*. Rather than a story about the recruitment of a construction into a new domain of meaning, the evolution of *tener que* involves a process of weakening the absoluteness constraint. In Traugott’s terms, this can be characterized as subjectification, where language users increasingly accept *tener que* when the generalizations in the ordering source are clearly based on the speaker’s individual experience and knowledge.

The data collected through the experimental task with Cuban Spanish speakers allowed me to show that the acceptability of the future-oriented epistemic uses of *tener que* does depend on the presence of absolute generalizations in the ordering source; however, the data also revealed how the absolute constraint can weaken over time. One key insight in the comments of informants was that certain self-assured personalities might tend to use *tener que* even though they do not

have the objective grounds to make their claim. This intuition is consistent with accounts like that of Haspelmath (1999) who argues that the pattern towards the generalization of meaning in grammatical change is due to a human tendency to be ‘extravagant’ in communication. The use of *tener que* in Cuban Spanish is a clear case where overstatement leads to a change in meaning, but it is important to observe that this is a particular kind of change where the constraint on interpretation concerns an elevated epistemic status. Notice that I have not proposed this kind of a story in the case of the *iba a* construction.

I have also suggested that *tener que* is becoming a conventional way to express a prediction that is based on the characteristic behavior—or perhaps the fundamental nature—of an agent. The philosophical foundation of this suggestion concerns the fact that the behavior of human agents arises from two sources: preferences that we can reflect on and change, on the one hand, and instincts that are part of our fundamental nature, on the other. Although human behavior is generally unpredictable, predictions that arise from generalizations about the instincts of agents are indistinguishable from predictions that arise from any other generalization about Nature. On an empirical level, I showed that target sentences that described the outcome of an agent’s intervention were rated more favorably than those that did not, with the exception of the meteorological patterns of the magical land of Lulandia. Ultimately, this is a hypothesis that I was not testing directly and that must be explored with future research. The story that emerges from the conceptual approach and the data is that *tener que*, formerly a modal expression that did not access the action-oriented preferences of the director of the prejacent, now accesses (at least a subset of) these generalizations. The use of *tener que* in these disposition contexts provides further opportunity for listeners to interpret utterances containing *tener que* without the absoluteness constraint.

Whether overstatement of confidence precedes these strong disposition uses or vice versa is something of a chicken-or-the-egg problem. Anecdotal evidence suggests that non-obligation first- and second-person uses of *tener que* are the final holdout in the evolution of this form, but as I mentioned in Chapter 4 there are signs that this may be changing. As I have suggested, future research can explore this particular question in more detail. It is always exciting when answers

such as these lead to more questions. One question that remains concerns the status of the Synthetic Future in Cuban Spanish should *tener que* reach the status of a generalization future construction. It has been well-documented that the Synthetic Future form is increasingly taking the role of an epistemic modal (Aaron, 2014; Dávalos, 2017). Perhaps, the entry of *tener que* on the scene as a generalization future is the what will cause the Synthetic Future to lose its hold on the future domain.

6.2 The Larger Picture

I now want to reflect more broadly on these results, thinking about the future domain of meaning as well as the study of grammaticalizations and semantic change more broadly. Holding the *iba a* and *tener que* stories together, we find that the future domain is not homogeneous. This has been suggested in prior literature, such as Copley (2009). The story in this dissertation suggests that there is a fundamental distinction in the future domain that holds between environmental state futures and generalization futures. The reason that I propose this as a ‘fundamental’ distinction is that rational agents, when making predictions, have been shown to be sensitive to patterns at different levels of temporal granularity (Iigaya, 2014). This distinction represents reasoning processes that rely on global generalizations versus generalizations that are sensitive to the current ‘settings’ of the environment. This literature was part of the inspiration for the environmental state vs. generalization future distinction, and I propose that it should be a key difference to examine in any language with multiple constructions in the future domain.

This hypothesis lends support to the less-studied hypotheses of semantic retention and source determination that were proposed by Bybee et al. (1994). I have shown that the process of recruitment into the future domain is fundamentally different in the case of verbs of motion and obligation constructions. In the case of the former, a lexical item is recruited into a grammatical domain, and a non-modal construction is reanalyzed as a modal construction. Furthermore, it is futurate uses of the motion construction that lead to the reinterpretation of this construction. The-

oretically speaking, I believe there is more to be said here, but there is a clear connection between the presumption of settledness that accompanies futurate uses of present tense constructions and the time-contingent ‘guarantee’ that environmental states offer. In the case of the evolution of *tener que*, a modal obligation construction evolves such that the kinds of generalizations that are candidates for its ordering source change. As the absoluteness constraint weakens, we find that generalization-based meanings, like dispositions, are immediately available.

As we find in English *will* and in the Spanish Synthetic Future, disposition readings are distinct from environmental state intention readings. This distinction shows up in the evolution of both *iba a* and *tener que*. The past prospective *iba a* is being recruited by Cuban Spanish speakers to express hypothetical statements with agentive subjects that are expressly not disposition readings, yielding constrained choice and premeditated choice readings. On the other hand, in the evolution of *tener que*, we are already finding that disposition readings—predictions that are based on an agent’s character and stable tendencies—are becoming available. A specific prediction of this account is that future constructions that evolve from modal constructions like obligation or desire will eventually develop disposition readings; whereas, future constructions that evolve from motion constructions will have environmental state readings. This is a prediction that can be tested in other languages, but what I would like to highlight is that semantic retention and source determination are rather under-studied hypotheses in grammaticalization literature, and I argue that they should be seriously considered.

This said, I will highlight that one of the advantages of bringing formal semantic tools to questions of grammaticalization and semantic change is that these tools allow us to create precise accounts of what semantic retention is. In this dissertation, I have proposed that by defining the modal ordering source in terms of generalizations—a more restrictive analysis than is common in current literature on modality—we are able to develop principled accounts for the ways that modal meanings, such as obligation and epistemic, are related to one another. This allows us to see, for example, that what is retained in the evolution of *tener que* is the basic structure of modal necessity, but what changes are the kinds of ordering source with which the construction

is compatible. Similarly in the case of *iba a*, the basic structure of environmental state modal necessity remains, but the interpretation of the past tense marking generalizes from past temporal to exclusion.

Turning to the more well-known hypotheses of universal pathways and unidirectionality, it is clear in the present analysis how the meanings at each stage are related to one another. I have argued that obligation and epistemic (and subsequently future) readings are related through the fine line of customs: what one does and what one has to do in a society are often indistinguishable. I have shown that past prospective and present hypothetical meanings only differ in the reference time, a change which does not change the informational content of an utterance in which these constructions are used. Before addressing unidirectionality, it is important to reiterate that I understand this hypothesis as a statement about what meanings tend to evolve into others.

Formulated in this way, the relevant questions must be turned on their head. Taking first the past prospective to hypothetical pathway, we must explain why a hypothetical construction that does not have past prospective interpretations should tend not to be recruited as a past prospective construction. I will suggest that, in the past prospective to hypothetical reanalysis, the tense marking (that is, the reference time) becomes less marked, leading to the tendency for this change to move in a single direction. With respect to *tener que*, what I have shown is that the evolution of an obligation construction to an epistemic construction amounts to the loss of the requirement that there be a (human) director of the prejacet. Once again, this is a case of a less marked reading through the removal of a stipulation. The patterns in the phenomena under study in this dissertation suggest that unidirectionality corresponds to a move towards less marked meanings; the extent to which this applies generally is something that can be explored in future research.

Reflecting on these large picture conclusions, I have taken an amphichronic approach to the study of linguistic phenomena: a research process that takes semantic change as a fundamental fact to be explained in addition to synchronic facts. Through this approach, I have developed insights that are informative for synchronic pursuits, developing for example, a distinction between environmental state and generalization future. This insight arose from a careful consideration of

the circumstances of the grammaticalization and semantic evolution of the synchronically striking phenomena in Cuban Spanish. On the other hand, appealing to a robust synchronic analysis, I have been able to develop precise characterizations of the meanings at each stage of the cline through which I articulated precisely how these stages relate to one another. The diachronic semantic enterprise is a fruitful area for future research and, as shown clearly in the present study, sheds fresh light on old, puzzling questions.

A final note that I would like to make is a methodological one. The culmination of the corpus study and preliminary theoretical analysis was the implementation of an experimental design in which I was able to gather evidence about the meaning of *iba a* and *tener que* in Cuban Spanish today. Traditionally, historical analysis of grammatical forms uses corpus data alone, and such research yields crucial insights into the way that grammars evolve. As shown in this dissertation, one of the great advantages of studying changes in progress is that we are able to access the intuitions of the speakers and put our hypotheses about the meaning of forms at different stages to the test.

One thing that this type of analysis does is it allows us to compare phenomena. An interesting similarity emerged in the data for each form under study. In Figures 6.1 and 6.2, I present the overall results of each study.

What both of these figures show are the beginning stages of categorialization in which there are a number of informants who prefer the innovative form over the canonical form in certain contexts. This means that the innovative form is becoming obligatory in certain contexts, which is a key stage in the process of semantic change. What data like this show is that in both cases, the innovative forms are not categorialized across the population, which illustrates that part of the gradual nature of grammaticalization and semantic change is that not all speakers in a community share the same grammatical system. There is debate in the literature about the extent to which semantic change is gradual or categorical, and what data like this suggest is that different speakers in a single community respond to the exact same contexts differently. In corpus data, this may manifest as a gradual shift—and this is not a misinterpretation of the data—but it is important in

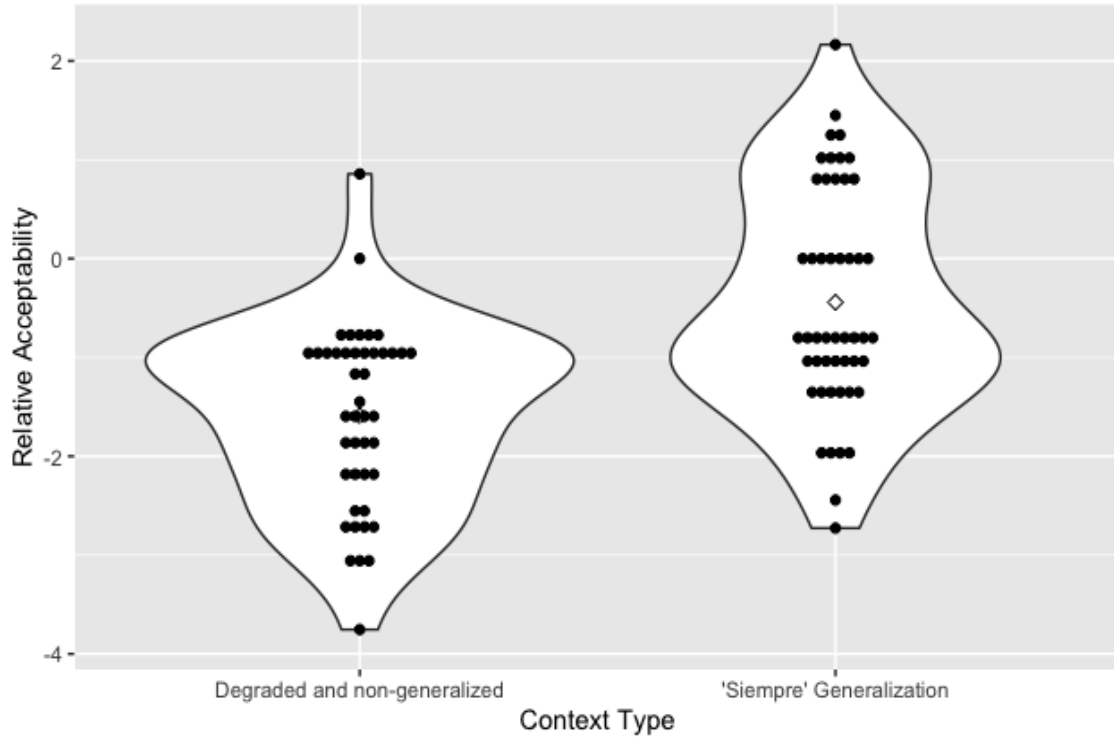


Figure 6.1: Aggregate results for *tener que*: Absolute Generalization vs. No generalization

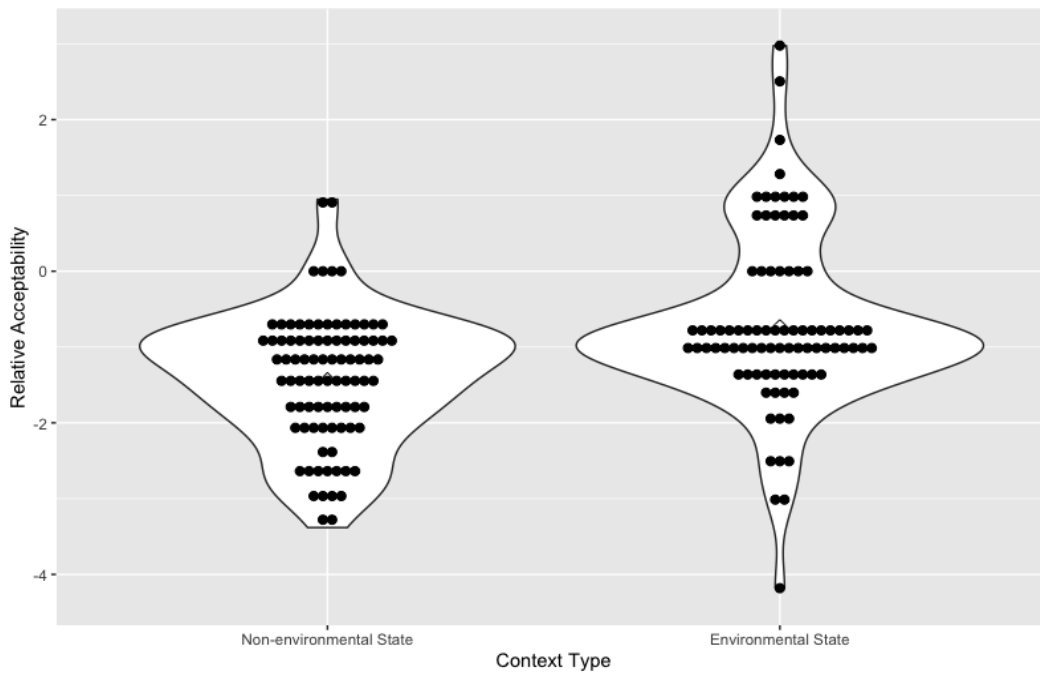


Figure 6.2: Aggregate results for *iba a*: Environmental State vs. Non-environmental State

these debates to be explicit about whether theoretical positions pertain to the individual linguistic systems of agents in a speech community or to population-level generalizations about how these individual linguistic systems overlap.

6.3 Future Research

To conclude, I would like to discuss briefly some directions that I propose for future research. The study of grammatical change in progress as in the case of *iba a* and *tener que* is an exciting ground for research, and such research can teach us about synchronic phenomena like the meaning of future constructions, modals, and conditional sentences. It can also teach us about the dynamics of language change and about the forces that lead to the creation of diverse language varieties and languages.

One of the clear first steps forward with this research is a comparison of the results found in this study with other varieties of Spanish. These results would help to show that the intuitions of Cuban Spanish speakers contrast with those of other varieties and provide data about the extent to which this is the case. In the present research, this contrast is taken somewhat for granted because the phenomena are so striking, but comparative data with other varieties would reveal precisely in what ways—and in what contexts—intuitions differ.

Further work can also be conducted among the same population of speakers. One of the conclusions in this dissertation that requires further corroboration is the claim that subject animacy and person are key factors influencing the acceptability and interpretation of *tener que*. Further study could target this hypothesis directly and shed light on the development of disposition interpretations of *tener que* in this variety.

Following up on the phenomena, a logical step forward for the study of *iba a* would be to conduct both corpus analysis and experimental work concerning hypothetical uses of the past prospective *ia* in Portuguese. Because this construction is used even more widely in Portuguese, this research could give us access to yet another stage in the evolution of past prospective constructions.

A theoretical question that is relevant to the phenomena under study concerns the extent to which changes in a grammatical system are interconnected. Returning to Figures 6.1 and 6.2, we find that although the phenomena under study here are relatively unrelated, they both are connected to the future domain, and they seem to be in virtually identical stages in the process of categorization. A future research program can examine the future and modal domain in Cuban Spanish more comprehensively to gain a better understanding of how these phenomena are related.

There is much exciting research to be done, and the amphichronic enterprise has proven to be a fruitful approach to a complex question. It is clear that when we understand where a grammatical system has been, we have a better understanding of where it is today. It has also been clear that in bringing together diverse approaches to linguistic study, we can benefit from the strengths of these multiple perspectives. May this guide us always.

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Appendix A

Coding Conventions

A.1 Prospective Sub-classes

1 Intention

(a) Prototypical Uses:

- i. **Prototype intention:** 1st person, animate or group of animate agents, agentive verb, desired outcome. No explicit restriction. Context doesn't indicate that the preadjacent is not a goal of the speaker.
- ii. **Near prototype intention (Explicit restriction):** 1st person, animate or group of animate agents, agentive verb, desired outcome. Explicit restriction.
 - A. Explicit restriction is a reason (exists in the world already)
 - B. Explicit restriction is a condition (e.g. supuesto que)
 - C. Aunque plus subjunctive
 - D. Time referring adverbial expression
 - E. Command
- iii. **Near prototype intention (Non-agentive):** Non-agent verb. 1st person, animate agent or group of agents. Agents have control over the realization of preadjacent.

(b) Marginal Uses

- i. **3rd person, animate subject; Subject Goal:** 3rd person, agentive verb, animate subject, subject intention. Matrix and dependent clauses if the context makes clear that it's a goal (Goal attributed to the subject)
 - A. Matrix clause: Context describes preadjacent as a goal.
 - B. Relative clause: Context makes reference to subject's subjective state
 - C. Relative clause generalization: the context is generalizing about a group, the relative clause is the intention that this group has in a given situation

- D. Justification of previous statement: there is an implicit “me dijo que” which we can back out from a previous future-oriented statement and/or the use of a marker like “pues”
- ii. **Inanimate Subject; Speaker Goal:** Inanimate fulfillment intention. An inanimate subject fulfills the goal of a speaker. The context indicates that the prejacents is in fulfillment of a speaker’s goal.
 - A. Explicit responsibility: A prepositional phrase dependent clause (of the matrix clause) describes a responsibility of the speaker.
- iii. **3rd animate subject; Speaker Goal:** 3rd person. Context makes clear that the other’s actions are the will of the speaker. (Goal attributed to the speaker)
- iv. **3rd animate subject; 3rd person Goal:** Other animate, salient agent intention. 3rd person. Context makes clear that the subject’s actions are the will of another agent. (Goal attributed to salient agent)
- v. **2nd subject; Addressee Goal:** Speaker is making a guess about the intentions of the addressee.
 - A. Inferential Marking: Supposition adverb (e.g. “seguro”)
- vi. **Questionable control:** 1st person, animate agent or group of agent subject. Non-agentive verb. Agent’s control over outcome is questionable.
 - A. Future inflected verb is a verb of trying or managing (e.g. procuraré)

2 Prediction

(a) Prototypical Uses:

- i. **Prototype prediction:** 3rd person, inanimate, main clause, context does not specify alternative interpretation
- ii. **Near prototype prediction (Dependent clause):** 3rd person, inanimate, subordinate clause, matrix verb is not a propositional attitude verb but is understood as making reference to the subjectivity of the speaker.
- iii. **Near prototype prediction (Explicit prediction):** Prejacents is in an object clause of a propositional attitude verb. The content of the prejacents is not a fact about the actual world.

(b) Marginal Uses:

- i. **First person subject:** An individual makes an inference about himself or herself in the future.
 - A. Prejacents verb is a psychological state verb. The default understanding is that this is not about the present because we take individuals to be aware of their present psychological states.
 - B. Passive construction.
 - C. Prejacents is undesirable.
- ii. **2nd, 3rd animate subject:** An individual is predicted to be the subject of a non-agentive and/or non-desirable eventuality.
 - A. Psychological state verb.

- B. Non-agent eventuality (e.g. “caer”)
- C. Others’ epistemic state is indicated by the matrix verb or an adverbial
- D. Undesirable, context specifies that this is not a goal
- iii. **2nd, 3rd indefinite subject:** Indefinite subject such as *quién* or *nadie*.
- iv. **Conditionals:** Context makes clear that this is not a generalization (e.g. through unique direct object). Context does not provide evidence that the statement is based on publicly available information.
 - A. Inscrutable reasoning process: context discusses reasoning based on feeling or generalizations
 - B. Lack of authority: speaker does not have authority or knowledge to make absolute claims
 - C. Implicit protasis: prepositional phrase or adverb make conditional claim

3 Predestination

(a) Prototypical Uses:

- i. **Prototype predestination:** 3rd person, inanimate, relative clause, adverbial clause, protasis, object clause, context does not specify alternative interpretation
- ii. **Near prototype predestination (2nd, 3rd Animate subject):** 2nd,3rd person, animate, object, adverb, or relative clause, context does not specify alternative interpretation (e.g. explicit mention of a plan).
- iii. **Near prototype predestination (1st, Animate subject):** 1st person, animate, relative clause, context does not specify alternative interpretation (e.g. “La cosa que voy a decirte”)

(b) Marginal Uses

- i. **Main clause, Overt Common Ground:**
 - A. Movers on a path.
- ii. **Main clause, Covert Common Ground:** A background is recoverable in which the prejacent follows from facts that are available to the public (but which otherwise may not be available to participants at the time of speech)
 - A. Speaker is expert or authority on a topic, therefore, having knowledge of facts that determine the prejacent.
 - B. Speaker gives commands to the interlocutor.
 - C. Use of the adverb “ya”
 - D. Series of arguments, prejacent under “therefore, so,” etc.
 - E. The speaker describes a situation whose future is decided by a group
- iii. **Prophetic Claims:**
 - A. Retrospective prophesy. The context claims that elements of a prophesy have been realized.
 - B. Nonretrospective prophesy. The context determines the statement is a prophesy by tone, a series of metaphors, etc.

- iv. **Others' perception:** Perception verb. What is perceived is claimed to already exist.

4 Scheduled

(a) Prototypical Uses:

- i. **Prototype Scheduled:** 3rd person, inanimate subject, adverbial indicating time/ date/ location

(b) Marginal Uses:

- i. **Implicit Scheduled:** 3rd person, inanimate subject, no explicit mention of time/ date/ location, context indicates that the prejacents is scheduled.
 - A. Series of events: The sentence is embedded in a series of events.

5 Command

- (a) Prototype Command: 2nd person, animate or group of animate agents. Context indicates that the prejacents accomplishes a goal of the speaker or is responded to with an intention or assent.

- i. A “para que” expression voices the goal of the speaker
- ii. The addressee responds in assent

A.2 Non-prospective Sub-classes

1 Restricted Generalization

(a) Prototypical Uses:

- i. **Prototype restricted generalization:** Apodosis. Context and content make clear that the prejacents is a generalization.
 - A. Topic is indefinite.
 - B. Singular subject. Multiple realizations of the prejacents. Past verifiable instances.

(b) Marginal Uses:

- i. **Non-apodosis, Indefinite relative clause:** Relative clause taken to have occurred before.
 - A. Indefinite, relative clause Indirect object (e.g. “a quién”)
 - B. Indefinite, relative clause subject (e.g. “quien”)
- ii. **Non-apodosis, Past verifiable instances:**
 - A. Plural subject. Singular realization of the prejacents.
 - B. Plural subject. Multiple realizations of the prejacents.
- iii. **Command or suggestion:** This command or suggestion indicates a practice or habit. (It is not a prediction about what will happen in the future, but a generalization about what follows the command or suggestion)

A. The prejacents are contained in the justification or reason for making the command

2 'Virtue of'

(a) Prototypical Uses:

i. **Explicit 'virtue of'**: The context and content explicitly state that a fact is in virtue of another.

(b) Marginal Uses:

i. **Supporting knowledge**: The prejacents are in a question asking the source of the fact/ knowledge (“¿de dónde?” “¿Por qué?”)

ii. **Non-generalization, Past**: Prejacents refer to a definite event in the past

3 Imperative

(a) Prototypical Uses:

i. **Prototype imperative**: 1st person plural. Interlocutors respond with assent.

ii. **Near prototype imperative (Context)**: 1st person plural. No response. Context describes that the speaker is in service to another.

iii. **Near prototype imperative (Series)**: 1st person plural. No response. The command is a conjunct with another command.

A.3 Motion vs. Other

1 Generalization

(a) **Prototype generalization**: Explicit content points to a generalization.

i. Series of generalizations

ii. Generalization adverb (e.g. “siempre”, “cuando” + present)

iii. Passive voice

iv. Subject is indefinite (e.g. “el que”)

2 Progressive motion

(a) **Prototype progressive motion**: The subject of is currently in motion as described in the context.

i. Scene describes motion previously.

ii. Participant announces motion previously.

iii. Stage direction.

iv. Narration of motion (verbs in a series)

v. Auxiliary (“ir”) is modified

vi. Under “mientras” (e.g. “mientras la va a encender”), context doesn't specify other interpretation

- vii. Reference is made to a time interval. 3rd person. (e.g. “al tiempo que iban a pelear”)
- viii. Simultaneous. Indicated with present participle, “cuando” expressions (especially in the past), etc.
- (b) **Near prototype progressive motion:** The subject has temporarily stopped motion towards a destination in order to have a conversation.
- (c) **Subjunctive motion:** subjunctive *ir*, 3rd person imposing will on other 3rd person
 - i. For competition with future predestination (“vaya”) interpret as motion if there is a locative adverb with “a” or “con” with a person

A.4 Futurate vs. Future

1 Ambiguous Cases: Code Futurate

- (a) **Outside Deictic center:** The eventuality is realized in another location.
 - i. Explicit: Followed by “Vase” or similar stage direction.

2 Unambiguous Cases: Code Future

- (a) **Undesired**
- (b) **Inside deictic center:** The eventuality is realized in the deictic center of the subject
 - i. Verb type: The verb invariably begins in the deictic center of the speaker (e.g. “llevar”)
 - ii. Immovable: The subject is abstract or immovable (e.g. “luck”)
 - iii. Large situation of evaluation: Verb is verified in a situation that may be as large as the whole world (e.g. “atreverse”)
 - iv. Subsequent discourse: The prejacent announces subsequent spoken or written discourse
 - v. Prepositional phrase: A prepositional phrase in the sentence contains a generalization, indicating that the main verb is “here”
- (c) **Modified prejacent:** A modifier of the verb phrase modifies the prejacent (e.g. “I’m going to die fighting”)
- (d) **Non-intention:**
 - i. Go is not sub-goal: Going is not a subgoal of the prejacent. Going is not necessary or essential in achieving the prejacent (e.g. “Ir a fingir celos”)
 - ii. Inanimate subject: The prejacent isn’t a goal by virtue of the fact that the subject is inanimate
 - iii. Evocation of others’ epistemic state: “según dicen” or “they say that”
- (e) **High clitic:** Evidence of grammaticalization
- (f) **Abstract object:** The subject can’t physically interact with the prejacent

(g) **Unsettled** (a requirement for futurates):

- i. There is no determined time. The prejacet will happen “eventually.”
- ii. There is a precondition in the context which is not yet fulfilled

3 Unambiguous cases: Code Futurate

(a) **“Irse”**

Appendix B

Stimuli in Spanish: *tener que*

Label	Contexts and Target Sentences
A	Los paquetes de España a Cuba siempre tardan 6 meses en llegar a más tardar. Hace 4 meses Alfredo mandó un paquete desde España a su mamá en Cuba. Le dice a su mamá:
	El paquete [tiene que/ va a] llegar dentro de 2 meses.
B	En el país mítico de Lulandia, siempre se caen caramelos del cielo unas horas después de que las nubes se ponen azules. Tomás vive en Lulandia. Sale de su casita y ve que las nubes están azules. Le dice a sus niños:
	Prepárense que en un rato [tiene que/ va a] empezar a caer caramelos.
C	Todos los años sin fallar, Pánfilo—el actor favorito de Paola—sale en el musical del fin de año en la última semana de diciembre. Hoy es el primero de diciembre. Paola le dice a su vecina:
	Pánfilo [tiene que/ va a] salir en el musical de este fin de año.
D	Selena trabaja en un bufete de abogados. En el trabajo de Selena, siempre cuando alguien gana un caso el próximo lunes los jefes compran comida para todos los abogados aunque no es una obligación de ellos. Esta semana Selena ganó su caso. Su compañera le dice:
	Qué bueno, el lunes nos [tienen que/ van a] dar comida.
1	En Australia siempre llueve en la tarde si el cielo se pone gris por la mañana. Emily vive en Australia. Sale de su casa por la mañana y el cielo está gris. Entra en la casa y su hijo le pide ir a la playa por la tarde. Emily le dice:
	No podemos ir a la playa, porque [tiene que/ va a] llover esta tarde.

2	Siempre cuando Jorge regresa de la tienda, abre la puerta, entra en la casa y en seguida, su perro sale corriendo. Maykel vive en frente de Jorge y ve esto todos los días. Un amigo está de visita cuando Jorge regresa con las compras y entra en la casa, dejando abierta la puerta. Maykel le dice a su amigo:
	Mira, el perro de Jorge [tiene que/ va a] salir de la casa corriendo.
3	Una vez el hijo de Yolanda trajo caramelos a la casa y la casa se llenó de hormigas el próximo día. Eso fue en temporada de lluvia. Ahora es temporada seca y el hijo de Yolanda trae caramelos a la casa. Yolanda dice:
	Ay no, la casa [tiene que/ va a] llenarse de hormigas mañana.
4	Yiselys leyó en el periódico que Carlos Otero, su locutor favorito va a salir en el musical del fin de año este año. Yiselys le dice a su vecina:
	Carlos Otero [tiene que/ va a] salir en el musical del fin de este año.

Table B.1: Contexts and target sentences presented to informants: *tener que*

Appendix C

The Structuring of the Premise Set

Premise sets are structured in the sense that some propositions “lump” other propositions (Kratzer, 1989). Intuitively, lumped propositions are propositions that are mutually dependent in the world. For example, consider a painter who creates a still life that includes apples and oranges. When this painter paints the still life, she also paints apples and she paints oranges. The painting of a still life with apples and oranges lumps the painting of apples and the painting of oranges.

To quote Kratzer’s (2012) definition of lumping:

(244) A proposition p lumps a proposition q in a world w iff (a) and (b) both hold:

- a. p is true in w
- b. Whenever a situation s is part of w and p is true in s , then q is true in s as well. (p.118)

If p lumps q , I will assume that the appropriate representation of this proposition in the factual set of premises is $p \wedge q$. Expanding on this idea slightly, I will assume that there are other cases in which agents may take two propositions to ‘hang together.’ These may include causality (p causes q), generalizations (q is expected when p), and others. I will assume that the most common revision is that of a set of circumstances. The circumstances that are considered in the reasoning process are the relevant circumstances.¹

¹Kratzer (2012) frames her premise set differently, privileging premise sets that confirm the non-accidental generalizations that they contain.

The implementation of the REVISION OPERATION that I propose is defined below:

- (245) a. A is a premise set of factual propositions.
 b. p is a proposition that is not a member of A .
 c. A revision $A_{rev.p}$ of A with p is the following:
 i. $A_{rev.p} = \{q \cap p \mid q \in A\} \setminus \{\emptyset\}$

This revision operation creates a new set of propositions from A by intersecting p individually with every proposition in A and removing any set that contains the empty set. It is necessary to remove any set containing the empty set if p is incompatible with any proposition in A . The operation is visualized in the table below.

A	$q \cap p$	output	$A_{rev.p}$
a	$a \cap p$	$a \wedge p$	$a \wedge p$
b	$b \cap p$	\emptyset	
c	$c \cap p$	$c \wedge p$	$c \wedge p$

Table C.1: An example of the elaboration of the revision operation.

If p is compatible with all propositions in A , the effect of the revision operation adds p to A (e.g. $A \cup \{p\}$). However, if p is incompatible with any proposition q in A , revision has the effect of replacing q with p . Because the premise set is structured by lumping, this operation also removes any proposition that ‘hangs together’ with q . An advantage of such a revision account is that it avoids some of the vagueness of similarity-based accounts in the counterfactual conditional literature (e.g. Ippolito, 2013).

Appendix D

Stimuli in Spanish: *iba a*

Label	Contexts and Target Sentences
A	Raúl vive en Canadá. A Raúl le fascina España y sueña con viajar allá algún día, pero trabaja de enfermero y no tiene tiempo para viajar. Su amigo le pregunta, “¿A dónde viajarías si no estuvieras tan ocupado con el trabajo?” Raúl contesta:
	[Iba a ir/ iría] a España.
B	Yudit es una niña que sueña con ser maestra, pero tiene problemas en las cuerdas vocales y no puede hablar mucho porque el dolor es insoportable. Una vecina de Yudit le pregunta a su mamá, “¿Qué haría Yudit si pudiera hacer lo que quisiera?” La mamá le contesta:
	[Iba a ser/ sería] maestra.
C	Roberto está planeando graduarse en mayo y se siente confiado de que va a aprobar todos los exámenes finales para poder graduarse. Un amigo le pregunta, ¿y qué pasaría si cayeras enfermo y no aprobaras tus exámenes finales? Roberto le responde:
	Bueno, no me [iba a graduar/ graduaría] en mayo entonces; [iba a seguir/ seguiría] estudiando un año más.
D	Todos los días, Yunier va a la escuela para buscar a su hijo. Una amiga de Yunier le pregunta, ¿Y qué pasaría si un día por alguna razón no pudieras ir a buscarlo? Yunier contesta:
	Si yo no pudiera, mi mamá lo [iba a hacer/ haría]. Ella está jubilada.
E	Dariel se mudó a Alemania porque encontró un trabajo de profesor de español. Dariel se siente triste porque en donde vive, la gente no sale a la calle para platicar así que no conoce a ninguno de sus vecinos. Lo lamenta a su mamá por teléfono y le dice:
	Si la gente acá no fuera tan cerrada, yo [iba a estar/ estaría] feliz.

1	El hijo de Yadira vive en otro país. Marta le pregunta a su amiga Yadira, cómo se sentiría si su hijo llegara de repente a casa para sorprenderle. Yadira le dice:
	[Iba a estar / estaría] muy feliz.
2	Melissa y Yeni viven en Puerto Rico. Melissa es de Uruguay y Yeni es de Puerto Rico. En Puerto Rico, el precio de la ropa no baja casi nunca. Melissa le pregunta a Yeni, ¿Qué pasaría si un día el precio de la ropa bajara? Yeni le contesta:
	La gente [iba a correr/ correría] a la tienda.
3	Juan tiene un estante muy viejo en la sala que está a punto de caerse. No se cae por una barra que lo apoya contra la pared. Una visita de Juan le pregunta, “¿Qué pasaría si quitaras esa barra?” Juan contesta:
	El estante se [iba a caer/ caería].
4	Raúl vive en Canadá. Trabaja de enfermero y no tiene tiempo para viajar. Su amigo le pregunta, “¿A dónde viajarías si no estuvieras tan ocupado con el trabajo?” Raúl no piensa mucho en viajar, pero considerándolo contesta:
	[Iba a ir/ iría] a España.
5	Yudit es una niña a quien le fascina enseñar, pero tiene problemas en las cuerdas vocales y no puede hablar mucho porque el dolor es insoportable. Una vecina de Yudit le pregunta su mamá, “¿Qué haría Yudit si pudiera hacer lo que quisiera?” La mamá le contesta:
	[Iba a ser/ sería] maestra.

Table D.1: Contexts and target sentences presented to informants: *iba a*

Appendix E

Tukey multiple comparisons of means 95% family-wise confidence level

Comparison	Lower Mean	Upper Mean	Difference	p (adj)
Const. Choice-Act. Reaction	0.98473000	-0.4203744	2.3898344	0.3195957
Disp. Choice-Act. Reaction	0.28356022	-1.2759689	1.8430894	0.9944451
Emot. Reaction-Act. Reaction	0.22295014	-1.2192591	1.6651594	0.9974137
Environ. Emot.-Act. Reaction	0.85474226	-0.9749454	2.6844300	0.7405272
Prem. Choice-Act. Reaction	1.10790213	-0.3145499	2.5303541	0.2126195
Disp. Choice-Const. Choice	-0.70116978	-2.0544073	0.6520677	0.6485720
Emot. Reaction-Const. Choice	-0.76177986	-1.9779575	0.4543977	0.4452683
Environ. Emot.-Const. Choice	-0.12998774	-1.7873584	1.5273830	0.9999047
Prem. Choice-Const. Choice	0.12317213	-1.0695098	1.3158541	0.9996315
Emot. Reaction-Disp. Choice	-0.06061008	-1.4523359	1.3311158	0.9999949
Environ. Emot.-Disp. Choice	0.57118205	-1.2189829	2.3613470	0.9342402
Prem. Choice-Disp. Choice	0.82434192	-0.5468995	2.1955834	0.4916112
Environ. Emot.-Emot. Reaction	0.63179212	-1.0571504	2.3207346	0.8783974
Prem. Choice-Emot. Reaction	0.88495199	-0.3512273	2.1211313	0.2968104
Prem. Choice-Environ. Emot.	0.25315987	-1.4189433	1.9252630	0.9976578

Table E.1: Results of post-hoc Tukey Analysis