

THE UNIVERSITY OF CHICAGO

FREE CHOICE FROM INDISCRIMINACY:  
A STUDY OF FREE CHOICE INDEFINITES AND INDISCRIMINATIVES IN  
ENGLISH AND CUEVAS MIXTEC

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This is dedicated to my mom, brother, pop, siblings, welita, tí@s, prim@s, and all my relatives in California, Panamá, México and beyond. No great wealth, material or intellectual, compares to my most cherished memories of family.

“The word *any*, when used *in a negative*, may have either a universal or a particular meaning: it may either stand for *any whatsoever*, or for a *certain or uncertain one or more*.

[...] A person who has just dined heartily need not take *any* food (universal): a convalescent ought not to take *any* food (particular; beef tea, but not pickled salmon). Some will perhaps make it depend upon the verb used; they will see the universal in ‘*need not take any food*’, and the particular in ‘*ought not to take any food*’. Some will make it a question of emphasis, laying stress on *any*, when the word is particular: but the ambiguity is there, let the grammarian and rhetorician treat it as they will. A logician may, if he please, postulate that *any* shall always have the universal sense in technical enunciation:

[Sir William] Hamilton did not do so, but implicitly maintained that *any* is *always* universal. Accordingly, he asserted that ‘No X is Y’ is properly expressed by ‘Any X is not any Y.’ But though ‘No fish is fish’ be certainly false, ‘Any fish is not any fish’ is false or true, according as the second *any* is universal or particular. Choose what fish you please, it is not *any* fish: turbot is not trout.”

– Augustus De Morgan (1864, 431-432)

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1. It competes with Sharon Rose's *Languages of Africa* course for my favorite course offering of all time.

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## ABSTRACT

This dissertation concerns the semantics of free choice indefinites, indiscriminatives (Horn, 2000), and the derivational relationship between these two indefinite classes across languages. It defines indiscriminatives as indefinites that occur under negation to express the specificity or noteworthiness of a yet to be revealed candidate for satisfaction of a predicate. They include English indefinites of the *just any* paradigm, as well as its translations across languages.

The dissertation refutes the prevailing attitude in the literature that indiscriminatives are pragmatic enrichments on free choice indefinites that are unessential to understanding free choice phenomena, and it proposes a novel semantics that predicts that free choice indefinites are actually frequently derived from indiscriminatives. Two case studies are considered: English indiscriminative *just any* and bare *any*, as well as indiscriminatives in Cuevas Mixtec, an Otomanguean language of southern Mexico. In both languages, indiscriminatives may have free choice readings, and in Cuevas Mixtec, an optional focus particle *va* must be attached to the indiscriminative to derive a free choice indefinite. The proposal accommodates this data first by developing a novel analysis of free choice meaning, then by building a general semantics of indiscriminatives that may be modified to derive free choice indefinites.

The proposal breaks down the meaning components of free choice indefinites and indiscriminatives into four semantic ingredients: existential quantification, the activation of subdomain alternatives, exclusive meaning, and an inferential operation called minimal sufficiency evaluation. Existential quantification and subdomain alternatives are involved in the semantic composition of both types of indefinite, and they are exploited in deriving polarity sensitive behavior more broadly by means of inferential conflicts between an assertion and its propositional alternatives (Krifka, 1995). For example, English indefinites of the *any* paradigm are analyzed as existential quantifiers with a presupposition that some propositional alternative to their assertion, with a strictly more specific nominal restriction, is true. This results in an assertion that is inferentially weaker than the presupposition in upward

entailing environments, and a felicitously stronger assertion in environments that reverse inferential strength relationships.

Indiscriminatives additionally feature an explicit or implicit exclusive meaning component, modelled as the ONLY operator defined by Coppock & Beaver (2014). This operator applies an exhaustified interpretation on the assertion relative to propositional alternatives, and when negated, it forms an assertion that matches the presupposition in strength. Free choice indefinites instead feature minimal sufficiency evaluation, an operation that associates individuals with degrees on a relevant scale and imposes a dependency on exceeding some minimum degree sufficient for satisfaction of a predicate. The operation reverses the inferential strength relationships between scalar terms in semantic environments with modal expressions, satisfying *any*'s need for a stronger assertion for felicity.

These four semantic ingredients may be reorganized with respect to each other in order to account for distributional differences between polarity sensitive indefinites across languages. Most crucially, indefinites with both indiscriminative and free choice readings organize the ingredients so that the ONLY operator is interpreted with narrow scope with respect to minimal sufficiency evaluation, explaining the derivation of free choice indefinites from indiscriminatives.

## CHAPTER 1

### INDISCRIMINATIVES AND FREE CHOICE INDEFINITES

Freedom of choice, or FREE CHOICE, can be described as the meaning contribution of the English determiner *any* in its positive occurrences (Vendler, 1967). It is the expression of arbitrariness of candidate for satisfaction of a predicate or description, resulting in a form of universal quantification that is strictly distributive. Example (1) below is a sentence in which the indefinite *anyone* is used to express free choice.

- (1) We can give this job to **anyone**.

Here, the speaker claims that the person who may be given the job in question is arbitrary, or similarly, that the description *we can give the job to* is attributable to everyone, though perhaps not everyone all at once. Taken as such, *anyone* approximates the meaning contribution of a distributive universal quantifier. Nominal expressions that feature a dedicated marker for expressing free choice, such as a determiner or indefinite article, are called FREE CHOICE INDEFINITES.<sup>1</sup>

The task of accurately characterizing the semantics of free choice indefinites has been a decades-long, unresolved puzzle, at times sparking intense debate. The phenomenon has been investigated from a large number of perspectives (Kadmon & Landman, 1993; Dayal, 1998, 2004, 2013; Giannakidou, 2001; Giannakidou & Cheng, 2006; Sæbø, 2001; Jayez & Tovena, 2005; Aloni, 2007; Menéndez-Benito, 2007, 2010; Chierchia, 2013), each offering a distinct, competing analysis of its semantic or pragmatic resources. As heated as the debates have been, many of the most circulated accounts still fall short in their ability to predict grammatical features very common to free choice indefinites. In particular, few accounts consider the ubiquitous grammatical link between free choice indefinites and so-called INDISCRIMINATIVES<sup>2</sup> across languages.

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1. FREE CHOICE ITEM is another, perhaps more common, term for this class of nominal expression in the literature.

2. This term comes from Horn (2000).

Indiscriminatives are modified or unmodified nominal expressions that co-occur with negation to express the specificity or noteworthiness of a yet to be revealed candidate for satisfaction of a description. Indiscriminatives include nominal expressions featuring the English lexeme pair *just any*. Example (2) below shows the indiscriminative *just anyone* occurring under scope of negation to prime the addressee for the reveal of some entity.

(2) Bob didn't see **just anyone** – He saw ... Stan Papi!

(Carlson, 1981, 22)

Above, the speaker applies negation on *just anyone* to assert that the person Bob saw at some event was not an unnoteworthy person, but someone more. The noteworthiness of the person is not confirmed until the follow-up sentence, where the person is revealed as a famous former major league baseball player. This discourse effect of priming an addressee for the reveal of some entity by negating indiscriminatives is called ANTI-INDISCRIMINACY, while the meaning contribution of non-negated indiscriminatives alone would be called INDISCRIMINACY.

Indiscriminatives frequently bear a strong morpho-syntactic similarity to free choice indefinites across languages, suggesting that the two indefinite classes are derivationally related in some manner. Example (3) below shows how the Italian free choice indefinite *qualunque libro* in (3a) and the indiscriminative *qualunque libro* in (3b) are at least segmentally identical, ignoring possible suprasegmental differences, like emphatic stress.

(3) a. Gianni legge **qualunque** libro.  
Gianni reads any book  
'Gianni reads any book.'

b. No, non legge **qualunque** libro. Per esempio, odia la saggistica politica  
No not read any book for example hates the essay political  
'No, he doesn't read ANY book. For example, he hates political essays.'

(Chierchia, 2013, 341)

It is curious, then, that most analyses of free choice indefinite semantics, especially the most circulated ones, do not account for this relationship with indiscriminatives. Through-

out the literature, it is common to consider indiscriminatives as merely pragmatic meaning enrichments on free choice indefinites. In his crosslinguistic survey of indefinite pronouns, Haspelmath (1997, 190) lists indiscriminatives<sup>3</sup> among the possible meaning enrichments on other standard classes of indefinite. Sæbø (2001, 743) similarly supposes that indiscriminatives in Norwegian are pragmatic meaning enrichments on indefinite expressions, resulting in “rhetorical” meanings, as he puts it. It has even been proposed to the author of this work by very prominent semanticists that indiscriminatives are “idioms”, despite their frequent derivational association with free choice indefinites across languages. Such biases towards indiscriminatives have probably impeded research into formal analyses of their semantics, with the result that so little is said about their mysterious relationship with free choice indefinites.<sup>4</sup> The irony is that research on indiscriminatives may foster refinement of analyses of free choice indefinite semantics. Meanwhile, gallons of ink have already been spilled on the topic, with slow progress towards broad consensus on approach.

This dissertation aims to fill the gap in this research by devoting itself to the semantic analysis of indiscriminatives in two languages: English, and an Otomanguean language of southern Mexico called Cuevas Mixtec. These languages are chosen based on the particular morpho-syntactic strategies they utilize for the construction of both free choice indefinites and indiscriminatives. The data from these two languages suggest that, when a non-segmental derivational relationship is implied, it is actually free choice indefinites that can be derived from indiscriminatives. This is the opposite direction of derivational relationship that has been assumed so frequently in the literature. The rest of this chapter expounds on some details that justify this conclusion, while adding additional information about how indiscriminatives are being defined here. The chapter ends with a preview of the following chapters and discussion of the semantic analysis adopted for free choice indefinites,

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3. He refers to them as *depreciatives*.

4. Chierchia (2013, 275-276) considers that indiscriminativity might simply be negated free choice and offers a couple brief and speculative treatments within his formal framework for deriving free choice. For dedicated work on the semantics of indiscriminatives, only Duffley & Larrivéé (2012) seem to deliver, although their work is not compositional.

indiscriminatives, and their proposed derivational relationship.

## 1.1 Introducing indiscriminatives

This section presents some brief arguments to support that, when a non-segmental derivational relationship is implied, it is free choice indefinites that are derived from indiscriminatives, as opposed to the opposite derivational relationship frequently assumed in the literature. It starts by further expounding on the definition of indiscriminatives to be assumed throughout this dissertation. Then it presents two arguments based on data regarding indiscriminatives and free choice indefinites from various, unrelated languages.

### 1.1.1 *Indiscriminatives defined*

For this work, indiscriminatives will be defined as nominal expressions with the following properties in (4):

- (4) a. co-occurrence with negation to express the specificity or noteworthiness of a yet to be revealed candidate for satisfaction of a predicate
- b. presence of a dedicated marker that contributes indiscriminative meaning productively

Note that this definition allows a lot of flexibility as to what may qualify as an indiscriminative. It only says that it must bear the right meaning contribution with negation, and that the meaning must be sourced to a consistent marker. It does not say what the meaning contribution ought to be without negation, or what form the marker should take. This is an intentional choice of criteria since indiscriminatives, often thought to bear some derivational relationship with free choice indefinites, share many features in common with them. Therefore, care should be taken not to define indiscriminatives in a way that distinguishes them too much from free choice indefinites. Additionally, indiscriminatives across languages can diverge in their characteristics beyond their characteristic attributes, just as free choice

indefinites often do. Their points of divergence include how they are interpreted outside the scope of negation, as well as the form of the dedicated marker.

## Interpretation outside of negation

Indiscriminatives tend to be polarity sensitive, just as free choice indefinites are, and do not always have an interpretation outside of negation. When there is an interpretation without negation, the interpretation is difficult to distinguish from the meaning of certain other indefinite classes, like free choice indefinites. Example (5) below is a French sentence with an indiscriminative formed with the marker *n'importe quel(le)*.

- (5) Ce n'est pas **n'importe quelle** théorie  
it is not not.matter which theory  
'It is not just any theory.'

(Jayez & Tovenà, 2005, 59)

Here, the marker interacts with negation to express the noteworthiness of some theory under discussion. The same marker may be used for forming free choice indefinites, as in the following example (6) without negation marking.

- (6) Marie pourrait avoir **n'importe quel** accident  
Marie might have not.matter which accident  
'Marie might have any accident.'

(Jayez & Tovenà, 2005, 60)

Here, *n'importe quel(le)* functions more as a marker of free choice meaning, and the nominal expression is interpreted as a free choice indefinite. Therefore, indiscriminatives that are acceptable outside of negation may not be easily distinguishable from free choice indefinites. What distinguishes them from free choice indefinites is their interpretation with negation, which is not a defining characteristic of free choice indefinites. A distinction between the two might seem superfluous if it were not for the fact that free choice indefinites in Greek

and Italian have been claimed or suggested to be unacceptable under scope of negation (Giannakidou, 2001; Chierchia, 2013).

## Diversity in internal structure

Indiscriminatives vary in the internal structure of their dedicated marker across languages, just as free choice indefinites do. The marker may take the form of a simple determiner, as in English, or it may take the form of a something like a relative clause, as in Cuevas Mixtec. English allows for the option of attaching an exclusive particle *just to any* to explicitly form indiscriminatives, as in (7).

(7) I wouldn't marry **just anyone**.

(Horn, 2000, 172)

Indiscriminatives in other languages may take on more complex forms, adding several obligatory particles, or displaying similar internal structure to relative clauses, as in Cuevas Mixtec. The list below in (8) is a collection of samples taken from Haspelmath (1993, 191) which show the diversity of forms that indiscriminative markers may take across languages.

(8) a. *German*

Ich verpacke doch nicht **irgendwelche** Brücken und Gebäude, einfach so.  
I pack but not any bridges and buildings just so  
'I don't package just any bridges and buildings, just like that.'

b. *Latin*

...virtutes-que non **quas-libet** faciebat Deus per manum Pauli.  
miracles-and not which-INDEF did God through hand of.Paul  
'...and God wrought not just any miracles by the hands of Paul.'

c. *Bulgarian*

Čovek-ât ne iska **kakvato i da e** ovca, a si târsi ovca-ta.  
man-the not wants which INDEF sheep but REFL seeks sheep-the  
'The man doesn't want just any sheep, but is looking for his sheep.'

d. *Serbo-Croatian*

Milan nije video **bito koga**, već predsednika  
Milan NEG.has seen INDEF whom but president  
‘Milan did not see just anyone, but the president.’

e. *Lithuanian*

Jis dėl **bet ko** ne-sijaudina  
he because.of INDEF what NEG-get.excited  
‘He does not get excited about just anything.’

f. *Chuvash*

Väl **takam** marške, xamăr syn  
he someone not.is ourselves person  
‘He is not just anyone, but one of ours.’

Throughout these samples, the form of the indiscriminative’s marker ranges from morphologically simple to complex. Therefore, the specific form of the dedicated marker is not worth much discussion, as far as the crosslinguistic definition of indiscriminatives is concerned.

### 1.1.2 *Variation in relationship with free choice indefinites*

Studies on the more common languages of Europe and Asia have revealed that indiscriminatives frequently take on the form of nominal expressions that may also be interpreted as free choice indefinites. Semanticists have typically regarded this phenomenon as evidence of the derivability of indiscriminatives from free choice indefinites by way of pragmatic meaning enrichment, like implicature. Here are presented two arguments against this assumption. First, it is noted that not all free choice indefinites across languages are capable of indiscriminative readings by way of pragmatic meaning enrichment. Sometimes, additional morpho-syntactic modification is required to derive something like an indiscriminative reading. Also, some languages do not seem to have indiscriminatives at all. Second, there is some evidence that free choice indefinites can actually be derived from indiscriminatives through various grammatical mechanisms. Evidence for this claim comes from languages as common as English, while

very explicit evidence comes from Cuevas Mixtec, a language featuring an indiscriminative that must be morpho-syntactically modified in order to derive a free choice indefinite.

### Free choice indefinites that do not become indiscriminatives

The first argument against the assumption that indiscriminatives are meaning enrichments on free choice indefinites comes from languages where pragmatics is insufficient for such a derivation. If it were the case that indiscriminatives were derived from free choice indefinites as pragmatic meaning enrichments, it should be possible to derive them from free choice indefinites universally. Yet, not all free choice indefinites can become indiscriminatives through pragmatics.

Modern Greek free choice indefinites of the *-dhipote* paradigm lack indiscriminative readings, being unacceptable under scope of negation. Example (9) below shows how the free choice indefinite *otidhipote* ‘anything’ is not licensed under negation and therefore lacks an indiscriminative interpretation.

- (9) \*I Roxani **dhen** idhe **otidhipote**  
 the Roxanne not see.3SG FCI.thing  
 (‘Roxanne didn’t see anything.’)

(Giannakidou, 2001, 682)

In order to derive something like an indiscriminative from a Greek free choice indefinite, the marker of the free choice indefinite must take the form of an adjective, while an indefinite determiner *enas* is added to the nominal expression. Example (10) shows how the free choice marker *opjosdhipote* takes on an adjectival position within the nominal expression, in between the determiner and the noun.

- (10) **Dhen** ine **enas opjosdhipote** daskalos. Ine o kaliteros!  
 not be.3sg a FC teacher is the best  
 ‘He is not just any teacher. He is the best teacher!’

(Giannakidou, 2001, 692)

The result is a nominal expression that would seem to be an indiscriminative. The data here show that the derivation of indiscriminatives from Greek free choice indefinites is not achieved merely by pragmatic mechanisms, but requires certain morpho-syntactic modifications. Therefore, at least in this case, indiscriminatives are a bit more than a pragmatic meaning enrichment.

In Mandarin Chinese, indiscriminatives appear to be completely absent, despite the fact that the language still features free choice indefinites. Interrogative pronouns and determiners are often utilized for expressing free choice. Example (11) below presents a case of an interrogative expression *nǎ-běn shū* ‘which book’ taking on a free choice reading.

- (11) Bólíng **nǎ-běn** shū dōu kěyǐ kàn  
 Boling which-CL book all can read  
 ‘Boling can read any book.’

(Cheng & Giannakidou, 2013, 134)

This same interrogative expression has two different readings under negation, but neither of them are indiscriminative. Instead, the readings attained are those of an existential quantifier, like unstressed English *any* under negation, and what might be described as appreciative or specific reading. Examples (12-13) below show *nǎ-běn shū* ‘which book’ and *nǎr* ‘where’ occurring under scope of negation with either existential readings or appreciative/specific readings, marked in the translation by ‘in particular’ in parentheses.

- (12) Tā **bù** xiǎng mǎi **nǎ-běn** shū  
 he not want buy which-CL book  
 ‘He does not want to buy any book (in particular).’
- (13) Tā **bù** xiǎng qù **nǎr**  
 he not want go where  
 ‘He does not want to go anywhere (in particular).’

(Giannakidou & Cheng, 2006, 174)

The negation of the existential reading results in an assertion of non-existence, while negation of the appreciative or specific reading results in an assertion of non-specificity. Meanwhile,

unlike with Greek free choice indefinites, there seems to be no mechanism for the derivation of indiscriminatives at all.

### Free choice indefinites from indiscriminatives

The second argument against the assumption that indiscriminatives are meaning enrichments on free choice indefinites comes from data showing that the opposite derivational relationship occurs. Certain nominal expressions that always have indiscriminative readings under negation may feature free choice readings outside of it. This is certainly the case with the English indiscriminative *just any*, which also displays free choice readings, as seen earlier and again below. Examples (14-16) are further examples of English *just any* contributing a free choice reading outside scope of negation.

(14) Albert eats (**just**) **anything**.

(15) (**Just**) **anyone** will eat Sara Lee cheesecake.

(LeGrand, 1975, 32)

(16) Jane listens to (**just**) **anyone**.

(Horn, 2000, 172)

The interpretation of the indiscriminative in these cases is hardly different from that of bare, free choice *any*, allowing optionality of *just* without a strong meaning difference. Free choice meaning, therefore, appears to be derivable from the meaning contribution of English indiscriminatives.

There are even some languages in which the derivation of free choice indefinites from indiscriminatives is morpho-syntactically explicated. In Cuevas Mixtec, free choice indefinites are constructed with three lexical components: a (complex) interrogative pronoun, a verbal base *kuu*, and a focus particle *va*. Example (17) below features a free choice indefinite *yuu kuu va* ‘anyone’.

- (17) *kuvi katasyà'á [yuu kuu va]*  
 can dance.IRR who happen.IPFV FOC  
 ‘Anyone can dance.’

These items may be modified to become indiscriminatives, but in an atypical way. Indiscriminatives are morpho-syntactically simpler items, formed with almost the same components, except that the focus particle is optional. The indiscriminative in example (18) below, *ndyé kárró kuu* ‘just any car’, lacks the focus particle.

- (18) *kòó ìsyiin [tyà juáàn] [ndyé kárró kuu]*  
 NEG buy.COMPL the.SG.M Juan which car happen.IPFV  
 ‘Juan did not buy just any car.’

However, the focus particle loses its optionality outside the scope of negation. Without the particle, indiscriminatives become unacceptable without occurrence under scope of negation. Below in (19), the indiscriminative *yuu kuu* ‘just anyone’ is unacceptable outside the scope of negation.

- (19) \* *kuvi katasyà'á [yuu kuu]*  
 can dance.IRR who happen.IPFV  
 (‘Anyone can dance.’)

Since indiscriminatives are unacceptable outside scope of negation without the particle, they lack free choice readings. Thus, in order to gain free choice readings, the particle must be reintroduced. This pattern then suggests that the derivational relationship between indiscriminatives and free choice indefinites is from the former to the latter, and not the reverse direction assumed for more common languages. This conclusion is further corroborated with a more in-depth analysis of the syntax and semantics of both the indiscriminatives and free choice indefinites of Cuevas Mixtec in Chapter 5.

### 1.1.3 Summary

This section defined indiscriminatives using two criteria: their characteristic meaning contribution under negation, and the presence of a dedicated marker. These criteria were chosen

because indiscriminatives are typically identified by their interaction with negation, and not without it, and the capacity of the marker to take one of a variety of grammatical forms. It was also argued that indiscriminatives are not pragmatically derived from free choice indefinites using two arguments. Free choice indefinites in Greek and Mandarin Chinese do not display pragmatic mechanisms for the derivation of indiscriminatives. Also, English and Cuevas Mixtec present cases where it appears that free choice indefinites may be derived from indiscriminatives, the opposite derivational relationship that has been assumed in the literature.

## 1.2 Goals and structure of the dissertation

The previous section ended with data from English and Cuevas Mixtec, showing that free choice indefinites may be derivable from indiscriminatives. However, to make a case for this direction of derivation, it is insufficient to provide supporting natural language data. The claim here concerns the derivation of greater meanings from more basic meanings, and because of this, it is necessary to provide a demonstration of how the derivation is actually achieved in the semantics. Thus, we arrive at the ultimate purpose of this dissertation, to provide a semantics of both indiscriminatives and free choice indefinites, and how one can be semantically elaborated into the other. When such a demonstration is provided, only then can one convincingly argue for the reality of free choice indefinites derived from indiscriminatives.

One might ask why this task is worth the effort, but it has a couple important consequences for the literature on free choice indefinites. First, as mentioned previously, study of indiscriminative semantics ought to bring linguists closer to the most descriptively adequate model of free choice semantics. The meaning contribution of English *any* has been a curiosity since De Morgan (Horn, 2000), an era well over a century ago. Understanding the semantics of indiscriminative *just any* is bound to get us at least some better clues, if not the actual solution. Second, once established that free choice indefinites are derivable from

indiscriminatives, several past approaches to the semantics of particular indefinites with free choice readings will be in need of review. It may be that, upon re-evaluation of the data, many so-called “free choice indefinites” will be better analyzed as indiscriminatives, with the free choice reading being the meaning enrichment.

The proposal can be briefly summarized as follows. The dissertation argues that indiscriminatives and free choice indefinites are both polarity sensitive indefinites with two semantic features in common, as well as one distinct additional feature each. Both classes of indefinite denote an existential quantifier, and they both activate subdomain alternatives that the quantifier’s restriction is contrasted with. These two features alone already capture much of the meaning contribution of polarity sensitive indefinites generally, and they are included in popular proposals for the semantics of English *any* (Krifka, 1995; Chierchia, 2013). Beyond these shared semantic ingredients, indiscriminatives and free choice indefinites additionally feature at least one additional ingredient. Indiscriminatives necessarily bear an exclusive meaning component that is the source of its characteristic meaning contribution under scope of negation. Free choice indefinites, on the other hand, grammatically induce a special kind of inference called MINIMAL SUFFICIENCY EVALUATION, which is proposed to be the source of free choice readings generally. Figure 1.1 shows how these features combine to result in either type of indefinite. As the figure shows, the combination of existential quantification and the activation of subdomain alternatives provides the foundation for many polarity sensitive indefinites, including indiscriminatives and free choice indefinites. Indiscriminatives are made more distinct with an exclusive meaning component, while free choice indefinites are formed with the additional application of minimal sufficiency evaluation. A polarity sensitive indefinite may also have both an exclusive meaning component and a minimal sufficiency evaluation applied, resulting in the dual status as both an indiscriminative and a free choice indefinite. However, key to the argument of the dissertation regarding the derivational relationship between these two indefinite classes is the innateness of the exclusive meaning component versus minimal sufficiency evaluation. It is proposed that in many

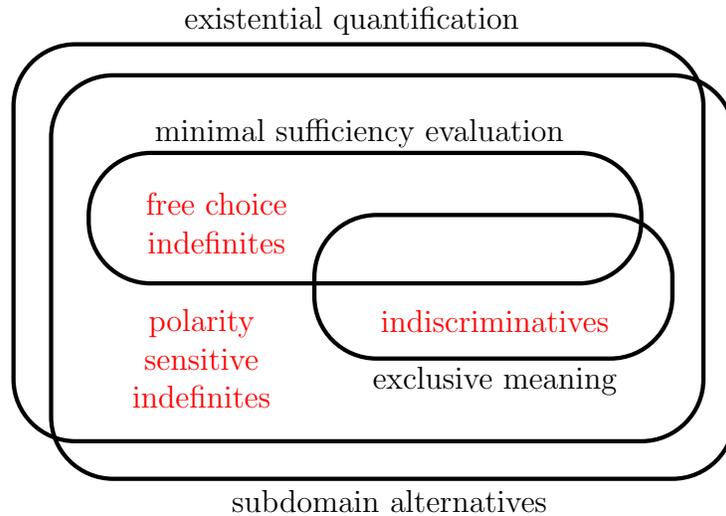


Figure 1.1: Semantic components of various indefinite categories

cases, a polarity sensitive indefinite that occurs as either an indiscriminative or free choice indefinite will have an inherent exclusive meaning component, making it an indiscriminative. Meanwhile, the status of free choice indefinite is typically derived after the application of minimal sufficiency evaluation.

The rest of the dissertation is structured as follows. Chapters 2 and 3 are devoted to developing a semantics of the source of free choice readings on nominal expressions generally, while chapters 4, 5, and 6 develop the semantic account of indiscriminatives and how free choice readings occur on them to derive free choice indefinites. Chapter 2 establishes the referential conditions on a nominal expression for hosting free choice readings. It argues that a nominal expression, given the right environment, need only refer to the bottom value of a scale in order to express free choice. This suggests that free choice indefinites similarly denote the bottom value of a scale, while free choice meaning is supplied as an implicature. Chapter 3 then establishes the environmental conditions for hosting free choice readings and forming free choice indefinites from bottom scalar values. The source of free choice readings is analyzed to be minimal sufficiency evaluation, an operation that associates individuals with degrees on a scale and imposes a dependency on exceeding some minimum degree suf-

ficient for satisfaction of a description. Chapter 4 returns to the topic of indiscriminatives and offers a foundation for their general semantics by developing a compositional analysis of English *just any*. The meaning of *just* is settled by invoking Coppock & Beaver's (2014) analysis of exclusive particles, and an original analysis for *any* is provided with many elements borrowed from Krifka (1995). These two meaning models are combined in a way so as to derive not only indiscriminative meaning, but also more general features of *just* and *any*, and even the capacity for both bare *any* and *just any* to attain free choice readings. Chapter 5 moves on to details of the syntax and semantics of Cuevas Mixtec indiscriminatives, expounding on the argument that indiscriminatives more broadly may be modified into free choice indefinites. In particular, it defines the grammatical features to be captured in a semantic model of indiscriminatives for explanation of their derivation into free choice indefinites. It also covers the interpretation of lexical items involved in the derivation, so as to motivate the compositional analysis. Chapter 6 concludes the dissertation by building the semantics of Cuevas Mixtec indiscriminatives and the compositional semantics of how they may be derived into free choice indefinites. The account resembles the semantic account of English *just any*, although the ingredients of existential quantification, activation of subdomain alternatives, and exclusive meaning are reorganized to accommodate some grammatical differences. The chapter ends with a comparison of the analysis with other popular analyses of free choice indefinites and explains advantages, plus some future directions.

## CHAPTER 2

### FREE CHOICE FROM BOTTOM SCALAR VALUES

The previous chapter offered a definition of indiscriminatives and presented evidence that they may be modified into free choice indefinites in some languages. This chapter begins the analysis of this derivational relationship by developing a general characterization of nominal expressions that may be interpreted with free choice meaning. Beyond free choice indefinites, free choice meaning has been identified on other types of nominal expressions. Both disjunctions and certain other types of indefinites have been observed to display it optionally. Examples (20-21) below present cases of free choice meaning as displayed by the English indefinite determiner *any* and the disjunction *or*.

(20) If we hire **any instructor**, the class will go well.

(21) If we hire **either Mary or Sue**, the class will go well.

In both of these examples, the speaker expresses arbitrariness in choice of hire for the class to go well. Example (20) with *any instructor* says that each instructor within a given domain is a viable choice of hire for the class to go well, while (21) says the same thing for a choice between two specific individuals, Mary and Sue. By contributing these truth conditions, the two nominal expressions, *any instructor* and *either Mary or Sue*, qualify as FREE CHOICE EXPRESSIONS, nominal expressions that display free choice meaning either optionally or obligatorily.

Previous analyses of free choice meaning often draw data from a very narrow range of free choice expressions. Typically, only data from indefinites and disjunctions is considered, and most researchers refrain from identifying free choice meaning on other types of nominal expressions. Perhaps due to this focus, it is a common impression that semantic disjunction and/or existential quantification are key semantic ingredients to free choice meaning. Popular analyses like Chierchia's (2013) start from this view and result in proposals that are too

narrow in their predictions. Consideration of a greater range of free choice expressions may help to refine our understanding of the semantic or pragmatic source of free choice meaning.

Many analyses of free choice meaning do not predict it to occur on definite descriptions. A critical observation presented in this chapter is that free choice meaning is also expressed by superlatives. Below in (22) is an example where the superlative *the laziest instructor* displays free choice meaning.

(22) Among these instructors, if we hire **the laziest instructor**, the class will go well.

The expression *the laziest instructor* qualifies as a free choice expression when one considers the right discourse context for the sentence above. Assuming a ranking of instructors from laziest to most industrious, a typical discourse context would establish that the laziest instructor is the riskiest choice for planning a class to go well. The speaker's suggestion that even the riskiest choice will allow the class to go well implies the arbitrariness of choice of hire, such that more industrious options of hire should also be satisfactory. The result of this inferential reasoning is the interpretation of the superlative as a free choice expression.

The capacity for superlatives to become free choice expressions has several theoretical implications regarding the semantic properties of free choice meaning. First, although quantifying superlatives may be potentially analyzed as indefinites (Szabolsci, 1986), the deictic expression in example (22) makes it clearer that the superlative may have a referent. Therefore, superlatives show us that semantic disjunction is in fact unessential to free choice meaning, and the list of known free choice expressions must be expanded to include certain definite descriptions. Second, that superlatives refer to an extreme value on a scale provides a more refined view of the semantic similarity among free choice expressions. Rather than consist of merely the bottom values of Horn scales, free choice expressions are characterized by reference to the bottom values of scales generally, including evaluative scales or those associated with gradable predicates. Therefore, a proper semantics of free choice meaning demands a more general characterization of the free choice expression's meaning contribution, that of reference to the bottom value of a scale.

This chapter expounds on this argument by presenting the evidence that superlatives can serve as free choice expressions. §2.1 continues the introductory discussion of Chapter 1 by defining free choice indefinites and describing the qualities of free choice expressions generally. Free choice indefinites are defined by the presence of two properties described by Giannakidou & Cheng (2006): *anti-episodicity* and *quantificational variability*. Giannakidou & Cheng offer these properties as criteria for free choice indefinites, but they may also characterize free choice expressions generally. §2.2 discusses other nominal expressions that display free choice meaning, and how these readings come about as implicatures. §2.3 discusses superlatives and their capacity to host free choice meaning as implicatures. They are shown to display the characteristic properties of other free choice expressions. §2.4 concludes the chapter with a summary of results.

## 2.1 Criteria for free choice indefinites

Free choice indefinites constitute a class of indefinite that is notoriously difficult to characterize, despite their widespread appearance across languages. They are *non-specific* indefinite pronouns in Haspelmath's (1997) crosslinguistic survey, i.e, indefinites that do not presuppose the unique identifiability of their referent. Among non-specific indefinites, free choice indefinites can be further distinguished by two additional properties defined by Giannakidou (2001) and Giannakidou & Cheng (2006): *anti-episodicity* and *quantificational variability*.

**Anti-episodicity:** an aversion to occurrence within non-generic, affirmative declarative sentences in the perfective past or in the ongoing present

**Quantificational variability:** a quantificational interpretation that is approximate to that of distributive universal quantification, resulting in paraphraseability with universal quantifiers in some cases and not others

This section elaborates on the characteristics of these two properties with data from Modern Greek. Modern Greek features a set of indefinites of the *-dhipote* paradigm, which are

convenient in that they seem to function unambiguously as free choice indefinites.

### 2.1.1 *Anti-episodicity*

The non-specificity of an indefinite often results in its limited distribution. A common form of this displayed by free choice indefinites is polarity sensitivity, and its subvariant, *anti-episodicity* (Giannakidou, 1997, 1998, 2001; Giannakidou & Cheng, 2006). Anti-episodicity is a constraint against occurrence in episodic sentences, i.e., non-generic, affirmative declarative sentences marked in the perfective past or ongoing present. In modern Greek, a common example of an episodic sentence is one in which the main verb is inflected for the perfective past. The following Greek example (23) shows that the free choice indefinite *opjondhipote* ‘anybody’ is unacceptable in a simple sentence with the main verb inflected for the perfective past.<sup>1</sup>

- (23) \* **Idha** opjondhipote ston kipo  
 saw.1SG FC.person in.the garden  
 (‘I saw anybody in the garden.’)

(Giannakidou, 2001, 713)

This aversion to episodic sentences extends even to cases where the free choice indefinite takes scope under negation. In example (24) below, *opjondhipote* is unacceptable under

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1. There are some cases of Greek free choice indefinites acceptably occurring with verbs inflected for the perfective past. Example (1) below presents such a case, where **ton opjodhipote** occurs with a main verb inflected for the perfective past.

- (1) Ekane ta panda monos tu: paragogi, scenario, skinothesia ke xrisimopiise **ton opjodhipote**  
 did.3SG the all alone him production scripts staging and used.3SG the FC-person  
 ja ithopio.  
 for actor  
 ‘He did everything alone: production, scripts, staging. He also used just any actor.’

(Vlachou, 2007, 261)

However, the discourse context also renders a generic interpretation on this sentence, and this generic quality removes the episodic interpretation that the sentence would otherwise display. Episodicity, then, is crucially defined as being non-generic, a characteristic of sentences as denoting episodes in time or events that are expressed as singular points on a time interval.

negation in an episodic sentence.

- (24) \* **Dhen** idha opjondhipote  
not saw.1SG FC.person  
(‘I did not see anybody.’)

(Giannakidou, 2001, 661)

In order to license free choice indefinites, they must occur in non-episodic sentences that express possibility or genericity. Non-veridical operators such as possibility or generic markers tend to provide the appropriate meaning contribution for licensing free choice indefinites. In example (25) below, the free choice indefinite *opjondhipote vivlio* is licensed within the sentence, due to the occurrence of the modal auxiliary verb *boris*.

- (25) **Boris** na dhanistis opjodhipote vivlio  
can.2SG SUBJ borrow.2SG FC book  
(‘You may borrow any book.’)

(Giannakidou, 2001, 677)

Other semantic environments that license Greek free choice indefinites include generic statements, imperatives, habitual statements, and the restriction of universal quantifiers.

Beyond anti-episodicity, Haspelmath (1997), citing Horn (1972), notes that free choice indefinites typically have more constraints on their distributions than other types of non-specific indefinites. In particular, they tend to be unacceptable in sentences with necessity modals or other expressions of necessity; a constraint that other classes of non-specific indefinite lack. Examples (26-27) show the unacceptability of free choice *any* while co-occurring with expressions of necessity, like *must* and *require*.

- (26) \* You **must** marry **anybody**

- (27) \* I **require** you to marry **anybody**

(Horn, 1972, 174)

Altogether, anti-episodicity and aversion to sentences with necessity expressions form the primary distributional properties encountered with free choice indefinites across languages. These distributional constraints are very consistent among the free choice indefinites of Greek, Spanish, Catalan, French, Norwegian, Italian, and even Mandarin Chinese (Giannakidou, 1998, 2001; Giannakidou & Cheng, 2006; Menéndez-Benito, 2007, 2010; Jayez & Tovena, 2005; Sæbø, 2001; Chierchia, 2013).

Although there is broad overlap in the distributional properties of free choice indefinites across languages, this is not to say that there is no variation. Greek free choice indefinites are generally acceptable in conditional clauses (Giannakidou, 2001), as observed in example (28) in which *opjondhipote* occurs in a conditional clause.

- (28) [**An** kimithis me **opjondhipote**] tha se skotoso  
 if sleep.2SG with FC.person FUT you kill.1SG  
 ‘If you sleep with anyone, I’ll kill you.’

(Giannakidou, 2001, 676)

Meanwhile, Norwegian free choice indefinites are awkward in conditional clauses (Sæbø, 2001). The following Norwegian example (29) shows that a free choice indefinite *hvilken som helst* is unacceptable within a conditional clause.

- (29) # Vi blir glade [**hvis** vi får en **hvilken som helst** støtte]  
 we become glad if we get a which as rathest support  
 (‘We are happy if we get just any show of support.’)

(Sæbø, 2001, 760)

The distributional differences encountered among free choice indefinites across languages may provide a challenge to the adequacy of their grouping as a uniform grammatical category. Fortunately, a more adequate descriptor of free choice indefinite status is gained by looking at their meaning contribution across the semantic environments within which they occur. This meaning contribution is fairly consistent wherever free choice indefinites are acceptable.

### 2.1.2 Quantificational Variability

Quantificational variability is the truth-conditional component to the meaning contribution of free choice indefinites. Giannakidou & Cheng (2006) explain it as the context-sensitive, truth-conditional interchangeability of free choice indefinites with universal quantifiers. Depending on the environment of occurrence, free choice indefinites may be truth-conditionally identical to universal quantifiers, permitting their paraphrase as such. In particular, within sentences that are generic, the free choice indefinite is paraphraseable as a universal quantifier. The Greek examples (30-31) below provide generic statements whose truth-conditions are not altered if the free choice indefinite is replaced by a universal quantifier.

- (30) **Opjadhipote ghata** kinigai pondikia  
FC cat hunt.3SG mice  
'Any cat hunts mice.'  
= 'Every cat hunts mice.'

(Giannakidou, 2001, 679)

- (31) **Opjosdhipote fititis** bori na lisi afto to provlima  
FC student can SUBJ solve.3SG this the problem  
'Any student can solve this problem.'  
= 'Every student can solve this problem.'

(Giannakidou, 2001, 663)

Both examples here express generalizations about cats and students, respectively. In each case, the free choice indefinite may be translated into English as either *any* or *every* without a meaning difference.

Within other types of environments, the free choice indefinite loses truth-conditional interchangeability with universal quantifiers. Instead, it may display a reading closer to that of a narrow-scoping existential quantifier. Such an reading occurs within statements of possibility, conditional clauses, and imperatives. The Greek examples (32-33) below are an

imperative statement and a statement of possibility. In these sentences, truth-conditions are altered if the free choice indefinite is replaced by a universal quantifier.

- (32) Dhialekse **opjodhipote** forema  
 pick FC dress  
 ‘Pick any dress.’  
 ≠ ‘Pick every dress.’

(Giannakidou, 2001, 697)

- (33) I epitropi bori na dosi ti thesi se **opjondhipote ipopsifio**  
 the committee can SUBJ offer.3SG the position to FC candidate  
 ‘The committee can offer this job to any candidate.’  
 ≠ ‘The committee can offer this job to every candidate.’

(Giannakidou, 2001, 665)

The imperative statement is a permission to select one dress from a choice among all dresses presented, but it is not a permission to select the entire set of dresses. Therefore, the translation of the free choice indefinite as an English nominal expression with *every* is inappropriate. The same is true for the statement of possibility, which states that some job under discussion may be offered to a single job candidate from a list of candidates under consideration, but not every candidate at once. So, here too, the translation of the free choice indefinite as something with *every* does not work. The free choice indefinites in these examples are therefore closer to existential quantifiers in their interpretation.

Quantificational variability does not mean that free choice indefinites literally fluctuate between the semantics of universal and existential quantifiers. Rather, free choice indefinites are understood to bear a consistent meaning contribution whose truth conditions accidentally converge with those of common universal quantifiers, depending on features of the semantic environment. Across all of these examples, free choice indefinites retain a sense of expressing strictly distributive universal quantification, which can be indistinguishable from collective universal quantification in some environments, especially generic ones, but distinguishable

in others. The added feature of anti-episodicity often leads semanticists to believe that this form of distributive universal quantification is of an intensional type (Giannakidou, 2001; Chierchia, 2013), where quantified referents are necessarily distributed across the values of some intensional parameter, such as possible worlds. The power of this idea lies in its ability to account for the distributional property of anti-episodicity, since episodic contexts crucially lack the semantic parameter needed for the desired intensional quantification. Semanticists working on free choice have agreed for some time on the reliance on intensional parameters for free choice indefinites, but they disagree on the mechanisms by which it manifests.

### 2.1.3 Summary

Free choice indefinites are identified in this work by two properties. They display anti-episodicity, which is an aversion to occurrence within non-generic, affirmative declarative sentences in the perfective past or the ongoing present. They also display quantificational variability, meaning that they are paraphraseable as common universal quantifiers in certain sentence types, but not others. It is commonly thought in the literature that both of these properties arise from the semantics of free choice indefinites, a mysterious form of strictly distributive universal quantification that necessarily distributes quantified entities along an intensional parameter. Beyond these properties, free choice indefinites may display other idiosyncracies to distinguish them from one another, such as expanded or more constrained distributions. The chapter now turns to other nominal expressions that bear free choice in their meaning contribution.

## 2.2 Other free choice expressions

Besides free choice indefinites, there are other nominal expressions that have been observed to display free choice meaning. These include disjunctions, as well as indefinites that display readings besides free choice readings, e.g., the English *any* and German *irgend* paradigms.

What distinguishes these nominal expressions from free choice indefinites is that they display free choice meaning optionally. Typically, their free choice readings come about within a restricted set of semantic environments, while other readings have broader distributions. These optional free choice readings have been described as scalar implicatures in some analyses of the phenomenon, while in other accounts, they are evidence of homophonous sets of disjunction operators and indefinites, corresponding to either free choice or other readings. This section discusses the optional free choice readings of these nominal expressions and their similarity to free choice indefinites. As with free choice indefinites, these expressions may be shown to exhibit polarity sensitivity and quantificational variability. The section also discusses the interaction of these expressions with negation and how it has been used to argue for the status of optional free choice meaning as a type of scalar implicature.

### *2.2.1 Free choice disjunction*

Free choice disjunction refers to a phenomenon encountered with disjunction operators, like English *or*, in which an inference is licensed from a disjunction to its disjuncts regarding the satisfaction of a description or predicate. The phenomenon is paradoxical in that the inference is not predicted from the standard semantics of disjunction, nor from the assumed semantics of the environment (von Wright, 1968; Kamp, 1974). This paradox has led to a variety of perspectives on how inferences from disjunctions to disjuncts come about either semantically or pragmatically (Gazdar, 1979; Zimmermann, 2000; Schulz, 2005; Simons, 2005; Alonso-Ovalle, 2006; Aloni, 2007; Fox, 2007; Barker, 2010; Franke, 2011), and the debate regarding the proper approach is nearly as heated as the debate over the proper analysis of free choice indefinites. This similarity in research investment is not unwarranted, since semanticists have remarked on the strong resemblance in meaning contribution between free choice disjunction and free choice indefinites, leading to some unified analyses, like Chierchia's (2013). These accounts are likely on the right path, since free choice disjunction can be shown to display the hallmark characteristics assigned to free choice indefinites by

Giannakidou & Cheng (2006): anti-episodicity and quantificational variability.

## The phenomenon

The prototypical example of free choice disjunction is the case where a disjunction operator co-occurs with certain modal expressions. In example (34), two disjuncts *go to the beach* and *go to the cinema* are offered as options to the addressee with the modal expression *may*.

(34) You may go to the beach **or** go to the cinema.

(Kamp, 1974, 57)

Although the sentence above features a disjunction, the combination of *or* with a modal expression somehow allows the addressee to infer similar statements with the disjuncts of *or*. The sentence above may then be interpreted with the inferences given in (35):

(35) You may go to the beach **or** go to the cinema.

⇒ You may go to the beach.

⇒ You may go to the cinema.

With such inferences derived, the disjunction displays the same logical behavior as conjunction, as if *or* were synonymous with English *and*. This behavior is unpredicted from the standard semantics of disjunction, which is identical to logical disjunction and would never license inferences to disjuncts, save for occurrences under the scope of downward entailing operators. The problem is more easily illustrated with the logical representations below in (36), taken from Fox (2007). (36a) and (36b) show equivalent logical statements with disjunction and the possibility modal operator, translated for English *may*. (36c) shows the the inference of the free choice disjunction.

(36) a.  $\Diamond[\text{BEACH} \vee \text{CINEMA}]$

b.  $\Diamond\text{BEACH} \vee \Diamond\text{CINEMA} (\equiv \Diamond[\text{BEACH} \vee \text{CINEMA}])$

c. Free Choice:  $\Diamond\text{BEACH} \wedge \Diamond\text{CINEMA}$

Note that in symbolic logic alone, there is no way for deriving the statement in (36c) from those of (36a) and (36b). The mechanism for deriving the free choice inference is therefore a mystery.

Crucial for licensing of free choice disjunction is occurrence in the right semantic environment, such as those with modal operators. For the example above, the modal expression *may* served as a licensing operator for free choice disjunction. A similar sentence without the modal expression and inflected for the perfective past does not display the same inferential pattern. Example (37) below has *may go* replaced by *went*.

(37) John went to the beach **or** went to the cinema.

$\not\Rightarrow$  John went to the beach **and** John went to the cinema.

Note that the inference from disjunction to disjuncts is not licensed, and the disjunction has its regular logical interpretation, perhaps with an ignorance implicature included. The mystery of this phenomenon is then one of how the interaction of disjunction with modal expressions results in the inferences of conjunction.

Beyond modal expressions, free choice disjunction has been identified within other semantic environments. Imperatives are another environment that has been identified in the literature as licensing environments for free choice disjunction (Aloni, 2007). Example (38) below is an order from the speaker to do one of two things, either post the letter or burn the letter.

(38) Post this letter **or** burn it!

(Aloni, 2007, 66)

Just as with the examples with modal expressions, the sentence seems to have its disjuncts as inferences. It orders the addressee to choose an option between posting the letter, burning it, or perhaps both if chosen in a sequential manner.

## Free choice disjunction as a free choice expression

Although the topic of free choice disjunction encompasses a broad and independent body of research literature, some semanticists have proposed a meaning relationship between free choice disjunction and free choice indefinites. In particular, it has been proposed that free choice disjunction and free choice indefinites overlap in their meaning contributions (Chierchia, 2013), or that their meaning contributions are built from a common set of semantic principles. The evidence for this proposal is strong. Like free choice indefinites, free choice disjunction displays anti-episodicity. In affirmative declarative sentences marked in the perfective past, disjunctions lack their free choice reading. In example (39) below, the speaker asserts a disjunction involving past activities for Jane.

(39) Jane sang or danced.

$\not\Rightarrow$  Jane sang.

$\not\Rightarrow$  Jane danced.

The disjuncts of this example do not follow from the disjunction, as would be expected from free choice disjunction. What happens instead is an ignorance implicature, or a reading that the speaker does not know which activity Jane participated in. The reason for this may be traced back to the episodic semantic environment, which is known for not licensing free choice indefinites.

Quantificational variability is also demonstrable for free choice disjunction, although this is more easily shown with several paraphrases. Chierchia (2013) notes that it is sometimes possible to paraphrase a free choice disjunction with a nominal expression with English *any*, as long as the two match in their referents. When this paraphrase is appropriate, the same paraphrase with *every* instead of *any* is sometimes also appropriate. Example (40) below offers a case of free choice disjunction which lends itself to paraphrase with *any* and another with *every*, assuming that the disjuncts represent an exhaustive list of students.

(40) Student A, student B, **or** student C can solve this problem.

⇒ **Any** student can solve this problem.

⇒ **Every** student can solve this problem.

However, the paraphrase with *any* does not guarantee an appropriate paraphrase with *every*. Similar to the case of free choice indefinites, the paraphrase with *every* above is possible because the sentence has a generic interpretation. In a non-generic sentence, such as in example (41) below, the *every* paraphrase is inappropriate despite the acceptability of the *any* paraphrase.

(41) The committee can offer this job to candidate A, candidate B, **or** candidate C.

⇒ The committee can offer this job to **any** candidate.

≠⇒ The committee can offer this job to **every** candidate.

Here, the discourse context is such that only one job is available. The job may be offered to any candidate, but given that there is only one position, only one person can be offered the job. Due to these discourse conditions, the occurrence of *every* in the paraphrase is awkward. On the other hand, the paraphrase with *any* remains appropriate, signalling that the disjunction here is indeed a free choice expression. Therefore, the free choice disjunction here displays quantificational variability, and the same two criteria for free choice indefinites appear to also characterize other free choice expressions.

### 2.2.2 *Free choice as scalar implicature*

The exact grammatical nature of optional free choice readings on nominal expressions remains an open question in semantics and pragmatics. Evidence points to the status of these optional readings as a variety of scalar implicature called FREE CHOICE IMPLICATURE. Yet, as it is still uncertain how to best model the semantics and/or pragmatics of free choice, less is certain regarding how free choice may come about as an implicature. Fortunately, what is certain is the evidence for status as an implicature, as it is consistent with common tests for scalar implicatures generally.

## Implicatures with disjunction

The primary evidence for the status of free choice disjunction as a variety of scalar implicature is its disappearance in downward entailing environments, such as negation. A hallmark property of scalar implicatures is their disappearance in downward entailing environments (Gazdar, 1979; Horn, 1989; Chierchia, 2004). Since free choice disjunction bears this property, it has been frequently analyzed as a scalar implicature in the literature (Schulz, 2005; Alonso-Ovalle, 2005, 2006; Fox, 2007; Franke, 2011).<sup>2</sup> The disappearance of the free choice reading of disjunction under negation can be observed in example (42) below:

(42) You may **not** go to the beach **or** go to the cinema.

The sentence above does not have the interpretation of negation on free choice disjunction. Instead, it says that the addressee cannot partake in either of the options provided. This interpretation of negation on disjunction is essentially its logical or literal interpretation. According to De Morgan's laws, this interpretation is equivalent to a conjunction of the negated disjuncts. This seems to be the case, as example (42) above is truth-conditionally identical to the following example (43).

(43) You may **not** go to the beach **and** you may **not** go to the cinema.

The logical representations in (44) below illustrate the difference between this interpretation of the example and the missing free choice reading.

(44)  $\neg\Diamond[\text{BEACH} \vee \text{CINEMA}]$

a. Negated Free Choice:  $\neg\Diamond\text{BEACH} \vee \neg\Diamond\text{CINEMA}$

b.  $\neg\Diamond\text{BEACH} \wedge \neg\Diamond\text{CINEMA}$  ( $\equiv \neg\Diamond[\text{BEACH} \vee \text{CINEMA}]$ )

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2. The alternative view is that free choice readings of disjunction may be derived through semantic principles (Zimmermann, 2000; Simons, 2005; Aloni, 2007; Barker, 2010), such that the free choice reading is actually the inherent meaning contribution.

The negation of a free choice disjunction should result in a reading equivalent to the disjunction of negated disjuncts, as in (44a). Instead, a conjunction of the negated disjuncts is the more appropriate interpretation, as in (44b).

Other downward entailing environments may replicate the disappearance of free choice disjunction, further supporting the analysis of free choice disjunction as an implicature. Free choice readings of disjunction disappear under the scope of *few*, as can be observed in (45).

(45) Few people may go to the beach **or** go to the cinema.

$\Rightarrow$  Few people may go to the beach **and** few people may go to the cinema.

$\nRightarrow$  Few people may go to the beach **or** few people may go to the cinema.

Here again, the interpretation of the sentence is not one of the quantifier *few* on a free choice disjunction, but rather on a logical disjunction. The resulting entailment is one of conjunction of the disjuncts while each is operated on by *few*. The expected free choice reading would have been one of a disjunction while each disjunct is operated on by *few*. Taken altogether, a strong case is made for the status of free choice disjunction as a scalar implicature.

One argument against the implicature analysis has been its narrow focus on cases of free choice disjunction in which there is a single licensing operator, such as a modal verb. Supporters of the implicature analysis often develop formal models of free choice disjunction which assume that the disjunction operator is interpreted with narrow scope with respect to licensing operators. In fact, many of these analyses predict free choice disjunction only when disjunction takes scope under the licensing operator. However, there are cases of free choice disjunction like in (46) in which the licensing operator occurs within the disjuncts themselves, as was pointed out by Zimmermann (2000) and Barker (2010).

(46) You may go to the beach **or** you may go to the cinema.

$\Rightarrow$  You may go to the beach.

$\Rightarrow$  You may go to the cinema.

Here, the reader is able to interpret a free choice disjunction from the sentence, as though the disjunction operator *or* were interpreted as a conjunction operator *and*. This data shows that free choice disjunction may not require that the disjunction operator be interpreted with narrow scope with respect to licensing operators. On the other hand, this data does not directly contradict the implicature analysis. It only contradicts particular analyses of the phenomenon, especially those that assume that free choice disjunction does not occur with sentences like the one above.

### Free choice implicatures with indefinites

The perspective that free choice disjunction is derivable as an implicature has its inspiration from the work of Kratzer & Shimoyama (2002) on the semantics of the German indefinite paradigm with *irgend*. In this work, Kratzer & Shimoyama argued that indefinites with *irgend* gain their free choice readings as implicatures. There is a lot of support in favor of this perspective. Indefinites with *irgend* have several other indefinite readings besides their free choice readings. They also have readings as epistemic indefinites, indicating ignorance of the speaker as to the exact referent satisfying the relevant description. It is possible to conjure up examples where an indefinite with *irgend* is ambiguous between the free choice and epistemic readings, such as (47) below.

- (47) **Irgendeins** von diesen Kindern kann sprechen  
Irgend-one of these children can talk
- a. ‘One of those children can talk.’ (the speaker doesn’t know or care which one it is.)
  - b. ‘One of those children is allowed to talk.’ (any one is a permissible option)

(Kratzer & Shimoyama, 2002, 23-24)

In the example above, the *irgend* indefinite may have an epistemic reading, which is that the speaker only knows that some child can talk, but they do not know which one. It may

also have a free choice reading, which is that every child is allowed to talk, but the number of children allowed to talk is not given.

To argue that the free choice readings are implicatures, Kratzer & Shimoyama invoke the negation test, showing that free choice readings disappear under negation. The examples in (48) below show how negation on the same modal environment can render the indefinite with *irgend* into a basic existential quantifier. (48a) provides a modal environment for licensing of the free choice reading of the indefinite. (48b) involves adverbial negation on the same environment to show how the free choice reading disappears.

- (48) a. Du kannst dir **irgendeins** von diesen beiden Büchern leihen  
You can you.DAT irgend-one of those two books borrow  
'You can borrow one of those two books, it doesn't matter which.'

(Kratzer & Shimoyama, 2002, 19)

- b. Du kannst dir auf **keinen** Fall **irgendeins** von diesen beiden Büchern  
You can you.DAT in no case irgend-one of those two books  
leihen  
borrow  
'In no case can you borrow any one of those two books.'

(Kratzer & Shimoyama, 2002, 21)

(48a) features a free choice reading of the indefinite, which is one where the speaker offers a choice between two books. If this were the reading that were negated, the second example should say that the addressee does not have a choice between the two books, and must take some predetermined one. However, (48b) does not say this, but instead says that the addressee cannot borrow either of the books. The free choice reading is only salvageable with prosodic emphasis on *irgend*.

### 2.2.3 Summary

Free choice meaning is not limited to free choice indefinites, but has been long observed with other nominal expressions as optional readings. An example of this is free choice disjunction,

the long-observed phenomenon of a disjunction displaying an inference to its disjuncts within a restricted set of semantic environments. Free choice disjunctions resemble free choice indefinites in that they both display the properties of anti-episodicity and quantificational variability, suggesting large overlap in their meaning contributions. Free choice disjunction has been argued to be a scalar implicature, since free choice readings on disjunctions typically disappear under negation. Similar phenomena is observed with indefinites that optionally express free choice, such as those of the German *irgend* and English *any* paradigms. Altogether, the data points to the potential for free choice meaning to be expressed pragmatically on disjunctions in the form of scalar implicatures, as opposed to being an exclusive feature of free choice indefinites.

### 2.3 Free choice with superlatives

This section reviews the often overlooked observation that, besides indefinites and disjunctions, definite descriptions can also host free choice meaning. This observation was implied many decades ago in the work of Fauconnier (1975, 1979, 1980), who had shown that superlatives can display characteristics attributable to English *any* and are often paraphraseable as some indefinite with *any*.<sup>3</sup> These observations are expounded on in this section, along with verification that quantifying superlatives also display the characteristic properties of free choice indefinites: polarity sensitivity and quantificational variability. This shows that free choice meaning also occurs on definite descriptions, or at least on superlatives, and is a more grammatically widespread phenomenon than has been previously thought in the more circulated literature. The section starts by reviewing the observations made by Fauconnier on superlatives, and it ends with tests for the relevant free choice properties.

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3. More recently, Israel (1996, 1997, 2001, 2004) considered the value of this phenomenon for semantic models of polarity sensitivity. He cites these studies on superlatives as evidence for a scalar analysis, just as this work does. However, the mechanism of exploiting a scale for deriving polarity sensitivity differs in this work from that of Israel.

### 2.3.1 Quantifying superlatives

In a series of papers, Fauconnier (1975, 1979, 1980) argued for a broader conception of polarity sensitivity than was conceived of at the time. In his time, polarity sensitivity was understood as a characteristic of lexical items that inherently expressed it. Lexical items such as English *any* and *even* were said to display “grammatical polarity”, the dependence on environment for interpretation, and thought of as unique bearers of this quality. Fauconnier’s studies showed that polarity sensitivity could also be an attribute of alternative readings of nominal expressions that are otherwise not polarity sensitive themselves. The primary examples were the *quantifying superlatives*, which are superlatives whose meaning contributions are pragmatically enriched so as to approximate the meaning of *any*. Example (49) below shows a quantifying superlative *the most difficult problem* with the superlative material in bold.

(49) Max can solve **the most difficult** problem.

Fauconnier (1979, 291)

The sentence in this example has two readings. The literal reading is that some person named Max has the capacity to solve a problem that has been deemed the most difficult within some domain. Whether or not Max is able to solve other problems within the set is undetermined. The second reading is a pragmatic enrichment. It is the reading that, since Max is able to solve the most difficult problem, he is also able to solve every less difficult problem, and therefore, Max is able to solve any problem. This second reading allows the superlative to be paraphrased as the same nominal expression with the superlative material replaced by *any*, as in example (50) below.

(50) Max can solve **any** problem.

When a superlative may be paraphrased as a nominal expression with *any*, it is a quantifying superlative.

## Referential constraints on quantifying superlatives

The adjective of the quantifying superlative may take many forms, and perhaps any adjective may be used. Example (51) below provides a case with *the faintest noise*, where the literal meaning of the superlative is enriched to become a quantifying superlative.

- (51) a. My uncle can hear **the faintest** noise.  
b. My uncle can hear **any** noise.

(Fauconnier, 1975, 354-355)

The enriched meaning says that my uncle can hear every kind of noise, so long as he can hear the faintest noise, the least likely. With this enriched meaning, the superlative material becomes paraphraseable with *any*.

Although any adjective might serve for construction of a quantifying superlative, superlatives are not interchangeable within the same sentence. Crucially, the superlative must denote the least likely candidate for satisfaction of a particular predicate. Among noises that vary in their loudness, some noise that is the faintest will be the least likely noise that my uncle can hear. Among problems that vary in their difficulty, the most difficult problem should be the least likely problem for Max to be able to solve. Each predicate imposes its own conditions for identifying the least likely candidate for its satisfaction. So, when the predicate changes, so does the identity of the least likely candidate for its satisfaction. Example (52) below demonstrates the unavailability of the quantifying superlative reading for *the faintest noise* when the predicate is changed.

- (52) a. # A mouse can produce **the faintest** noise.  
b. A mouse can produce **any** noise.

Here, the quantifying superlative reading is lost because the faintest noise is not an unlikely noise for a mouse to make. Replacing the superlative material with *any* results in a proposition with very different truth conditions, which are also false in the real world. As such, the

superlative material is not paraphraseable with *any*, and the quantifying superlative reading is absent.

## Environmental constraints on quantifying superlatives

Besides the superlative's adjective and the main predicate, the structure of the semantic environment also plays a role in the interpretation of a superlative as a quantifying superlative. Quantifying superlatives always occur in what Fauconnier recognized as inferential strength reversing environments, or those where the inferential strength of scalar terms are reversible. Such environments tend to be those where a logical operator that licenses *any* is present and occurs in an appropriate scope relationship with the superlative. Example (53) below contrasts two sentences with the same literal meaning, but the second sentence inserts the superlative in a conjunction, interfering with its interpretation as a quantifying superlative.

- (53) a. Mrs. Crabtree wouldn't let her daughter **elope with** the richest man.  
b. Mrs. Crabtree wouldn't let [her daughter **and** the richest man] **elope**.

Both sentences say that Mrs. Crabtree prohibits her daughter from eloping with some man who is the richest man, but only (53a) easily has a second reading that Mrs. Crabtree prohibits her daughter from eloping with any man. The difficulty of interpreting the quantifying superlative reading in (53b) is due to the superlative occurring in a conjunction with *her daughter*, which interrupts the superlative's desired structural relationship with logical operators that license quantifying superlatives. A similar phenomenon occurs with the pair of sentences in (54).

- (54) a. John doubts that the most delicious wine **is equal to his father's**.  
b. John doubts that the most delicious wine **and his father's are equally good**.

Fauconnier (1975, 361)

Again, both sentences have the same literal meaning, that John doubts that a certain wine is as good as his father's. However, only (54a) has a quantifying superlative, and this is because (54b) inserts the superlative in a conjunction.

Fauconnier noted that the list of licensing environments for quantifying superlatives are not easily subsumed under a common set of descriptors. What little could be described of the class as a whole is that they are semantic environments in which inferential strength reversal occurs, and that there is broad correspondence with the licensing environments of *any*. In some cases, the semantic environment even determines the acceptability of the superlative itself, as if it were just like *any*. In example (55) below, the superlative is unacceptable as the nominal argument of the existential predicate *there is*. However, insertion of the existential predicate within a conditional clause rescues the superlative, though it necessarily has a quantificational superlative reading.

- (55) a. \*There is the faintest noise that bothers him  
b. **If** there is the faintest noise that bothers you, **please tell us**.

Fauconnier (1975, 358)

This example is curious because, as definite descriptions, superlatives are typically barred from occurring as the argument of an existential predicate. Clearly, the superlative takes on a new grammatical nature with its enriched meaning as a quantifying superlative.

### 2.3.2 *Quantifying superlatives as free choice expressions*

In the data that follows, it is confirmed that the meaning contribution of quantifying superlatives outside the scope of negation is actually that of free choice. It is shown that, although quantifying superlatives are not free choice indefinites, they satisfy the criteria suggested by Giannakidou (2001) and Giannakidou & Cheng (2006) for status as free choice indefinites. This does not mean that they are free choice indefinites. Quantifying superlatives are a form

of pragmatic enrichment on the literal meaning of superlatives, whereas free choice indefinites are lexical items. What this data does show, however, is that free choice meaning is not limited to indefinites and disjunctions. Free choice meaning can also be hosted by definite descriptions, given the evidence presented here of free choice readings on superlatives.

### Anti-episodicity

Although it is not explicit in Fauconnier's writings, quantifying superlatives are licensed in the same environments that license free choice indefinites, and they are similarly unacceptable within many of the same environments that free choice indefinites avoid. Both quantifying superlatives and free choice indefinites are barred from episodic sentences, as first noted by Bakker (1988, 32-36). Examples (56-57) below show that the superlative *the youngest beaver* only has its quantifying superlative reading in the modalized sentence and not the episodic sentence.

- (56) a. (+U) **The youngest** beaver can swim.  
b. **Any** beaver can swim.
- (57) a. (-U) **The youngest** beaver swam across the river.  
b. \* **Any** beaver swam across the river.

Haspelmath (1997, 116)

(56) says that the youngest beaver, which is probably the weakest, is able to swim, entailing the ability of all other beavers to swim. (57) is episodic, and therefore, it is a statement only about the youngest beaver. As such, the distribution of the quantifying superlative reading also corresponds to that of free choice *any*.

Quantifying superlatives are also awkward in various environments with necessity expressions, including the scope of necessity modals. Examples (58-59) below show the unacceptability of quantifying superlatives in statements of necessity. The superlative lacks a

quantifying superlative reading in both examples, and the lack of the reading corresponds to the unacceptability of free choice *any* in the same environment.

(58) a. (-U) You must marry **the most undesirable** person.

b. \* You must marry **any** person.

(59) a. (-U) **The smallest** amount is necessary.

b. \* **Any** amount is necessary.

Haspelmath (1997, 116)

(58) says that you must marry someone that is the most undesirable, but not that you must marry more desirable people as well. (59) says that some specific low amount is necessary, but not that any amount that is higher is also necessary.

## Quantificational variability

Finally, it is demonstrable that quantifying superlatives display the same quantificational variability that free choice indefinites do. They are paraphraseable with the universal quantifier *every* in certain environments outside the scope of negation, especially generic statements. The two examples (60-61) below provide typical cases of quantifying superlatives in generic statements. Note that the universal quantifier *every* may replace the superlative material without a change in meaning.

(60) **The lamest** student can solve this problem.

↪ **Every** student can solve this problem.

(61) He usually read **the easiest** book very carefully.

↪ He usually read **every** book very carefully.

(60) says that the lamest student, and therefore any student, can solve the problem. (61) says that he usually read any book, up to the easiest book, very carefully.

The paraphraseability with *every* may be lost in other semantic environments that are not generic. Such is the case in example (62) below, where the quantifying superlative *the most unqualified candidate* occurs in a non-generic yet non-episodic sentence. Here, the superlative material may not be replaced by *every* to get the same meaning. However, note that the superlative material may be replaced by *any* for an identical meaning contribution.

(62) The committee can offer this job to **the most unqualified** candidate.

↯ The committee can offer this job to **every** candidate.

↪ The committee can offer this job to **any** candidate.

The sentence says that the committee can offer the job to the worst candidate, and therefore, it can offer the job to any better candidate. The sentence says nothing about whether more than one candidate can take the job at the same time, so the paraphrase with *every* is inappropriate. However, paraphrase with *any* remains appropriate, confirming that free choice meaning is expressed.

### 2.3.3 Summary

Superlatives are able to take on secondary readings in which they become paraphraseable as indefinites with *any*. When they take on this paraphraseability, they are called quantifying superlatives. These secondary readings come about in a restricted set of semantic environments corresponding to the distribution of *any*. Tests show that in positive sentences, outside the scope of negation, the quantifying superlative reading is a free choice reading. This is demonstrable in that quantifying superlatives display the characteristic properties of free choice indefinites, which are polarity sensitivity and quantificational variability. Quantifying superlatives do not occur in episodic statements or statements of necessity. They are also paraphraseable with English *every* in many generic sentences, but lose this paraphraseability in other semantic environments while retaining paraphraseability with *any*. This shows that quantifying superlatives are free choice expressions, at least outside the scope of negation.

## 2.4 Conclusion

This chapter established that free choice meaning is expressible through a wider variety of nominal expressions than previously thought. It is well known that free choice meaning can be expressed on the weak scalar terms of various Horn scales, but it is also expressible on superlatives representing bottom values on context-induced, evaluative scales. The chapter argued this point by first defining free choice expressions as nominal expressions with the properties of anti-episodicity and quantificational variability. Then it demonstrated how these properties are exhibited by certain well-studied nominal expressions, namely disjunctions. It finally demonstrated how superlatives also gain these properties and become quantifying superlatives, given certain conditions on the adjective and the semantic environment. In gaining the defining properties of free choice indefinites, they also gain paraphraseability with *any* for their superlative material. The fact that these secondary readings on superlatives come about optionally suggests that they may be the result of free choice implicature, at least outside of negation. Therefore, they qualify as free choice expressions, perhaps gaining their free choice readings in a similar manner to disjunction.

The capacity for superlatives to gain free choice meaning is important for the proper characterization of the semantics of free choice, and ultimately how nominal expressions like indiscriminatives may attain it. If superlatives are capable of free choice readings, as indefinites and disjunctions are, then scalar terms on Horn scales are not essential for the formation of free choice expressions. Rather, reference to bottom values on any scale, including evaluative scales, characterize the referential component in the semantic composition of free choice expressions. In this observation, the proposal of this work already counters previous analysis of free choice meaning which propose its basis to be in the meaning of disjunction or non-scalar semantic elements. The next chapter considers the environmental component in the semantic composition of free choice expressions, and completes the analysis of the source of free choice.

## CHAPTER 3

### MINIMAL SUFFICIENCY EVALUATION

The previous chapter concluded that the referential component of free choice meaning must be reference to the bottom value of a scale, given evidence that superlatives may also express free choice. However, reference to bottom scalar values alone is insufficient for the formation of free choice expressions. What remains to be resolved is how the semantic environment contributes to the interpretation of bottom scalar values, so that they ultimately gain the characteristic properties of free choice expressions, i.e., anti-episodicity and quantificational variability. This chapter discusses how the environmental component to free choice meaning can be traced to a truth-conditional dependency on the scale that bottom scalar values are evaluated on. More specifically, free choice meaning comes about due to the co-occurrence of bottom scalar values with an underdescribed type of inference called minimal sufficiency evaluation.

Minimal sufficiency evaluation is a meaning enrichment on a sentence, producing an inference that the scalar value of a nominal expression on some relevant scale exceeds a minimum value sufficient for satisfaction of a description. The observable result of minimal sufficiency evaluation is the reversal of inferential strength relationships between scalar terms. In the example below, the sentence *Three men can lift the boulder* is interpreted with a minimal sufficiency evaluation, producing an inference from the lower scalar term *three* to the higher scalar term *five*.

(63) **Three men** can lift the boulder.

⇒ **Five men** can lift the boulder.

With a minimal sufficiency evaluation, the sentence not only expresses that a group of three men working together is capable of lifting a heavy boulder alone, but that if they can do it alone, a greater quantity of men are able to do the same. This is because the nominal expression *three men* is interpreted as a scalar value on a scale of physical strength that

exceeds a minimum value sufficient to lift the boulder. Meanwhile, the nominal expression *five men*, denoting a larger quantity of men, should associate with an even higher degree of physical strength. Taken altogether, an inference from the lower scalar term *three men* to the higher scalar term *five men* is attained. Considering the phenomenon recursively, nominal expressions referring to bottom scalar values may then be interpreted as the strongest scalar terms among alternatives on their scale, gaining the inferential properties of universal quantifiers or free choice expressions.

Minimal sufficiency evaluation seems to have been first described by König (1991), who did not refer to it as such. Rather, he indirectly described it as a property of certain semantic environments. He noted that the same environments that license minimal sufficiency evaluation also license the occurrence of quantifying superlatives and polarity sensitive items like English *any*, suggesting a common source for both phenomena. König's (1991) valuable insight that minimal sufficiency evaluation and polarity sensitive items go hand-in-hand in the same semantic environments unfortunately seems to have been overlooked or forgotten in the literature. As with Fauconnier's insights on quantifying superlatives, reconsidering these older observations will be key to understanding the semantic components of free choice meaning.

This chapter expands on König's (1991) observations by ultimately developing a semantic model of minimal sufficiency evaluation. Using more recent literature on degree semantics and the semantics of sufficiency predicates, the chapter posits a silent operator that imposes a minimal sufficiency evaluation on a semantic environment. The operator does this by associating a scalar term with a degree on a relevant scale, then by imposing a dependency on exceeding a minimum degree sufficient for satisfaction of the predicate denoted by the semantic environment. Inferential strength reversal is then achieved by the association of lower scalar terms with lower degrees and higher scalar terms with higher degrees, such that exceedance of the minimum degree by a lower scalar term's degree will imply exceedance by a higher scalar term's degree. Recursively, exceedance by the lowest scalar term's degree

implies exceedance by all scalar terms' degrees, and so, scalar terms denoting bottom scalar values may formally achieve the inferential properties of free choice expressions.

The rest of the chapter continues as follows. §3.1 introduces minimal sufficiency evaluation as first described by König, observed to be a common inferential pattern among certain classes of semantic environment. §3.2 covers the expanded analysis of minimal sufficiency evaluations, including evidence that they are implicatures, and it demonstrates how the meaning of sufficiency of scalar value for satisfaction of a description or predicate can be captured using degree semantics. This section concludes with discussion of the proposed model of minimal sufficiency evaluation and how it captures both inferential strength reversal and the restriction of the implicature to certain semantic environments. §3.3 applies the semantic model to definite descriptions and disjunctions, and it briefly explains how the properties of quantifying superlatives and free choice disjunctions are borne out. §3.4 concludes the chapter with a summary of results.

### **3.1 Minimal sufficiency and inferential strength reversal**

This section presents and elaborates on some arguments from König on the existence of MINIMAL SUFFICIENCY ENVIRONMENTS. These are basically semantic environments on which a minimal sufficiency evaluation has applied, identified by the reversal of inferential strength relationships between scalar terms at the propositional level, without the aide of downward entailing operators. The presence of inferential strength reversal is curious in that it resembles downward entailment, despite the lack of downward entailing operators. The section elaborates on the distinctiveness of minimal sufficiency environments from other semantic environments, including their interaction with negation and their capacity to license free choice expressions. It ends with a discussion of the licensing of non-exclusive readings of exclusive particles and their alternative meaning contribution. These alternative readings on exclusive particles are suggested to explicate the application of a minimal sufficiency environment on a scalar term, such that the scalar term is evaluated for the sufficiency of its

scalar value in satisfaction of a description.

### 3.1.1 *Sufficiency versus necessity*

In his discussion on the scalar semantics of exclusive particles, König (1991, 101-107) identifies two distinct classes of semantic environment which determine the strength relationships between scalar terms. He refers to them as “contexts expressing necessary conditions” and “contexts expressing sufficient conditions”. They are renamed here as MAXIMAL NECESSITY ENVIRONMENTS and minimal sufficiency environments, respectively.

#### Maximal necessity environments

Maximal necessity environments are semantic environments within which the inherent inferential strength relationships between scalar terms are reinforced. When two scalar terms occur within identical maximal necessity environments, the two resulting propositions display an inferential strength relationship that corresponds to the scalar relationship already displayed by the scalar terms. Take, for example, a set of differing amounts of dollars, all inherently associated with a scale of monetary value. When a term denoting a higher monetary value occurs within a maximal necessity environment, the result is a proposition that entails similar propositions about lower monetary values. In example (64) below, the description *needs to be in my bank by tomorrow* represents a maximal necessity environment, with the modal verb *needs* contributing the necessity semantics that can produce such an environment.

- (64) **\$1,000 needs** to be in my bank account by tomorrow.  
     $\implies$  **\$500 needs** to be in my bank account by tomorrow.

When the scalar term *\$1,000* enters this environment, there is an inference that the same proposition with the scalar term replaced by a lower monetary value, like *\$500*, is also true. Meanwhile, an inference in the reverse direction does not exist, as shown in example (65).

(65) **\$500** needs to be in my bank account by tomorrow.

$\not\Rightarrow$  **\$1,000** needs to be in my bank account by tomorrow.

Therefore, an inferential strength relationship between the resulting propositions is displayed, wherein inferential strength corresponds to the ranking of scalar terms, in this case, a scale of monetary value.

### Minimal sufficiency environments

Minimal sufficiency environments are opposite to maximal necessity environments in that they are semantic environments within which the inferential strength relationships between scalar terms are reversed. When two scalar terms occur within identical minimal sufficiency environments, the two resulting propositions display an inferential strength relationship corresponding to a reversal of the scalar relationship displayed by the scalar terms. Take, for example, a set of differing amounts of dollars, all inherently associated with a scale of monetary value. When a term denoting a lower monetary value occurs within a minimal sufficiency environment, the result is a proposition that entails similar propositions about higher monetary values. In example (66) below, the description *would solve all my problems* represents a minimal sufficiency environment, with the modal verb *would* contributing the probability semantics that can produce such an environment.

(66) **\$500** would solve all my problems.

$\Rightarrow$  **\$1,000** would solve all my problems.

(König, 1991, 102)

When the scalar term *\$500* enters this environment, there is an inference that the same proposition with the scalar term replaced by a higher monetary value, such as *\$1,000*, is also true. Meanwhile, an inference in the reverse direction does not exist, as shown in example (67).

- (67) **\$1,000** would solve all my problems.  
 $\not\Rightarrow$  **\$500** would solve all my problems.

Therefore, an inferential strength relationship between the resulting propositions is displayed, wherein inferential strength corresponds to a reversed ranking of scalar terms, in this case, a scale of monetary value.

König provides further examples of inferential strength reversal within minimal sufficiency environments involving scales of extraordinariness. In both examples (68-69) below, the proposition with the more extraordinary entity is an inference of the proposition with the more ordinary entity. Each proposition features a minimal sufficiency environment with the scalar term given in bold.

- (68) A **cosmetic operation** can save our economy.  
 $\Rightarrow$  A **radical change** can save our economy.

- (69) **Ordinary measures** can save us.  
 $\Rightarrow$  A **miracle** can save us.

(König, 1991, 102)

Examples (70-71) show that, again, inferences in the opposite direction do not exist, despite correspondence with the natural ranking of these scalar terms on scales of extraordinariness.

- (70) A **radical change** can save our economy.  
 $\not\Rightarrow$  A **cosmetic operation** can save our economy.

- (71) A **miracle** can save us.  
 $\not\Rightarrow$  **Ordinary measures** can save us.

Therefore, inferential strength reversal for scalar terms within minimal sufficiency environments is not limited to inherent scales, such as those of monetary value. Scalar terms on evaluative scales are also susceptible to inferential strength reversal.

### 3.1.2 *Further differences between the two environments*

Minimal sufficiency and maximal necessity environments are further distinguished by a host of other features. They display differences in their interaction with negation with regards to resulting inferences, and they differ in how they affect the paraphraseability of exclusive particles. They also differ in their licensing capacities for polarity sensitive items and free choice readings on nominal expressions.

#### Interactions with negation

When either a minimal sufficiency or maximal necessity environment is negated, they take on the inferential attributes of the other environment. Negated minimal sufficiency environments reinforce inherent inferential strength relationships between scalar terms, while negated maximal necessity environments reverse inferential strength relationships. Examples (72-73) below demonstrate the inferential patterns that come about when negation occurs on the environment. Each example is a statement about grades earned in a class, with distinct inferences displayed about other grades.

(72) A **B grade** is not adequate.

⇒ A **C grade** is not adequate.

(73) A **B grade** is not necessary.

⇒ An **A grade** is not necessary.

Example (72) says that a B grade is not sufficient, and as such, lower grades are also insufficient. There is no inference about higher grades, and it is not established whether they are acceptable. Meanwhile, example (73) says that a B grade is not necessary, and as such, higher grades are also unnecessary. There is no inference about lower grades, and it is not established whether any of them are necessary. So, among these examples, negation on the minimal sufficiency environment results in inferences about lower grades, while negation on the maximal necessity environment results in an inferences about higher grades.

This distinction between the two classes of semantic environment highlights an oddity in the interaction of minimal sufficiency environments with negation. Since inferential strength relationships are reinforced in negated minimal sufficiency environments, the resulting inferential patterns are unlike what is typical of downward entailing environments. Negation typically reverses inferential strength relationships by itself, but on a minimal sufficiency environment, it seems to undo the inferential strength reversal that would have already applied. The following example (74) with numerals shows this behavior.

- (74) It was not enough to buy **four** cakes for the party.  
     $\implies$  It was not enough to buy **three** cakes for the party.

Here, the proposition is an evaluation of the sufficiency of buying four cakes for a party, which is that four was not enough. The resulting inferences from this proposition are that lower numbers of cakes were also not enough. Therefore, despite the presence of negation, inherent inferential strength relationships between scalar terms are reinforced.

### Interactions with exclusive particles

The interpretation of exclusive particles like *only* is sensitive to the strength reinforcing or reversing properties of maximal necessity and minimal sufficiency environments. When *only* occurs in a sentence, it applies an exhaustified interpretation on a focused phrase, allowing it to be paraphrased as either *no more than* (Beaver & Clark, 2008; Coppock & Beaver, 2014) or *no less than*. The choice of the paraphrase depends on whether the focused phrase occurs in a maximal necessity or minimal sufficiency environment, as exhaustivity targets whatever scalar terms are made stronger by the environment. Example (75) below shows how, in a maximal necessity environment, *only* is paraphraseable as *no more than*.

- (75) **Only \$200** is required to solve all my problems.  
     $\rightsquigarrow$  **No more than \$200** is required to solve all my problems.

This sentence denies that higher amounts of money are required to solve all my problems. There is no inference about lower amounts of money, so the paraphrase explicates that the focused phrase is exhausted relative to higher scalar terms. Compare with example (76), where the exclusive particle occurs in a minimal sufficiency environment. Here, the appropriate paraphrase of *only* to *no less than*, or the more conventional *nothing short of*.

(76) **Only \$200** is enough to solve all my problems.

↪ **No less than \$200** is enough to solve all my problems.

↪ **Nothing short of \$200** is enough to solve all my problems.

This sentence denies that *lower* amounts of money are enough to solve all my problems. There is also the inference that higher amounts of money are also enough to solve my problems. As such, the paraphrase explicates that the focused phrase is exhausted relative to lower scalar terms. Clearly, this is due to the reversal of inferential strength imposed by the minimal sufficiency environment.

This phenomenon is demonstrable for many other types of minimal sufficiency environments. Among the examples (77-81) below are minimal sufficiency environments representing statements of possibility, the future, and conditional clauses. For each of these examples, the appropriate paraphrase for the exclusive *only* is *no less than* or *nothing less than*.

(77) **Only a miracle** can save us

↪ **No less than a miracle** can save us

(78) **Only a radical change** will save our economy

↪ **No less than a radical change** will save our economy

(79) **Only \$1,000** would solve all my problems

↪ **No less than \$1,000** would solve all my problems

(80) **Only with \$100** in his pocket would he go into this expensive restaurant.

↪ **No less than with \$100** in his pocket would he go into this expensive restaurant.

(81) **Only if you withdraw your troops**, will they negotiate with you.

↪ **No less than if you withdraw your troops**, will they negotiate with you.

In each of these cases, the focused phrase is associated with a different scale, representing scales of monetary value and potential to alter circumstances. Throughout these cases, the paraphrase explicates that the focused phrase is exhaustified relative to lower scalar terms, therefore, lower amounts of money and events with lower potential to alter circumstances.

### Licensing of free choice indefinites and readings

Finally, minimal sufficiency and maximal necessity environments differ in their capacity to license free choice indefinites and free choice readings on nominal expressions. König (1991) identifies minimal sufficiency environments to be exactly those that license free choice indefinites, or at least English *any* in its positive occurrences. If König is correct, minimal sufficiency environments should then include all the typical licensing environments of free choice indefinites, e.g., modal verbs, generic sentences, and conditional clauses (Giannakidou, 2001; Giannakidou & Cheng, 2006). The examples in (82) below present his case.

(82) a. **Any** amount is **adequate/sufficient**.

b. \***Any** amount is **required/necessary**.

König (1991, 104)

Example (82a) is a minimal sufficiency environment, indicated by the predicates *adequate* and *sufficient*. This example licenses the occurrence of free choice *any*. Meanwhile, the maximal necessity environment of example (82b), indicated by the predicates *required* and *necessary*, does not license the occurrence of free choice *any*.

#### 3.1.3 *Sufficiency readings with exclusive particles*

Besides the reversal of inferential strength relationships between scalar terms, minimal sufficiency environments also license non-exclusive readings of exclusive particles, lacking any

truth-conditional effect on a proposition. These alternative readings of exclusive particles can be analyzed as a means to explicate the application of a minimal sufficiency environment on a scalar term. They explicate that a scalar term has been evaluated as sufficient for satisfaction of a description, and that scalar terms of higher rank are in excess of the minimum rank sufficient for satisfaction.

### Non-exclusive readings of exclusive particles

Minimal sufficiency environments license the non-exclusive interpretation of some exclusive particles across languages. In example (83) below, the exclusive particle *nur* is not interpreted exclusively, but as having some meaning that makes it interchangeable with the additives *sogar* and *schon*.

- (83) a. **Nur** der GEDANKE AN ARBEIT kann ihm den ganzen Tag verderben  
 only the thought of work can him the whole day spoil  
 ‘[Just] the thought of work can spoil the day for him.’
- b. **Sogar/schon** der GEDANKE AN ARBEIT kann ihm den ganzen Tag  
 even the thought of work can him the whole day  
 verderben  
 spoil  
 ‘Even the thought of work can spoil the day for him.’

König (1991, 104)

Here, both examples express the same proposition, that the thought of work can spoil the day for some man. In fact, the only segmental difference between these two sentences is that (83a) has the exclusive particle *nur* and (83b) has the additive particle *sogar* or *schon* instead. Despite being different kinds of particles, *nur* seems to convey the same type of meaning as *sogar/schon*.

This convergence in meaning contribution only occurs in minimal sufficiency environments. If *nur* occurs in a maximal necessity environment, its interpretation is strictly ex-

clusive, while *sogar* maintains its interpretation as an additive particle. Example (84) below shows the contrast between the two particles in a maximal necessity environment.

- (84) a. **Nur** \$200 sind nötig  
only \$200 is required  
'Only \$200 is required.'
- b. **Sogar** \$200 sind nötig  
even \$200 is required  
'(As much as) \$200 is required.'

König (1991, 104)

Here, the two sentences express very different meanings despite only differing in the occurrence of either *nur* or *sogar*. Example (84a) with *nur* explains the maximum amount of money that is required. Example (84b) with *sogar* explains that some amount of money is required, besides some lower amount, without expressing the maximum required.

König (1991) explains that the reason for this apparent convergence in meaning between *nur* and *sogar/schon* is due the exclusive particle being capable of an alternative scope relationship with its environment. In this case, the meaning of *nur* operates only within the scope of the subject noun phrase *der gedanke an arbeit* 'the thought of work'. Exclusive particles are otherwise thought to receive their exclusive interpretation by operating on entire sentences. If operating at no more than the level of the noun phrase, exclusive particles like *nur* only convey an added description on the modified nominal expression. After this alternative scope relationship is established, *nur* gets its scalar additive reading, like *sogar/schon*, simply from occurring within a minimal sufficiency environment. This allows lower scalar terms to produce inferences about higher scalar terms, in agreement with additive meaning.

A similar observation was made by Grosz (2012) and later Coppock & Beaver (2014) about the exclusive particle *just*. This exclusive particle is also capable of non-exclusive readings, which they referred to as minimal sufficiency readings. This is observed in in examples (85-86) below.

(85) **Just** the thought of food makes me hungry.

Coppock & Beaver (2014, 385)

(86) **Just** the thought of him sends shivers down my spine.

Coppock & Beaver (2014, 399)

Both examples above have two possible readings. One reading is the exclusive one, which permits a paraphrase of *just* with *no more than*. The other reading is the minimal sufficiency reading, which permits the more appropriate paraphrase of *something that is no more than*. Examples (87-88) below show these paraphrases for (85-86), respectively.

(87) **Something that is no more than** the thought of food makes me hungry.

(88) **Something that is no more than** the thought of him sends shivers down my spine.

To compare with another exclusive particle, *only* does not permit such paraphrases, displaying exclusively exclusive readings.<sup>1</sup> Example (89) below shows *only* within a sentence, only capable of a paraphrase as *no more than*.

(89) **Only** the thought of food makes me hungry.

↗ **Something that is no more than** the thought of food makes me hungry.

↘ **No more than** the thought of food makes me hungry.

Coppock & Beaver (2014, 385)

This shows that *only* only bears exclusive readings, while *just* is ambiguous between exclusive readings and non-exclusive, minimal sufficiency readings. Like König, Coppock & Beaver analyze these non-exclusive readings as instances of exclusive meaning operating fully within the scope of the noun phrase and not at the level of the sentence. Unlike König, they do not remark on the contribution of the semantic environment for generating such a meaning.

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1. Coppock & Beaver (2014, 379) report the existence of variation among English speakers in the degree to which *only* and *just* converge in meaning contribution. Some English speakers might find that *only* may also have minimal sufficiency readings.

## Explicating the sufficiency of scalar values

The capacity for exclusive particles to be interpreted at the level of the noun phrase, without an exclusive reading, does not answer the question of why such an arrangement is useful for communication. The appropriate paraphrase of *something that is no more than* for exclusive particles in this arrangement explicates that they do not modify truth conditions, unlike their exclusive interpretation. However, an important clue towards the answer is provided in the fact that, as König pointed out, non-exclusive readings of exclusive particles are only apparent within minimal sufficiency environments. Recall that within minimal sufficiency environments, inferential strength reversal occurs, producing inferences from lower to higher scalar terms. These inferences may themselves receive paraphrases in which the scalar term takes on a non-exclusive exclusive particle and all the appropriate paraphrases that those take on. The examples in (90) below demonstrates how these paraphrases apply.

- (90) a. (Just) **\$500** would solve all my problems.  
       $\Rightarrow$  (Just) **\$1,000** would solve all my problems.
- b. (An amount that is no more than) **\$500** would solve all my problems.  
       $\Rightarrow$  (An amount that is no more than) **\$1,000** would solve all my problems.

Here the quantity of \$500 occurs in a minimal sufficiency environment to create inferences about higher amounts of money. The scalar term of \$500 may take on a paraphrase in which a non-exclusive exclusive particle is attached, without altering truth conditions. Similarly, the paraphrase could add *an amount that is no more than* without altering truth conditions. In any case, an inference is generated that higher amounts of money besides the original \$500, such as \$1,000, would solve my problems. For any of these inferences, the scalar term is also able to receive the same paraphrases, without altering truth conditions. This shows that the minimal sufficiency environment already contributes a meaning enrichment to the scalar term that is approximate to what the paraphrases express. The non-exclusive exclusive particle then is simply explicating the semantic effect of the environment on the

scalar term.

This semantic effect on the scalar terms is the expression of sufficiency of the scalar term's value for satisfaction of a description. Exclusive marking with *just* or *nur* in minimal sufficiency environments explicates that the scalar term has been evaluated for whether its scalar value exceeds a minimum value sufficient for satisfying a predicate. Any scalar value beyond the minimum is unnecessary, and so, exclusive marking can explicate the excess of higher scalar values beyond one that is already sufficient. If \$500 is sufficient for solving my problems, it is also true that \$1,000 would solve my problems as well, but this would be in excess of the original \$500. One can explicate the excess of scalar terms above \$500 by using non-exclusive exclusive particles.

### 3.1.4 Summary

Minimal sufficiency environments are semantic environments that reverse the inherent inferential strength relationships between scalar terms at the propositional level, without downward entailing operators. When two scalar terms occur in identical minimal sufficiency environments, the direction of inference is from the proposition with the lower scalar term to the proposition with the higher scalar term. These semantic environments contrast with maximal necessity environments, in which inherent inferential strength relationships are reinforced. Other features of minimal sufficiency environments include combining with negation to reinforce inherent inferential strength relationships between scalar terms, reversing the scalar direction of exhaustivity by *only*, and licensing free choice expressions. Minimal sufficiency environments also license non-exclusive readings of exclusive particles, in particular, English *just* and German *nur*. In such cases, *just* and *nur* seem to perform an explication of the application of minimal sufficiency environments on scalar terms. Non-exclusive *just* and *nur* explicate an evaluation of the sufficiency of the scalar value or rank in satisfying a description, as well as the unnecessary excess of higher ranking scalar terms in doing the same.

## 3.2 Modelling minimal sufficiency evaluation

König’s (1991) observations on the inferential strength reversing properties of minimal sufficiency environments were made with the intention of diagnosing the inherent scalarity in the meaning contribution of exclusive particles. As such, he could refrain from tackling two important questions with respect to the topic: how such an internally diverse group like the minimal sufficiency environments could apply the same inferential effect on scalar terms, and how the mechanism of inferential strength reversal actually works. This section is devoted to tackling these two questions with both some further observations from data and some current semantic tools. It first argues that minimal sufficiency environments are actually a diverse set of non-monotonic semantic environments which are merely compatible with the same form of meaning enrichment that produces inferential strength reversal. This meaning enrichment is an implicature, as revealed by the optionality of inferential strength reversal within these semantic environments. As such, the meaning enrichment is identified as minimal sufficiency evaluation. The section then attempts to characterize its meaning components and model its semantics as a silent operator. The intuition of the model is that scalar values can be reinterpreted as degrees on a scale, and speakers may sometimes evaluate a predicate as requiring exceedance of some minimum degree sufficient for its satisfaction. The resulting model is based on the degree semantics employed in recent literature for sufficiency predicates like *enough* (Heim, 2000; Meier, 2003; von Stechow et al., 2004; Hacquard, 2005a,b; Nadathur, 2017). The section ends with the predictions of the model for different semantic environments, including the incompatibility of minimal sufficiency evaluation with some environments that already impose entailment relationships.

### 3.2.1 *Minimal sufficiency environments as implicature*

The problem of understanding how inferential strength reversal comes about within minimal sufficiency environments may seem like a daunting task, given the great variety of semantic

environments that qualify as minimal sufficiency environments. As König himself pointed out, minimal sufficiency environments include at least those semantic environments that license free choice expressions, encompassing statements of possibility, generic statements, conditional clauses, imperatives, and more. Semanticists have long understood that there are no obvious semantic properties that these environments share in common, making it very mysterious as to how they could all endow scalar terms with the same reversed inferential strength. Fortunately, an additional observation clarifies the picture a bit.

As it turns out, minimal sufficiency environments are the products of implicature. Simple tests for implicature reveal that the inferential strength reversal of scalar terms is a cancellable phenomenon. Therefore, inferential strength reversal is not an inherent property of semantic environments beyond downward entailing ones, but rather comes about via implicature. Additionally, inferential strength reversal is a phenomenon that may occur on scalar terms embedded within other scalar terms, like disjunction. This corresponds to a similar phenomenon observed with other forms of scalar implicature, further corroborating the status of inferential strength reversal as a product of implicature.

## Strength reversal cancelled

The reversal of inferential strength within minimal sufficiency environments is an optional reading on scalar terms. In any case of a minimal sufficiency environment, inferential strength reversal may be cancelled. In reality, the semantic environments that would qualify as minimal sufficiency environments have a tendency to undo inferential strength relationships

between scalar terms, rather than reverse them.<sup>2</sup> Example (91) below shows how satisfaction of a predicate by lower amounts of money do not necessary entail that higher amounts of money will do the same.

- (91) **\$500** would solve all my problems, but I'll get in trouble with more than that.  
 $\not\Rightarrow$  **\$1,000** would solve all my problems.

The capacity for \$500 to solve my problems would typically imply that larger amounts of money would do the same, but it is not the case here. Enriching the discourse context with a constraint that higher amounts of money would cause trouble for me undoes the expected inference about larger monetary values.<sup>3</sup> The result is an exact reading of the dollar amount, such that the assertion becomes one about exactly \$500.

This cancellation of inferential strength reversal resembles the availability of quantifying superlative readings with superlatives. Superlatives lose their quantifying superlative readings when coupled with a conflicting meaning enrichment of the discourse context. Example (92) below features a superlative that would typically be interpreted as a quantifying superlative, if not for the description in the second part of the sentence.

- (92) Max can solve **the most difficult** problem, but somehow only that one.  
 $\not\Rightarrow$  Max can solve any problem.

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2. Curiously, not all tests for implicature work in the case of scalar terms in minimal sufficiency environments. Although inference cancelling is possible, it is unclear whether inferential strength reversal disappears under negation. Example (1) below shows that inferential strength reversal seems to be maintained under negation, since there is no clear inference from lower monetary values to higher monetary values.

- (1) It is not the case that **\$500** would solve all my problems.  
 $\not\Rightarrow$  It is not the case that **\$1,000** would solve all my problems.

If it is not true that \$500 would solve my problems, this seems to not say anything about whether higher amounts of money would or would not help me. This might be evidence that inferential strength reversal is not quite the result of an implicature, despite being optionally available.

3. The reader might notice similarity of this example with Sobel sequences (Sobel, 1970), in which conditional statements can be evaluated as true while the attachment of additional conditions can make them false, creating issues for the modelling of their truth conditions. Unfortunately, I have no remarks on this similarity, but it is worth investigation if the proposed model of minimal sufficiency evaluation plays some role in the phenomenon.

Typically, the ability to solve the most difficult problem would imply that the same person is able to solve any simpler problem, yet we might conceive of a discourse context in which some person mysteriously has the skill to solve only the most difficult problem. This elaboration on the discourse context conflicts with the universal quantificational reading on the superlative *the most difficult problem*, and the sentence remains true while the quantifying superlative reading is lost.

## Embedded implicatures

Similar to other forms of scalar implicature, inferential strength reversal occurs in embedded environments. Embedded scalar implicature has been noted to occur with scalar terms embedded in the sentential complement of attitude verbs, as well as within the scope of other scalar terms (Recanati, 2003; Sauerland, 2004; Chierchia, 2004). In the case of disjunction, scalar implicatures can be associated with scalar terms embedded within disjuncts, in addition to being associated with the disjunction operator itself. The same seems true for inferential strength reversal in minimal sufficiency environments, which seem to be able to reverse the inferential strength of both disjunction operators and scalar terms within disjuncts. The following example (93) provides a minimal sufficiency environment with a scalar term *\$500* embedded within a disjunct.

(93) A high school diploma or **\$500** would solve all my problems.

⇒ A high school diploma and **\$500** would solve all my problems.

⇒ **\$1,000** would solve all my problems.

The sentence says that a high school diploma or \$500 would solve all my problems. The derived inferences include, not only that both options denoted by the disjuncts would solve all my problems, but also that higher scalar values in comparison with the disjunct \$500 would solve all my problems as well. Therefore, inferential strength reversal is not only affecting the disjunction, but also the scalar terms embedded within the disjuncts.

### 3.2.2 *From scales to degrees and inferential strength reversal*

Having established that minimal sufficiency environments and their inferential strength reversing properties are produced by implicature, it is now possible to explain how inferential strength reversal results from the implicit meaning of sufficiency. König does well to elaborate on the intuition that the meaning of sufficiency and inferential strength reversal are intrinsically linked, though he does not provide a formal way of understanding the phenomenon semantically. This is perhaps because the formal tools had not been in place at the time of his writing. In any case, modern semantic treatments of sufficiency predicates like *enough* allow us to imagine how one might formally model inferential strength reversal from the meaning of sufficiency, using degree semantics. The proposal here hinges on the idea that language users can reanalyze the scalar values of linguistic expressions as degrees, for utility in alternative inferential reasoning beyond that of upward and downward entailment. Reanalysis of scalar values as degrees allows for them to be bundled into intervals along a scale, which correspond to subsets of scalar alternatives. Language users may then exploit such semantic constructs for novel ways of contrasting and relating scalar alternatives and forming new inferences.

#### Scalar values as degrees

In order to model the meaning of sufficiency, the most recent literature has employed degree semantics (Meier, 2003; von Stechow et al., 2004; Nadathur, 2017).<sup>4</sup> In such work, sufficiency predicates like *enough* are said to relate an individual to two predicates, one of them being gradable. The gradable predicate then associates the individual with a degree that matches or exceeds some minimum degree sufficient for satisfaction of the other predicate. Example (94) below provides a semantics of the sentence *John is fast enough to win the race*, in the style of von Stechow et al. (2004). In this sentence, *enough* relates an individual *John*,

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4. Rather than degrees, Meier (2003) uses EXTENTS, which are sets or intervals of degrees.

denoted by  $j$ , with the gradable predicate *fast* and the predicate *win the race*.

$$(94) \quad \llbracket \text{John is fast enough to win the race.} \rrbracket = \\ \lambda w_s. \{d : \forall w'_s \in \text{ACC}(w)[\text{WIN}(j, w') \rightarrow \text{SPEED}(j, w') \geq d]\} \subseteq \{d : \text{SPEED}(j, w) \geq d\}$$

In this analysis, *enough* has *fast* associate *John* with a degree of speed that matches or exceeds some minimum degree of speed sufficient for satisfaction of *win the race*. It does this by denoting the operation of set containment between two sets of degrees  $d$  of speed. The contained set is the set of degrees defining sufficiency conditions, i.e., the set of speeds that are equal to or less than the minimum speed sufficient for *John* to satisfy *win the race*. The container set is the set of all degrees of speed that are equal to or less than *John's* actual degree of speed. Since the latter set contains the former, it is entailed that *John's* speed falls in the upper realm of those sufficient for satisfaction of *win the race*. The denotation makes the sentence paraphraseable as *John's speed exceeds the speeds necessary to exceed so that he can win the race*.

This analysis serves as a good starting point for developing the analysis of minimal sufficiency evaluation proposed here. It already captures the scalar and inferential strength relationships that can exist between two nominal expressions that otherwise display no affiliation with Horn scales. Suppose that two individuals, *John* and *Mary*, had their respective speeds contrasted in their sufficiency to satisfy *win the race*. Their mutual scalar relationship can be represented as a containment relationship between the sets of degrees equal to or less than their degrees of speed. Example (95) shows how this scalar relationship could be represented.

$$(95) \quad \lambda w_s. \{d : \text{SPEED}(j, w) \geq d\} \subseteq \{d : \text{SPEED}(m, w) \geq d\}$$

In (95), *John* and *Mary* are denoted by the constants  $j$  and  $m$ , respectively. They are associated with two sets of degrees of speed, where the set of speeds equal to or less than *Mary's* speed contains the set of speeds equal to or less than *John's* speed. This containment relationship entails that *Mary's* speed is equal to or greater than *John's* speed, and so, *Mary*

outranks *John* in speed. Also, if *John*'s speed exceeded some absolute minimum speed for anyone to satisfy of *win the race*, (95) would entail that both *John* and *Mary* are fast enough to satisfy *win the race*.<sup>5</sup> Furthermore, *Mary* having a sufficient speed to win the race will never entail that *John* has a sufficient speed, because there is no appropriate expression of degree set containment to permit this inference. It could be that *Mary*'s speed represents the absolute minimum required to win the race, so that *John*'s speed is too low. Therefore, this semantics of *enough* already has the potential for translating individuals into contextually induced scalar terms, and modelling inferential strength relationships between them.

## Modifying previous approaches

For the proposed analysis of minimal sufficiency evaluation here, this work diverges from the analysis sketched above in several ways to account for some differences. First of all, there is no overt gradable predicate in minimal sufficiency evaluation, although there is an implied one utilized for translating individuals into scalar terms to the same effect. This implied scale can be retrieved by  $G$ , a variable over functions that associate individuals with degrees. As a variable, the exact value of  $G$  varies with each predicate and discourse context involved in a minimal sufficiency evaluation.

According to the needs of the proposal,  $G$  must be modified so as to associate an individual with an exact degree, representing its scalar value or ranking on  $G$ . To perform this, an operator  $\sigma$  is proposed, which associates an individual, world, and the scale  $G$  with an exact degree. Example (96) shows how two individuals *John* and *Mary* are associated with exact degrees, representing distinct scalar values on  $G$ .

---

5. It is necessary to add the assumption of an absolute minimum speed for anyone to satisfy *win the race* because examples (94) and (95) taken together only say that *Mary*'s speed exceeds the minimum sufficient for *John* to satisfy *win the race*. They do not say that her speed exceeds a minimum sufficient for herself. *Mary* might have her own set of sufficiency conditions that require her speed to exceed some higher degree compared to *John*. She may need to be faster than *John* to compensate for some handicap that prevents her from winning races, such as mild blindness or another medical problem. Therefore, even though *Mary* is faster than *John*, it is possible that she not be fast enough for herself to win the race, while *John* is fast enough for himself to win the race.

- (96) a.  $\sigma_G(j, w) = d_1$   
 b.  $\sigma_G(m, w) = d_2$

In this case, *John* and *Mary* are associated with distinct degrees  $d$  in a world  $w$ , representing their scalar values on  $G$  in  $w$ . The operator  $\sigma_G$  associates *John* with a degree  $d_1$ , while *Mary* is associated with a degree  $d_2$ .

Assuming that  $d_2$  is greater than  $d_1$ , these degrees will reflect a scalar relationship that exists between *John* and *Mary* on  $G$ , where *Mary* outranks *John*. Unlike von Stechow et al.'s (2004) style, this scalar relationship is represented as a containment relationship between sets of degrees equal to or greater than both  $d_1$  and  $d_2$ , or lower bounded sets, modelled as in (97).

$$(97) \quad \lambda_{w_s}.\{d : d \geq \sigma_G(m, w)\} \subset \{d : d \geq \sigma_G(j, w)\}$$

Example (97) is a containment relationship between sets of degrees, in which the set of degrees equal to or greater than *John*'s associated degree contains the set of degrees equal to or greater than *Mary*'s associated degree. Although this containment relationship involves sets of degrees equal to or greater than *John* and *Mary*'s associated degrees, it still entails that *Mary*'s degree is equal to or greater than *John*'s. Therefore, it captures that *Mary* outranks *John* on  $G$ , or is equal to him in rank. This scalar relationship is visualized in Figure 3.1 using bar graphs, where bars represent sets of degrees equal to or greater than the associated degrees of *John* and *Mary*. In Figure 3.1, *John* is associated with the degree

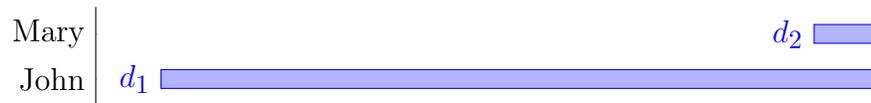


Figure 3.1: Sets of degrees on  $G$  above the associated degrees of *John* and *Mary*

$d_1$  and *Mary* with the degree  $d_2$ . The greater extent of the degrees above  $d_1$ , such that they contain the degrees above  $d_2$ , makes it clear that  $d_2$  is greater than  $d_1$ , and *Mary* outranks *John* on  $G$ .

## Redefining sufficiency

The set of degrees defining sufficiency conditions is also modified significantly. Instead of defining sufficiency conditions as a set of degrees equal to or less than the minimum degree sufficient for satisfaction of a predicate, they are defined as the set of degrees equal to or greater than those consistent with satisfaction of a predicate. This reformulation requires several changes to the von Stechow et al. method. Example (98) below offers a general schema for how the updated sufficiency conditions are defined.

$$(98) \quad \lambda P_{\langle e,p \rangle} \lambda O_{\langle p,p \rangle} \lambda x_e \lambda w_s. \{d : O(\lambda w_s. [P(x, w) \wedge d \geq \sigma_G(x, w)], w)\}$$

The biggest difference is that the operator  $\sigma_G$  is present for defining a set of degrees with a lower bound. Another major difference is that the inherent modal operator is removed and replaced by  $O$ , which is just a stand in for a similar propositional operator that may be provided overtly by the semantic environment. Otherwise, there is still a predicate  $P$  representing the content meaning of the semantic environment,<sup>6</sup> and an individual  $x$  evaluated for the sufficiency of their scalar rank. For a more concrete example, if one wanted to define sufficiency conditions for *John's* satisfaction of *can win the race*, the following representation in (99) would be possible.

$$(99) \quad \lambda w_s. \{d : \exists w'_s \in \text{ACC}(w) [\text{WIN}(j, w') \wedge d \geq \sigma_G(j, w')]\}$$

Here, the modal operator *can* is interpreted with wide scope over both the content meaning of *win (the race)* and the operator  $\sigma_G$ . The definition is also structured in a way so as to define a lower bound on the range of scalar values on  $G$  consistent with *John* satisfying *can win the race*. Finally, the exact value of  $G$  is set to a scale of speed or other relevant scale, given a settled predicate and discourse context. The resulting set defining sufficiency

---

6. Here, the predicate  $P$  is typed as  $\langle e, p \rangle$ , a function from individuals to propositions, rather than  $\langle e, t \rangle$ , a function from individuals to truth values. Throughout this work, predicates and quantifiers will be typed using this convention of substituting  $t$  for  $p$ . This convention is consistent with the intuition that propositions themselves are functions from worlds to truth values, type  $\langle s, t \rangle$ , and require a world of evaluation for ascertaining their truth value. More importantly, it is necessary for the proposals of polarity sensitivity and indiscriminative meaning later.

conditions should otherwise look very familiar. It is a lower bounded set of speeds equal to or greater than those consistent with *John* satisfying *can win the race*. The notion of some lower range of degrees of speed that prohibit *John* from being able to win the race is retained.

Having reformulated both the association of individuals with degrees and the definition of sufficiency conditions, minimal sufficiency evaluation may commence. It is modelled here as an assertion that the set of degrees equal to or greater than an individual's associated degree is properly contained in the set of degrees equal to or greater than those consistent with their satisfaction of a predicate. Example (100) below provides a formal representation of a minimum sufficiency evaluation with the sentence *John can win the race*. The exact value of  $G$  in this case will be a scale of speed.

$$(100) \quad \llbracket \text{John can win the race} \rrbracket^G = \lambda w_s. \{d : d \geq \sigma_G(j, w)\} \subset \{d : \exists w'_s \in \text{ACC}(w)[\text{WIN}(j, w') \wedge d \geq \sigma_G(j, w')]\}$$

Here, the denotation of *John can win the race* is a proper containment relationship between two sets of degrees of speed. The contained set is the set of speeds equal to or greater than *John's* speed. The container set is the set of speeds equal to or greater than those consistent with *John's* satisfaction of *can win the race*. Since the latter set properly contains the former, it is entailed that *John's* speed exceeds the minimum speed sufficient for his satisfaction of *can win the race*. The denotation makes the sentence *John can win the race* paraphrased as *John's speed exceeds all speeds necessary to exceed so that he can win the race*.

The minimal sufficiency evaluation can be represented more visually using bar graphs as well. Figure 3.2 provides a visualization of the truth conditions for example (100). In Figure 3.2, *John* is again associated with the degree  $d_1$ , which is his speed, while a degree  $d_0$  represents the minimum speed consistent with *John's* satisfaction of *can win the race*. The greater extent of the degrees above  $d_0$ , such that they properly contain the degrees above  $d_1$ , makes it clear that  $d_1$  exceeds  $d_0$ , and *John's* speed is enough to satisfy *can win the race*.

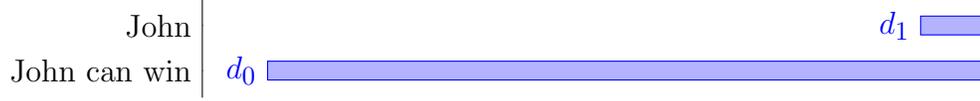


Figure 3.2: Degrees of speed above *John's* and minimum for *John can win the race*

## Deriving inferences from scalar relationships

As with the method of von Stechow et al., modelling sufficiency meaning as degree set containment allows for a means to attach inferential strength to individuals associated with degrees. If an individual's associated degree exceeds another individual's associated degree, and if the lower associated degree exceeds some absolute minimum degree sufficient for anyone to satisfy a predicate, it follows that the higher associated degree also exceeds the absolute minimum degree. In this manner, it can be inferred that both degrees are sufficient for satisfaction of the same predicate, and an inferential strength relationship is induced between the associated individuals. Example (101) below demonstrates how an inferential strength relationship can be derived between the individuals *John* and *Mary*. (101a) is the containment of *John's* speed in the set of speeds equal to or greater than those consistent with someone satisfying *can win the race*. (101b) is the containment relationship between the speeds equal to or greater than *John's* speed and *Mary's* speed. (101c) is the containment of *Mary's* speed in the set of speeds equal to or greater than those consistent with someone satisfying *can win the race*.

- (101) a.  $\lambda w_s. \{d : d \geq \sigma_G(j, w)\} \subset \{d : \exists x_e \exists w'_s \in \text{ACC}(w) [\text{WIN}(x, w') \wedge d \geq \sigma_G(x, w')]\}$   
 b.  $\lambda w_s. \{d : d \geq \sigma_G(m, w)\} \subset \{d : d \geq \sigma_G(j, w)\}$   
 c.  $\lambda w_s. \{d : d \geq \sigma_G(m, w)\} \subset \{d : \exists x_e \exists w'_s \in \text{ACC}(w) [\text{WIN}(x, w') \wedge d \geq \sigma_G(x, w')]\}$

It can be observed that (101a) and (101b), taken together, entail (101c). Since *John's* speed exceeds the minimum sufficient for someone to satisfy *can win the race*, and *John's* speed is lower than *Mary's*, it follows that *Mary's* speed also exceeds the minimum sufficient for someone to satisfy *can win the race*. Therefore, if *John's* speed is sufficient to satisfy *can*

win the race, it is entailed that *Mary's* speed is as well.

Figure 3.3 provides a visualization of the entailment in example (101). In Figure 3.3,

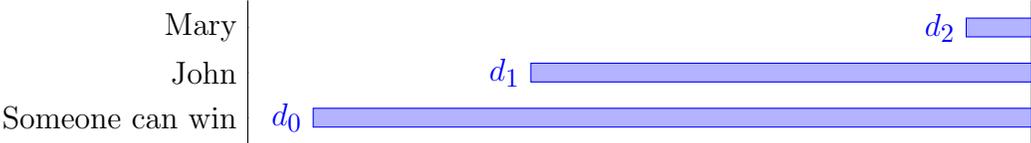


Figure 3.3: Speeds above *John's*, *Mary's*, and minimum for *Someone can win the race*

*John's* speed  $d_1$  exceeds the absolute minimum speed  $d_0$  consistent with someone's satisfaction of *can win the race*. *Mary's* speed  $d_2$  exceeds both *John's* speed and the absolute minimum speed. Given the set scalar relationship between  $d_1$  and  $d_2$ , *John's* speed cannot exceed  $d_0$  without *Mary's* speed doing the same, and both individuals are deemed fast enough that someone can win the race at their speeds. Meanwhile, the opposite direction of inference does not occur. It is possible that only *Mary's* speed is sufficient for winning the race, while *John's* speed is not. In Figure 3.4, the absolute minimum speed  $d_0$  is shifted so that only *Mary's* speed exceeds it. In such a context, *Mary's* speed is sufficient for someone

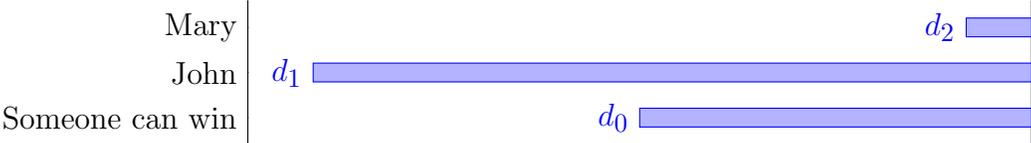


Figure 3.4: Minimum speed for *Someone can win the race* with only *Mary's* speed sufficient

to satisfy *can win the race* without *John's* speed being sufficient. Therefore, it is possible that *Mary can win the race* is true while *John can win the race* is false, corroborating the inferential strength relationship between higher and lower scalar values on  $G$ .

It is worth pointing out that  $d_0$ ,  $d_1$ , and  $d_2$  represent degrees of speed, and not likelihoods to win. *Mary's* speed being higher than *John's* might entail that she is more likely to win in stereotypical circumstances, but likelihood calculation should be a separate operation altogether. It is possible to consider a scenario where *Mary* has some handicap that prevents

her from winning races despite her speed over *John*, such as a medical condition. *John* then might be just as likely to win the race as *Mary*, despite his lower speed. Regardless, what Figures 3.3 and *movedmin* communicate is simply that there is a range of speeds that are too low for anyone to win the race, and individuals may or may not be associated with speeds within this range.

## Deriving inferential strength reversal

Names like *John* and *Mary* denote specific individuals whose scalar relationship on  $G$  can vary with the exact identity of  $G$ . Although *Mary*'s speed may be greater than *John*'s, *John*'s physical strength may be greater than *Mary*'s. Therefore, a minimal sufficiency evaluation that invokes a physical strength scale for  $G$  will impose a different inferential strength relationship between *John* and *Mary* compared to a speed scale. This is to say nothing about true scalar terms, such as nominal expressions on Horn scales, and their occurrences in minimal sufficiency environments. Nominal expressions on Horn scales are distinct in displaying inherent scalar relationships with certain other nominal expressions. These inherent scalar relationships allow them to display the same inferential strength regardless of the content meaning in a predicate. Because they are not sensitive to discourse context, the same lower scalar term on a Horn scale will always display a reversed inferential strength relationship with a higher scalar term within a minimal sufficiency environment. Therefore, the proposed model of minimum sufficiency evaluation must derive this consistent inferential strength relationship for scalar terms on Horn scales across varying predicates and values for  $G$ .

Accounting for Horn scales altogether requires a case-by-case consideration of each Horn scale and its collection of scalar terms, since their semantics are not identical. Their full investigation requires an investment that would not be fully appropriate for a study of free choice indefinites and indiscriminatives, but at least a relevant case study can be offered here with the prototypical example of disjunction. Chapter 2 already discussed the properties of free choice disjunction, and the licensing of inferences from a disjunction to its disjuncts

across a variety of semantic environments. It is proposed here that this phenomenon can be explained by minimal sufficiency evaluation.

The proposal is that when a disjunction undergoes a minimal sufficiency evaluation, what really happens is that the disjunct associated with the lowest degree on  $G$  undergoes the evaluation, while a comparison is made with the other disjuncts. The set of degrees containing the lowest degree associated with the disjuncts is captured by the union of degrees equal to or greater than the disjuncts' associated degrees. This idea is formalized in (102), which is the union of degrees equal to or greater than *John's* associated degree or *Mary's* associated degree.

$$(102) \quad \{d : d \geq \sigma_G(j, w) \vee d \geq \sigma_G(m, w)\}$$

Since the union of two sets always contains each set, regardless of whether *Mary* or *John* is associated with the lower degree, the associated degrees of both will be contained in the union, as shown in (103).

$$(103) \quad \lambda w_s. \{d : d \geq \sigma_G(m, w)\} \subseteq \{d : d \geq \sigma_G(j, w)\} \subseteq \{d : d \geq \sigma_G(j, w) \vee d \geq \sigma_G(m, w)\}$$

A minimal sufficiency evaluation involving a disjunction will then involve this union of degree sets into its calculation of truth conditions. The result is an assertion that the union of degree sets is properly contained in the degree set defining sufficiency conditions for the disjunction. This produces an inference that both disjuncts are associated with degrees sufficient for their satisfaction of a predicate. Example (104) below provides a sample semantics for a minimum sufficiency evaluation with the sentence *John or Mary can win the race*.

$$(104) \quad \llbracket \text{John or Mary can win the race} \rrbracket^G = \\ \lambda w_s. \{d : d \geq \sigma_G(j, w) \vee d \geq \sigma_G(m, w)\} \subset \\ \{d : \exists w'_s \in \text{ACC}(w) [\text{WIN}(j, w') \wedge d \geq \sigma_G(j, w')] \vee [\text{WIN}(m, w') \wedge d \geq \sigma_G(m, w')]\}$$

Here, the denotation of *John or Mary can win the race* is a proper containment relationship between two sets of degrees of speed. The contained set is the union of sets of speeds equal to

or greater than *John* or *Mary*'s speed. The container set is the set of speeds that are equal to or greater than those consistent with *John* or *Mary*'s satisfaction of *can win the race*. Since the latter set properly contains the former, it is entailed that both *John*'s speed and *Mary*'s speed exceed the minimum speed sufficient for *John* or *Mary*'s satisfaction of *can win the race*. The denotation makes the sentence *John or Mary can win the race* paraphraseable as *John's speed and Mary's speed exceed all speeds necessary to exceed so that either of them can win the race*.

Figure 3.5 provides a visualization of the truth conditions for example (104), assuming that *John*'s associated degree is lower than *Mary*'s. In Figure 3.5, the union of speeds equal

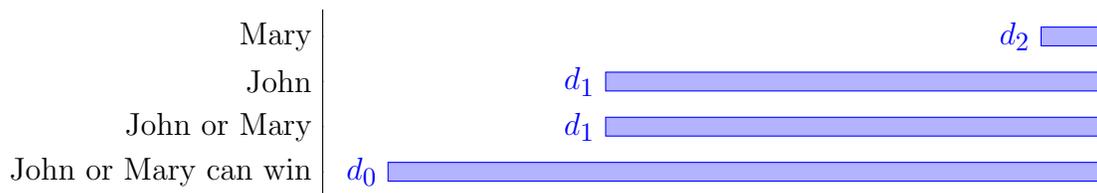


Figure 3.5: Speeds above *John* or *Mary*'s and minimum for *John* or *Mary* can win the race

to or greater than *John*'s speed or *Mary*'s speed has a lower bound at  $d_1$ , which is either *John* or *Mary*'s speed. It turns out that  $d_1$  is *John*'s speed, while *Mary*'s speed is a bit greater. Since  $d_1$  exceeds the minimum speed  $d_0$  consistent with *John* or *Mary*'s satisfaction of *can win the race*, both *John*'s speed and *Mary*'s speed must also exceed  $d_0$ . Therefore, the resulting inferences of the original sentence are *John is fast enough that he or Mary can win the race* and *Mary is fast enough that she or John can win the race*, and with these inferences, an inference from a disjunction to its disjuncts is achieved. This inferential strength relationship will hold across distinct predicates and values for the scale  $G$ , capturing a disjunction's lack of sensitivity to these factors. This is the manner in which inferential strength reversal with minimal sufficiency evaluation is cashed out, at least for disjunction. A similar analysis can be easily applied to existential quantifiers, given their logical similarity to disjunction.

### 3.2.3 Compositionality and distribution

Now that minimal sufficiency evaluation has been modelled using degree semantics, the section turns to the implementation of this semantics in a compositional manner. Beyond inferential strength reversal, two additional characteristics of minimal sufficiency evaluation must be accounted for: its optionality of application and its restriction to application on certain semantic environments and not others. The first characteristic is easily captured by positing a silent operator that endows predicates with the property of featuring a minimal sufficiency evaluation. The second characteristic requires a certain formulation of this operator, such that it allows for the association of individuals and degrees to be interpreted within the scope of logical operators present in a semantic environment. In other words, it must insert the  $\sigma_G$  operator within the scope of such logical operators, especially modal operators. This allows for  $\sigma_G$  to associate an individual with different degrees with respect to different world arguments. The set defining sufficiency conditions may then vary in its size according to the quality or absence of logical operators, changing its scalarity with an individual's associated degree in the world of evaluation and ensuring a containment relationship. The result is a model of polarity sensitivity that blends scalar approaches Krifka (1995); Lahiri (1998); Chierchia (2013) and variable binding approaches (??).

#### A silent operator

As an optional reading on semantic environments, the application of minimal sufficiency evaluation can be modelled as a silent operator  $\xi$ . This operator is indexed with the relevant scale  $G$  and takes a function of type  $\langle\langle\langle e, p \rangle, p \rangle, p \rangle$  as an argument, returning a predicate with minimal sufficiency evaluation. The indexed operator  $\xi_G$  may have the denotation in (105).

$$(105) \quad \llbracket \xi x \rrbracket^G = \lambda Q_{\langle\langle\langle e, p \rangle, p \rangle, p \rangle} \lambda x_e \lambda w_s. \xi_G(Q, x, w) = \\ \lambda Q_{\langle\langle\langle e, p \rangle, p \rangle, p \rangle} \lambda x_e \lambda w_s$$

$$\{d : d \geq \sigma_G(x, w)\} \subset \{d : Q(\lambda P_{\langle e, p \rangle} \lambda w_s. [P(x, w) \wedge d \geq \sigma_G(x, w)], w)\}$$

Here, the function  $\xi_G$  takes a function  $Q$  and an individual  $x$  as arguments. The result is an assertion of set containment, in which the degrees equal to or greater than  $x$ 's associated degree are properly contained in the set of degrees defining sufficiency conditions.

Next, the function of type  $\langle\langle e, p \rangle, p\rangle$  is defined to be a predicate of quantifiers. Predicates of quantifiers are simply another means of interpreting a proposition with a missing argument, such that its input is a quantifier of type  $\langle\langle e, p \rangle, p\rangle$  rather than an individual of type  $e$ . Since they take quantifiers as arguments, predicates of quantifiers allow for embedding their quantifier argument within the scope of other operators. Example (106) below shows how the same proposition with a missing argument may be interpreted as either a predicate of individuals or a predicate of quantifiers.

$$(106) \quad \llbracket \text{can win the race} \rrbracket^G =$$

- a.  $\lambda x_e \lambda w_s. \exists w'_s \in \text{ACC}(w) \text{WIN}(x, w')$
- b.  $\lambda X_{\langle\langle e, p \rangle, p\rangle} \lambda w_s. \exists w'_s \in \text{ACC}(w) X(\lambda x_e \lambda w_s. \text{WIN}(x, w), w')$
- c.  $\lambda X_{\langle\langle e, p \rangle, p\rangle} \lambda w_s. X(\lambda x_e \lambda w_s. \exists w'_s \in \text{ACC}(w) \text{WIN}(x, w'), w)$

In (106a), the predicate is of type  $\langle e, p \rangle$ , straightforwardly taking an individual argument to return a proposition. In the other two cases, the predicate is of type  $\langle\langle e, p \rangle, p\rangle$ , taking a quantifier argument to return a proposition. The crucial difference between the predicate of individuals and the two predicates of quantifiers is that only the predicate of quantifiers allows for different options of scope relationship between its argument and other operators present within the predicate. As seen in (106b), the quantifier argument is inserted beneath the scope of a modal operator *can*. However, It is also possible for predicates of quantifiers to trivially grant the quantifier argument highest scope, as in (106c).

If *John* is filled in for  $x$  and the predicate of quantifiers *can win the race* for  $Q$ , as in (107), we get the semantics for the proposition *John can win the race* with minimal sufficiency evaluation.

$$\begin{aligned}
(107) \quad & \llbracket \text{John } \xi_x \text{ can win the race} \rrbracket^G = \\
& \text{a. } \llbracket \xi_x \rrbracket^G (\llbracket \text{can win the race} \rrbracket^G, \llbracket \text{John} \rrbracket^G) \\
& \text{b. } \lambda w_s. \xi_G (\lambda X_{\langle \langle e, p \rangle, p \rangle} \lambda w_s. \exists w'_s \in \text{ACC}(w) X (\lambda x_e \lambda w_s. \text{WIN}(x, w), w'), j, w) \\
& \text{c. } \lambda w_s. \{d : d \geq \sigma_G(j, w)\} \subset \{d : \exists w'_s \in \text{ACC}(w) [\text{WIN}(j, w') \wedge d \geq \sigma_G(j, w')]\}
\end{aligned}$$

Example (107) provides a breakdown of the composition of  $\xi$  with its arguments, plus the resulting proposition. (113a) shows the semantic argument structure that (107) is broken down into, while (113b) additionally provides the denotations. (113c) is the result of composition of  $\xi$  with its arguments, a proposition that the set of degrees of speed equal to or greater than *John's* speed is properly contained in the set of speeds consistent with *John* being able to win the race.

Quantifiers can also participate in minimal sufficiency evaluations. In order for this to occur, the  $\xi$  operator must be type lifted to accept quantifiers as arguments instead of individuals, as in (108).

$$\begin{aligned}
(108) \quad & \llbracket \xi_X \rrbracket^G = \lambda Q_{\langle \langle \langle e, p \rangle, p \rangle, p \rangle} \lambda X_{\langle \langle e, p \rangle, p \rangle} \lambda w_s. \xi_G(Q, X, w) = \\
& \lambda Q_{\langle \langle \langle e, p \rangle, p \rangle, p \rangle} \lambda X_{\langle \langle e, p \rangle, p \rangle} \lambda w_s. \{d : X(\lambda x_e \lambda w_s. [d \geq \sigma_G(x, w)], w)\} \subset \\
& \quad \{d : Q(\lambda P_{\langle e, p \rangle} \lambda w_s. [X(\lambda x_e \lambda w_s. [P(x, w) \wedge d \geq \sigma_G(x, w)], w)], w)\}
\end{aligned}$$

Several other changes are made to allow the  $\sigma_G$  operator to take scope under the quantifier argument, while the quantifier argument composes with the predicate of quantifiers argument within the definition of sufficiency conditions. This denotation for  $\xi$  allows it to take disjunctions and indefinites as arguments.

## Sensitivity to environment

In order for a minimal sufficiency evaluation to be interpreted as a distinct inference, it is crucial for the set defining sufficiency conditions to have the  $\sigma_G$  operator interpreted within the scope of certain logical operators, especially modal operators. That way, within the definition of sufficiency conditions, the world argument of the operator  $\sigma_G$  will be bound by

some quantifier over worlds, allowing this operator to associate an individual with degrees other than its associated degree in the world of evaluation. Without an operator to bind the world variable,  $\sigma_G$  will always associate an individual with the same degree throughout a minimal sufficiency evaluation, creating problems for the calculation of truth conditions. If  $\sigma_G$  associates an individual with the same degree throughout, the lower bound of the set defining sufficiency conditions becomes identical to an individual's associated degree in the world of evaluation, preventing proper set containment.

To demonstrate this conflict, take for example a predicate such as *won the race*. There are no modal operators present in this predicate, and when combined with an argument, it produces an episodic statement. This predicate can be modeled as a predicate of quantifiers, as shown in (109).

$$(109) \quad \llbracket \text{won the race} \rrbracket^G = \lambda X_{\langle \langle e,p \rangle, p \rangle} \lambda w_s. X(\lambda x_e \lambda w_s. \text{WIN}(x, w), w)$$

Upon application of the  $\xi$  operator and an individual argument *John*, the result is a minimal sufficiency evaluation with the sentence *John won the race*, as in (110) below.

$$(110) \quad \llbracket \text{John } \xi_x \text{ won the race} \rrbracket^G =$$

- a.  $\llbracket \xi_x \rrbracket^G(\llbracket \text{won the race} \rrbracket^G, \llbracket \text{John} \rrbracket^G)$
- b.  $\lambda w_s. \xi_G(\lambda X_{\langle \langle e,p \rangle, p \rangle} \lambda w_s. X(\lambda x_e \lambda w_s. \text{WIN}(x, w), w), j, w)$
- c.  $\lambda w_s. \{d : d \geq \sigma_G(j, w)\} \subset \{d : \text{WIN}(j, w) \wedge d \geq \sigma_G(j, w)\}$

In this example, the denotation of *John won the race* is a proper containment relationship between two sets of degrees of speed. The contained set is sets of speeds equal to or greater than *John's* speed. The container set is also defined by the speeds equal to or greater than *John's* speed, with the trivial inclusion that *John* also won the race at this speed. Since  $\sigma_G$  associates *John* with the same degree throughout, the contained set and the container set have identical lower bounds, and a proper containment relationship is impossible, producing a contradiction. Figure 3.6 provides a visualization of the relationship between these degree sets referred to in example (110). In Figure 3.6, *John* is associated with the degree  $d_1$ , which



Figure 3.6: Degrees of speed above *John's* and minimum for *John won the race*

is his speed, but  $d_1$  is also the lower bound of the degree set defining sufficiency conditions for *John won the race*.

There is a weakness with this explanation of the unacceptability of minimal sufficiency evaluation with episodic statements. The result of this combination is not so much infelicitous as it is just a contradiction. This is not quite the desired result, since it predicts that a sentence like *John won the race* to be optionally interpreted as a contradiction, even if he did win the race. The preferred result would be a prediction of the infelicity of a minimal sufficiency evaluation with an episodic statement. This result can be cashed out with an additional presupposition on the  $\xi$  operator, in particular, one saying that the assertion produced by the  $\xi$  operator should be true in some possible world. For the sentence in (110), this presupposition would take the form of the proposition in (111) below.

$$(111) \quad \lambda w_s. \exists w'_s \in \text{ACC}(w) \{d : d \geq \sigma_G(j, w')\} \subseteq \{d : \text{WIN}(j, w) \wedge d \geq \sigma_G(j, w')\}$$

This presupposition would correctly predict the infelicity of minimal sufficiency evaluation with episodic statements, since the consistent association of an individual with the same degree will never allow for the desired proper set containment. Without modal operators to bind world variables, the set defining sufficiency conditions could never have a lower bound lower than an individual's associated degree in the world of evaluation.<sup>7</sup>

Beyond episodic statements, a similar issue is produced some modalized sentences. Necessity modals can also bind the world variable of the  $\sigma_G$  so as to allow an individual's

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7. Without including degrees greater than the individual's associated degree in the world of evaluation, the degree set defining sufficiency conditions would be a singleton set. The real conflict might then be one between minimal sufficiency evaluation and the incapacity for defining sufficiency conditions by a range of degrees, each independently assigned by a modalized  $\sigma_G$  operator. There is perhaps a better way to capture this intuition, provided some evidence to motivate it over the proposal of this dissertation. This thought experiment is left for future work.

associates degree to vary with worlds. Despite this, the universal quantification that necessity modals encode creates problems for the asserted containment of degree sets in a minimal sufficiency evaluation. It forces the set defining sufficiency conditions to define a lower bound that is the highest possible value that an individual may have among possible worlds accessible to the world of evaluation. This results in a convergence of the degree set defining sufficiency conditions' lower bound with the associated degree of an individual, reproducing the problem with episodic statements. The problem can be demonstrated with the example of the predicate *must win the race* in (112), modelled as a predicate of quantifiers.

$$(112) \quad \llbracket \text{must win the race} \rrbracket^G = \lambda X_{\langle \langle e,p \rangle, p \rangle} \lambda w_s. \forall w'_s \in \text{ACC}(w) X(\lambda x_e \lambda w_s. \text{WIN}(x, w), w')$$

Upon application of the  $\xi$  operator and an individual argument *John*, the result is a minimal sufficiency evaluation with the sentence *John must win the race*, as in (113) below.

$$(113) \quad \llbracket \text{John } \xi_x \text{ must win the race} \rrbracket^G =$$

- a.  $\llbracket \xi_x \rrbracket^G (\llbracket \text{must win the race} \rrbracket^G, \llbracket \text{John} \rrbracket^G)$
- b.  $\lambda w_s. \xi_G (\lambda X_{\langle \langle e,p \rangle, p \rangle} \lambda w_s. \forall w'_s \in \text{ACC}(w) X(\lambda x_e \lambda w_s. \text{WIN}(x, w), w'), j, w)$
- c.  $\lambda w_s. \{d : d \geq \sigma_G(j, w)\} \subset \{d : \forall w'_s \in \text{ACC}(w) [\text{WIN}(j, w') \wedge d \geq \sigma_G(j, w')]\}$

The denotation of *John must win the race* is a proper containment relationship between two sets of degrees of speed. The contained set is the set of speeds equal to or greater than *John's* speed. The container set is the set of speeds equal to or greater than those consistent with *John's* satisfaction of *must win the race*. The container set is also the intersection of the sets of speeds equal to or greater than those consistent with *John's* satisfaction of *can win the race*. Due to this quality, the lower bound of the container set is the greatest possible speed that  $\sigma_G$  can assign to *John* if he wins the race. If *John's* speed in the world of evaluation matches this highest possible assignment, the assertion becomes a contradiction because the asserted proper containment relationship is impossible. Even if *John's* speed in the world of evaluation were somehow higher than this highest possible assignment by  $\sigma_G$ , the assertion would be impossible because it would mean that no world within the quantified modal base

should be accessible to the world of evaluation. An impossible assertion is obtained either way.

### 3.2.4 *Summary*

The inferential strength reversing properties of minimal sufficiency environments are best analyzed as the result of implicature. This is because they display properties in common with implicatures, such as optionality of reading. As such, minimal sufficiency environments are simply semantic environments that are compatible with an inferential strength reversing form of meaning enrichment called minimal sufficiency evaluation. Minimal sufficiency evaluation itself is modelled as comparison of an individual's scalar value on a relevant scale with the set of scalar values consistent with their satisfaction of a predicate. Functionally, it reanalyzes scalar values as degrees and produces an assertion that an individual's associated degree exceeds a minimum sufficient for their satisfaction of a predicate. The application of this meaning enrichment achieves inferential strength reversal for disjunction, since a minimal sufficiency evaluation on a disjunction results in the assertion that the union of the associated degrees of disjuncts will exceed the minimum degree sufficient for their satisfaction of a predicate. Compositionally, minimal sufficiency evaluation is introduced by an operator  $\xi$ , which take either an individual or quantifier argument plus a quantifier of predicates argument. This model allows for variation in the association of individuals with degrees with respect to world variables, which is necessary for defining coherent truth conditions. Without variation in the association of an individual with a degree, the assertion of  $\xi$  becomes a contradiction. Such problems occur with episodic statements and expressions of necessity, favorably predicting the incompatibility of minimal sufficiency evaluation with such sentence types.

### 3.3 Free choice from minimal sufficiency evaluation

Minimal sufficiency evaluation results in inferential strength reversal outside of downward entailing environments. As such, it has the potential to cause bottom scalar values to be interpreted as the inferentially strongest values on their scales. As the strongest values, bottom scalar values will generate inferences to all other members of their scale, attaining readings similar to distributive universal quantifiers, or more exactly, free choice expressions. This section briefly discusses some examples of how free choice expressions are derived from reference to bottom scalar values and the application of minimal sufficiency evaluation, completing the list of semantic ingredients for free choice expressions. The examples are quantifying superlatives and free choice disjunctions, and they are provided simple denotations to show how simply the model predicts their free choice properties. Their differences result in distinct means of achieving quantificational variability, but similar means of achieving anti-episodicity. For superlatives to attain quantificational variability, the semantic environment and discourse context must be chosen so as to accommodate their interpretation as bottom values of the relevant scale. Otherwise, they are only interpreted as strong as they are ranked low on the relevant scale. In contrast, minimal sufficiency evaluation on disjunctions produce inferences about disjuncts regardless of the relevant scale. Meanwhile, the mechanism behind anti-episodicity is sourced to minimal sufficiency evaluation itself, since it requires logical operators to bind the world variable of the  $\sigma_G$  operator. These analyses are brief sketches intended to give a rough idea of how minimal sufficiency evaluation can explain free choice phenomena generally.

#### 3.3.1 *Modelling quantifying superlatives*

Chapter 2 introduced quantifying superlatives as definite descriptions with context-induced free choice readings, among other qualities. It was argued that these superlatives provide evidence that free choice meaning is not confined to indefinites, but may also be encountered

with definite descriptions, a fact which refutes analyses of free choice meaning that tie it to the meaning of indefiniteness or disjunction. Quantifying superlatives also explicate the role of minimal sufficiency evaluation in the formation of free choice expressions, since they explicitly reference the relevant scale  $G$  involved in minimal sufficiency evaluation. They are special among free choice expressions in that they rely on the content meaning of their semantic environment for deriving their free choice properties. For this reason, the semantic environment and discourse context must accommodate a choice of relevant scale  $G$  that the superlative makes reference to. Additionally, the discourse context must be enriched to accommodate the interpretation of some absolute minimum degree on  $G$  for any individual to satisfy a predicate.

### Minimal sufficiency evaluation on superlatives

Superlatives in this chapter will simply denote individuals, although minimal sufficiency evaluation with the right predicate and discourse context will still endow them with quantificational properties. Example (114) provides a denotation for the superlative *the slowest man*.

$$(114) \quad \llbracket \text{the slowest man} \rrbracket^G = \iota x_e \forall y_e [\text{MAN}(y) \rightarrow \text{SPEED}(y) \geq \text{SPEED}(x)] = s$$

Superlatives like this one can combine with a simple predicate of individuals, such as *can win the race* in (115) below.

$$(115) \quad \llbracket \text{can win the race} \rrbracket^G = \lambda x_e \lambda w_s. \exists w'_s \in \text{ACC}(w) \text{WIN}(x, w')$$

This predicate is an example of a non-monotonic environment, and scalar terms inserted into this environment will not generate inferences about other scalar terms. Applying this predicate to the superlative *the slowest man* then produces a proposition *The slowest man can win the race* in (116), without inferences about other individuals.

$$(116) \quad \llbracket \text{The slowest man can win the race} \rrbracket^G = \lambda w_s. \exists w'_s \in \text{ACC}(w) \text{WIN}(s, w')$$

The resulting sentence is only a statement about *the slowest man* and one of his attributes. There are no inferences regarding the ability of other people to win the race. There is no implied dependency on exceedance of a particular scalar value for satisfaction of *can win the race*. Being able to win the race is simply some quality that *the slowest man* has.

In order to derive the quantifying superlative reading, a minimal sufficiency evaluation must be applied. First, the description *can win the race* must be reanalyzed as a predicate of quantifiers, as in (117).

$$(117) \quad \llbracket \text{can win the race} \rrbracket^G = \lambda X_{\langle \langle e,p \rangle, p \rangle} \lambda w_s. \exists w'_s \in \text{ACC}(w) X(\lambda x_e \lambda w_s. \text{WIN}(x, w), w')$$

Then, the operator  $\xi$  may apply to this predicate. Example (118) shows composition of the of the predicate of quantifiers with the operator  $\xi$ .

$$(118) \quad \llbracket \xi_x \text{ can win the race} \rrbracket^G =$$

- a.  $\llbracket \xi_x \rrbracket^G (\llbracket \text{can win the race} \rrbracket^G)$
- b.  $\lambda x_e \lambda w_s. \xi_G (\lambda X_{\langle \langle e,p \rangle, p \rangle} \lambda w_s. \exists w'_s \in \text{ACC}(w) X(\lambda x_e \lambda w_s. \text{WIN}(x, w), w'), x, w)$
- c.  $\lambda x_e \lambda w_s. \{d : d \geq \sigma_G(x, w)\} \subset \{d : \exists w'_s \in \text{ACC}(w) [\text{WIN}(x, w') \wedge d \geq \sigma_G(x, w')]\}$

The predicate *can win the race* is now a minimal sufficiency environment and will induce inferential strength reversal on scalar terms. When combined with the superlative *the slowest man*, the resulting sentence has the semantics below in (119).

$$(119) \quad \llbracket \text{The slowest man } \xi_x \text{ can win the race} \rrbracket^G =$$

- a.  $\llbracket \xi_x \rrbracket^G (\llbracket \text{can win the race} \rrbracket^G, \llbracket \text{the slowest man} \rrbracket^G)$
- b.  $\lambda w_s. \xi_G (\lambda X_{\langle \langle e,p \rangle, p \rangle} \lambda w_s. \exists w'_s \in \text{ACC}(w) X(\lambda x_e \lambda w_s. \text{WIN}(x, w), w'), s, w)$
- c.  $\lambda w_s. \{d : d \geq \sigma_G(s, w)\} \subset \{d : \exists w'_s \in \text{ACC}(w) [\text{WIN}(s, w') \wedge d \geq \sigma_G(s, w')]\}$

Assuming the assignment of a speed scale for  $G$ , the resulting assertion here is that *the slowest man's* speed exceeds the minimum speed sufficient for him to satisfy *can win the race*.

As it stands, the assertion from (119) does not yet produce the desired inferences to other scalar values on  $G$ . In order to derive the desired inferences, an additional inferential step must be performed during a minimal sufficiency evaluation. The degree associated with the individual must be inferred to exceed some absolute minimum degree sufficient for any individual in a domain to satisfy a predicate. This inference can be accomplished with the reasoning that the lowest degree sufficient for an individual's satisfaction of a predicate matches or exceeds the absolute minimum degree. Example (120) shows how this reasoning can be modelled with a set containment relationship for the case of *the slowest man* and the set of degrees sufficient for his satisfaction of *can win the race*.

$$(120) \quad \{d : \exists w'_s \in \text{ACC}(w)[\text{WIN}(s, w') \wedge d \geq \sigma_G(s, w')]\} \subseteq \\ \{d : \exists x_e \exists w'_s \in \text{ACC}(w)[\text{WIN}(x, w') \wedge d \geq \sigma_G(x, w')]\}$$

This example has the set of speeds consistent with *the slowest man's* satisfaction of *can win the race* contained in the set of speeds consistent with anyone's satisfaction of *can win the race*. Next, since (119) already said that *the slowest man's* speed already exceeded the minimum sufficient for his own satisfaction of *can win the race*, his speed's exceedance of the absolute minimum speed is entailed. Examples (119) and (120), taken together, entail (121).

$$(121) \quad \{d : d \geq \sigma_G(s, w)\} \subset \{d : \exists x_e \exists w'_s \in \text{ACC}(w)[\text{WIN}(x, w') \wedge d \geq \sigma_G(x, w')]\}$$

Finally, since *the slowest man* is defined to ranked lowest on a speed scale relative to every other man in the domain, every other man's speed will also be entailed to exceed the absolute minimum. This is how inferential strength can be derived with superlatives, assuming their denotation as individuals.

It is worth reiterating that, in order to derive inferential strength, the superlative must denote the lowest ranking individual on  $G$  relative to other individuals. This means that for *the slowest man* to be interpreted as an inferentially strong scalar term,  $G$  must take the value of a speed scale, so that every other man in the domain will be associated with greater

speeds compared to *the slowest man*. A different semantic environment like *can reach the ceiling* would assign a different value to  $G$ , such as a height scale rather than a speed one. Therefore, for such a predicate, the interpretation of *the slowest man* as the lowest ranking individual on  $G$  will be lost, and there will be no inferences from *the slowest man* to other men, at least not without knowing each of their exact heights.

## Quantificational variability with superlatives

Minimal sufficiency evaluation on superlatives results in their interpretation as strictly distributive universal quantifiers, which allows them to satisfy the criteria of quantificational variability for free choice expressions. When an individual's associated degree exceeds an absolute minimum sufficient for anyone's satisfaction of a predicate, it entails that higher associated degrees also exceed the absolute minimum, and if that individual is interpreted as the lowest scalar value on  $G$ , inferences are generated to every other individual in the domain. The result is an indirect means of distributive universal quantification, and the superlative gains the ability to be truth-conditionally interchangeable with lexical universal quantifiers in some circumstances. The availability of the paraphrase depends on whether the semantic environment distinguishes distributive and collective readings on nominal expressions.

For example, with a predicate like *Max can hear*, minimal sufficiency evaluation has  $G$  become a scale of loudness. The superlative *the faintest noise* will then track the individual associated with the lowest loudness of all individuals in the domain. Then, if *the faintest noise* associates with a loudness that exceeds the minimum loudness sufficient for anyone to satisfy *Max can hear*, any higher loudness will be inferred to exceed the minimum as well. The sentence *Max can hear the faintest noise* will then have the inferences in (122), among many others.

- (122)  $\llbracket \text{Max } \xi_x \text{ can hear the faintest noise.} \rrbracket^G \implies$
- a.  $\llbracket \text{Max } \xi_x \text{ can hear a faint noise.} \rrbracket^G$
  - b.  $\llbracket \text{Max } \xi_x \text{ can hear a mild noise.} \rrbracket^G$

c.  $\llbracket \text{Max } \xi_x \text{ can hear a loud noise.} \rrbracket^G$

Since the construction of these inferences exhaust the set of noises in the domain, these inferences taken altogether are truth conditionally equivalent to distributive universal quantification over a domain of noises in satisfaction of *Max can hear*. With the semantic environment being a generic one, distributive and collective readings are indistinguishable, and the superlative marker becomes paraphraseable as the lexical universal quantifier determiner *every*. Example (123) demonstrates this convergence in truth conditions for the superlative and the universal quantifier.

$$(123) \quad \llbracket \text{Max can hear every noise.} \rrbracket^G \\ = \lambda w_s. \forall x_e \exists w'_s \in \text{ACC}(w) [\text{NOISE}(x, w') \wedge \text{HEAR}(m, x, w')]$$

This sentence says that every sentence of the form *Max can hear x*, with  $x$  being a noise, is true. Since this is the meaning of both *Max can hear every noise* and *Max can hear the faintest noise* with minimal sufficiency evaluation, the superlative marker *the faintest* earns its paraphrase as *every*.

The paraphrase with *every* does not always work, even though the inferences from minimal sufficiency evaluation can be represented with universal quantifiers in the predicate logic regardless. The lexeme *every* as a universal quantifier prefers collective readings on a semantic environment, while semantic environments like *Max can hear* bear a flavor of genericity, clouding the distinction between distributive and collective readings on nominal expressions. Other semantic environments display a clear preference for distributive readings, such that the paraphrase of *every* is no longer available. Take for example the predicate *can win the race*. For this predicate, the scale  $G$  becomes one of speed, so a superlative like *the slowest man* would denote the bottom scalar value among a domain of men. Combining the superlative with the predicate and a minimal sufficiency evaluation, the resulting inferences are as follows in (124).

$$(124) \quad \llbracket \text{The slowest man } \xi_x \text{ can win the race} \rrbracket^G \implies$$

- a.  $\llbracket \text{A fast man } \xi_x \text{ can win the race} \rrbracket^G$
- b.  $\llbracket \text{A man slightly quicker than the slowest man } \xi_x \text{ can win the race} \rrbracket^G$
- c.  $\llbracket \text{Usain Bolt } \xi_x \text{ can win the race} \rrbracket^G$

Similarly, minimal sufficiency evaluation on *the slowest man* exhausts the list men in the domain for generating inferences about who is fast enough to satisfy *can win the race*, resulting in truth-conditional equivalence with distributive universal quantifiers over men. The resulting set of inferences is truth conditionally equivalent to the logical proposition in (125), which states that for each man, he is able to win the race. However, the logical proposition is not an appropriate translation for *Every man can win the race*.

$$(125) \quad \llbracket \text{Every man can win the race} \rrbracket^G \\ \neq \lambda w_s. \forall x_e \exists w'_s \in \text{ACC}(w) [\text{MAN}(x, w') \wedge \text{WIN}(x, w')]$$

The translation does not work here because *every* prefers a collective reading on the semantic environment, which would be inappropriate for the predicate *can win the race* in most scenarios. In most cases, there is only one winner of a race, so that if one man wins, the others suddenly lose their capacity to win. This scenario is not in conflict with potential for different men to be the sole winner of the race, even at their own differing speeds. Thus, universal quantification on a distributive reading of *can win the race* would work, but this is not the meaning conveyed by *every*, so the paraphrase is unavailable.

### Anti-episodicity with superlatives

Since superlatives are defined here as definite descriptions, anti-episodicity can be derived in a similar manner. Basically, the quantifying superlative reading is only available with minimal sufficiency evaluation. So, if some semantic environment bears some conflict with the application of minimal sufficiency evaluation, the quantifying superlative reading will be unavailable. A semantic environment conflicts with the application of minimal sufficiency

evaluation when there are no logical operators to bind the world variable of the  $\sigma_G$  operator. Without this binding relationship, individuals cannot be associated with different degrees throughout the minimal sufficiency evaluation, and the asserted proper containment relationship becomes impossible.

To demonstrate this conflict again, reconsider the case of the predicate *won the race*, which lacks modal operators and produces an episodic statement. Upon application of the  $\xi$  operator and the individual argument *the slowest man*, the result is a minimal sufficiency evaluation with the sentence *The slowest man won the race*, as in (126) below.

$$(126) \quad \llbracket \text{The slowest man } \xi_x \text{ won the race} \rrbracket^G =$$

- a.  $\llbracket \xi_x \rrbracket^G (\llbracket \text{won the race} \rrbracket^G, \llbracket \text{The slowest man} \rrbracket^G)$
- b.  $\lambda w_s. \xi_G (\lambda X_{\langle \langle e, p \rangle, p \rangle} \lambda w_s. X (\lambda x_e \lambda w_s. \text{WIN}(x, w), w), s, w)$
- c.  $\lambda w_s. \{d : d \geq \sigma_G(s, w)\} \subset \{d : \text{WIN}(s, w) \wedge d \geq \sigma_G(s, w)\}$

Again, the denotation of *The slowest won the race* is a proper containment relationship between two sets of degrees of speed, but the two degree sets have the same lower bound. The  $\sigma_G$  operator associates *the slowest man* with the same degree throughout, and the assertion becomes one that *the slowest man's* speed exceeds his speed, a contradiction. A presupposition stipulating that minimal sufficiency evaluation should avoid contradictions of this type can render the minimal sufficiency evaluation infelicitous for this sentence. This is the manner in which anti-episodicity is derived for quantifying superlatives.

### 3.3.2 Modelling free choice disjunction

Free choice disjunctions were shown to bear strong resemblances to both free choice indefinites and quantifying superlatives in their interpretation and distribution in Chapter 2. They distinguish themselves in some minor ways, such as by explicating a domain of quantification as the set of their disjuncts. In the previous section, it was already shown how minimal sufficiency evaluation on disjunctions can derive inferences about their disjuncts in a consistent

way that disregards the qualities of the scale  $G$ . As such, disjunctions under minimal sufficiency evaluation are much less sensitive to the content meaning of predicates and require no assumptions about the discourse context. What they are sensitive to is the availability of a predicate that accommodates minimal sufficiency evaluation. Anti-episodicity is derived in the same manner as with superlatives, whereby the predicate involved in a minimal sufficiency evaluation must feature some logical operator for binding world variables, else result in a conflicting meaning.

### Minimal sufficiency evaluation on disjunction

Disjunctions in this study will denote quantifiers over pairs of individuals. Example (127) provides a denotation for the disjunction *John or Mary*.

$$(127) \quad \llbracket \text{John or Mary} \rrbracket^G = \lambda P_{\langle e,p \rangle} \lambda w_s. [P(j, w) \vee P(m, w)]$$

Since this item is a quantifier, in order to take scope beneath non-monotonic operators in a predicate, the semantic environment must be modelled as a predicate of quantifiers. The predicate *can win the race* is modelled as a predicate of quantifiers in (128), as before.

$$(128) \quad \llbracket \text{can win the race} \rrbracket^G = \lambda X_{\langle \langle e,p \rangle, p \rangle} \lambda w_s. \exists w'_s \in \text{ACC}(w) X(\lambda x_e \lambda w_s. \text{WIN}(x, w), w')$$

Applying this predicate directly to the disjunction *John or Mary* then produces a proposition *John or Mary can win the race* in (129).

$$(129) \quad \llbracket \text{John or Mary can win the race} \rrbracket^G = \lambda w_s. \exists w'_s \in \text{ACC}(w) [\text{WIN}(j, w') \vee \text{WIN}(m, w')]$$

The resulting proposition says that there is a possible world where either *John* wins the race or *Mary* wins the race. Without a minimal sufficiency evaluation, what the sentence seems to express is ignorance on the part of the speaker regarding which of the two individuals can win the race.

A minimal sufficiency evaluation must be applied to derive the free choice reading. Example (130) shows composition of the predicate with the operator  $\xi$ , where  $G$  is a scale of speed.

$$\begin{aligned}
(130) \quad & \llbracket \xi_X \text{ can win the race} \rrbracket^G = \\
& \text{a. } \llbracket \xi_X \rrbracket^G (\llbracket \text{can win the race} \rrbracket^G) \\
& \text{b. } \lambda X_{\langle \langle e, p \rangle, p \rangle} \lambda w_s. \xi_G (\lambda X_{\langle \langle e, p \rangle, p \rangle} \lambda w_s. \exists w'_s \in \text{ACC}(w) X(\lambda x_e \lambda w_s. \text{WIN}(x, w), w'), X, w) \\
& \text{c. } \lambda X_{\langle \langle e, p \rangle, p \rangle} \lambda w_s. \{d : X(\lambda x_e \lambda w_s. [d \geq \sigma_G(x, w)], w)\} \subset \\
& \quad \{d : \exists w'_s \in \text{ACC}(w) [X(\lambda x_e \lambda w_s. [\text{WIN}(x, w) \wedge d \geq \sigma_G(x, w)], w')]\}
\end{aligned}$$

The predicate is now a minimal sufficiency environment and should induce inferential strength reversal on the disjunction. Combining with the disjunction *John or Mary* produces the following proposition below in (131).

$$\begin{aligned}
(131) \quad & \llbracket \text{John or Mary } \xi_X \text{ can win the race} \rrbracket^G = \\
& \text{a. } \llbracket \xi_X \text{ can win the race} \rrbracket^G (\llbracket \text{John or Mary} \rrbracket^G) \\
& \text{b. } \lambda w_s. \{d : d \geq \sigma_G(j, w) \vee d \geq \sigma_G(m, w)\} \subset \\
& \quad \{d : \exists w'_s \in \text{ACC}(w) [[\text{WIN}(j, w') \wedge d \geq \sigma_G(j, w')] \vee [\text{WIN}(m, w') \wedge d \geq \sigma_G(m, w')]]\}
\end{aligned}$$

The resulting assertion here is that the union of the set of speeds equal to or greater than *John's* speed or *Mary's* speed is contained in the set of speeds consistent with either of them satisfying *can win the race*. This entails that both *John's* speed and *Mary's* speed exceed the minimum speed sufficient for either of them to win the race. In this manner, an inference from the disjunction to the disjuncts is achieved compositionally. As before, the assertion makes the sentence paraphraseable as *John's speed and Mary's speed exceed all speeds necessary to exceed so that either of them can win the race*. As simpler paraphrase might be *Both John's speed and Mary's speed are high enough so that either of them can win the race*.

In contrast to superlatives, there is no need to consider an absolute minimum degree for satisfaction of the predicate *can win the race*. This is because the disjunction already makes its domain of quantification explicit, and minimal sufficiency evaluation on disjunction defines sufficiency conditions for the entire domain.

## Quantificational variability with disjunction

The result of minimal sufficiency evaluation on disjunction can be described as its conversion into a distributive universal quantifier over its disjuncts, and this quality endows disjunction with the property of quantificational variability. Chapter 2 showed how free choice disjunction could be paraphrased with universal quantifiers if their domain of quantification consists of no more than the disjuncts. Disjunctions with minimal sufficiency evaluation can then recreate this feature of free choice disjunction with the consideration of domains of disjuncts in mind.

For a predicate like *Max can hear*, minimal sufficiency evaluation has  $G$  become a scale of loudness. Disjuncts are then both evaluated to associate with degrees of loudness that exceed the minimum loudness sufficient for either of them to satisfy *Max can hear*. For the sentence *Max can hear the loud noise or the faint noise*, a minimal sufficiency evaluation will have the inferences below in (132).

- (132)  $\llbracket \text{Max } \xi_X \text{ can hear the loud noise or the faint noise} \rrbracket^G \implies$
- a.  $\llbracket \text{Max } \xi_X \text{ can hear the loud noise} \rrbracket^G$
  - b.  $\llbracket \text{Max } \xi_X \text{ can hear the faint noise} \rrbracket^G$

Here, the sentence *Max can hear the loud noise or the faint noise* implies both *Max can hear the loud noise* and *Max can hear the faint noise*. As such, the disjunction *the loud noise or the faint noise* with minimal sufficiency evaluation has the interpretation of a distributive universal quantifier over its disjuncts.<sup>8</sup> Assuming a domain of only *the loud noise* and *the*

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8. This feature also presents an advantage over Fox's (2007) model of free choice disjunction. Fox uses a complex form of focus semantics to derive free choice disjunction. In this framework, a silent exhaustivity operator activates both a set of exhaustified domain alternatives and the conjunction alternative while asserting that they are all false. The activation and negation of these alternatives would typically generate conflicting inferences and prevent the licensing of free choice readings, but certain logical operators can alter the form of some alternatives when they are present, creating compatibility between inferences and licensing the free choice reading. Since the conjunction alternative must be negated, the model does not predict it to be an inference from free choice disjunction. Minimal sufficiency evaluation, instead, requires no direct calculation of the conjunction alternative, and allows it to arise from features of the semantic environment and discourse context.

*faint noise*, the paraphrase of the disjunction as the universal quantifier *every noise* then accurately captures the truth conditions for the original sentence, as shown in (133).

$$(133) \quad \llbracket \text{Max can hear \textbf{every} noise.} \rrbracket^G \\ = \lambda w_s. \forall x_e \exists w'_s \in \text{ACC}(w) [\text{NOISE}(x, w') \wedge \text{HEAR}(m, x, w')]$$

This paraphrase is possible due to the generic quality of the predicate *Max can hear*, which does not distinguish collective and distributive readings on nominal expressions.

Again, semantic environments that distinguish distributive and collective readings prevent the ability to paraphrase a disjunction with universal quantifiers. Recall the example of *John or Mary can win the race*, a non-generic statement about two people and their relationship with a particular event, which is a race in this case. Minimal sufficiency evaluation on this sentence produced the following inferences in (134).

$$(134) \quad \llbracket \text{John or Mary } \xi \text{ can win the race} \rrbracket^G \implies \\ \text{a. } \llbracket \text{John } \xi \text{ can win the race} \rrbracket^G \\ \text{b. } \llbracket \text{Mary } \xi \text{ can win the race} \rrbracket^G$$

Even though the sentence with minimal sufficiency evaluation entails that both disjuncts satisfy the predicate *can win the race*, the paraphrase of the disjunction as a universal quantifier is not available, as shown in (135).

$$(135) \quad \llbracket \text{Every person can win the race} \rrbracket^G \\ \neq \lambda w_s. \forall x_e \exists w'_s \in \text{ACC}(w) [\text{PERSON}(x, w') \wedge \text{WIN}(x, w')]$$

The unavailability of the paraphrase is due to the non-generic quality of the original sentence, which describes an race where there may be only one winner, distinguishing distributive and collective readings. As such, minimal sufficiency evaluation captures the context-dependent paraphraseability of disjunction with universal quantifiers.

## Anti-episodicity with disjunction

Anti-episodicity is derived for disjunction in the same manner as with superlatives. When there are no logical operators to bind the world variable of the  $\sigma_G$  operator, individuals cannot be associated with different degrees throughout the minimal sufficiency evaluation. The asserted proper containment relationship then becomes impossible because both the contained degree set and container degree set have identical lower bounds. Nothing about disjunctions alters the way in which this conflict comes about.

To demonstrate, consider the case of the predicate *won the race*, which lacks modal operators and produces an episodic statement. Upon application of the  $\xi$  operator and the disjunction *John or Mary*, the result is a minimal sufficiency evaluation with the sentence *John or Mary won the race*, as in (136) below.

$$(136) \quad \llbracket \text{John or Mary } \xi_X \text{ won the race} \rrbracket^G =$$

- a.  $\llbracket \xi_X \text{ won the race} \rrbracket^G (\llbracket \text{John or Mary} \rrbracket^G)$
- b.  $\lambda w_s. \{d : d \geq \sigma_G(j, w) \vee d \geq \sigma_G(m, w)\} \subset$   
 $\{d : [\text{WIN}(j, w') \wedge d \geq \sigma_G(j, w)] \vee [\text{WIN}(m, w') \wedge d \geq \sigma_G(m, w)]\}$

The denotation of *John or Mary won the race* is a proper containment relationship between two sets of degrees of speed, but the two degree sets have the same lower bound. The  $\sigma_G$  operator associates both disjuncts with the same degree throughout, and the assertion becomes one that the speeds of both disjuncts exceed the lower associated speed of the two. This is a contradiction at least for the case of the disjunct associated with the lower speed. As such, the manner in which anti-episodicity is derived for disjunctions under minimal sufficiency evaluation is no different from how it is derived for other items.

### 3.3.3 Summary

Minimal sufficiency evaluation can help explain the formation of quantifying superlatives and free choice disjunctions in a uniform manner. Quantifying superlatives are analyzed as

simple definite descriptions that depend on discourse contextual factors in addition to minimal sufficiency evaluation for attaining free choice readings. They are sensitive to content meaning of their semantic environment, which affects the kind of scale that  $G$  represents. Their superlative marker must then make reference to the bottom scale value on  $G$  among their alternatives in a domain, or they are only as strong as they are ranked low on  $G$  and will not attain free choice readings. An additional inference that they exceed some absolute minimum degree for anyone's satisfaction of a predicate is also required, in order to make more explicit reference to a domain of quantification. After these conditions are met, minimal sufficiency evaluation predicts quantificational variability for the superlative. Free choice disjunctions differ by interacting with minimal sufficiency evaluation in a way which allows them to disregard the specifics of the scale  $G$ . Under minimal sufficiency evaluation, they always generate inferences about their disjuncts, capturing their own form of quantificational variability. Both quantifying superlatives and free choice disjunctions inherit their anti-episodicity from minimal sufficiency evaluation itself, which requires logical operators within a predicate to bind world variables. Otherwise, the assertion becomes one about an impossible containment relationship among degree sets.

### 3.4 Conclusion

This chapter discussed the existence and characteristics of minimal sufficiency evaluation, an implicature in which the inherent inferential strength relationships between scalar terms are reversed. Evidence for their existence comes from not only their inferential patterns, but also their interaction with negation, their effect on the paraphraseability of exclusive particles, and their licensing of polarity sensitive items. The chapter presented a semantic model of minimal sufficiency evaluation as an operator on predicates, associating individuals with degrees and imposing a condition that their degree must exceed some minimum degree sufficient for satisfaction of a predicate. Individuals may associate with lower or higher degrees, and if lower degrees suffice for satisfaction of a predicate, so do the higher degrees,

given additional assumptions about the discourse context. This model predicts the reversal of inferential strength, since minimal sufficiency evaluation on disjunction results in an evaluation of sufficiency for the lowest associated degree among the disjuncts. It also predicts minimal sufficiency evaluation to be incompatible with some semantic environments, since a logical operator that binds world variables is required to make the resulting assertion coherent. The model was shown to derive the basic properties of quantifying superlatives and free choice disjunctions as free choice expressions. The derivation of quantificational variability differed among the two in the amount of additional inferential steps to make. The derivation of anti-episodicity was identical for both, attributable to the conditional availability of minimal sufficiency evaluation for a semantic environment. With these examples, minimal sufficiency evaluation is shown to predict free choice phenomena.

Minimal sufficiency evaluation and its inferential strength reversing properties complete the ingredients to free choice meaning by forming its environmental component. This component combines with the referential component of reference to a bottom scalar value in order to produce a form of distributive universal quantification that displays the characteristic properties of free choice expressions. However, the model so far only provides a general and superficial analysis of the meaning contribution of free choice expressions. Free choice expressions are quite diverse in their lexical sources, which differ in distribution and do not all interact with the same semantic environments in the same manner. A proper semantics of free choice expressions will require further attention to the details of their lexical sources. In the chapters that follow, such attention will be given to free choice expressions that are derived from certain polarity sensitive indefinites, including English *any* and indiscriminatives.

## CHAPTER 4

### COMPOSING ENGLISH *ANY* AND *JUST ANY*

The last two chapters offered a general analysis of free choice meaning and how bottom scalar values may come to attain it. That discussion culminated into the introduction of minimal sufficiency evaluation, and how its application on bottom scalar values may derive free choice expressions. Minimal sufficiency evaluation is the critical semantic ingredient in the formation of free choice indefinites, according to the analysis of this dissertation. Now, in order to better understand the derivational link between free choice and indiscriminacy, the critical ingredient in the formation of indiscriminatives must be identified. The identification of this ingredient must not only explain the meaning contribution of indiscriminatives, but also their similarity with free choice indefinites in semantic composition. This chapter begins the discussion by furnishing the full semantic recipe for composition of both free choice *any* and indiscriminative *just any*.

To understand the semantic components of indiscriminatives, recall that indiscriminatives were defined as indefinites with two properties. They are indefinites that co-occur with negation to express the specificity or noteworthiness of a yet to be revealed candidate for satisfaction of a predicate. They also feature some consistent marker to which their characteristic meaning contribution may be sourced. These two properties were displayed in example (137) below, in which the indiscriminative *just anyone* occurs under scope of negation.

(137) Bob didn't see **just anyone** – He saw ... Stan Papi!

(Carlson, 1981, 22)

Here, *just anyone* under negation expresses that the person that Bob saw is noteworthy, while priming the speaker for an eventual reveal of the noteworthy person: Stan Papi. For whatever reason, researchers have mostly avoided attempts to model this sort of discourse function. Interestingly, few researchers, if any, have remarked on the potential contribution

of the exclusive particle *just* to this sort of meaning. Exclusive particles on their own have long been observed to have a very similar discourse effect with negation, that of expressing the unexpectedly high scalar ranking of a yet to be revealed candidate for satisfaction of a predicate. The exclusive particle *just* performs this discourse function on its own, with any low ranking scalar term. Example (138) below shows how *just* interacts with the quantified noun *one film* while occurring under scope of negation.

(138) Bob didn't see **just one** film – He saw ... three!

In this example, we observe approximately the same discourse effect as with negation on indiscriminatives. The phrase *just one film* occurs under negation to express that the number of films Bob saw was more than one, while priming the speaker for an eventual reveal of the exact number. Therefore, the exclusive particle *just* seems to be providing much of the characteristic meaning contribution of indiscriminative *just any*, as if it were explicating an inherent exclusive meaning component in indiscriminative meaning.

Beyond its characteristic meaning contribution under negation, indiscriminative *just any* does not differ from bare *any* in its meaning or distribution. Both bare *any* and *just any* are polarity sensitive and capable of free choice readings, so that all of *just any*'s other characteristics must be inherited from *any* in some compositional manner. Also, if bare *any*'s free choice reading is traced to minimal sufficiency evaluation, we are provided an abundance of clues regarding what the meaning of bare *any* should be. The most appropriate analysis would have *any* denote an existential quantifier that activates subdomain alternatives to its restriction. As this type of quantifier, it may undergo minimal sufficiency evaluation for its free choice reading, or modification by exclusive particles for its indiscriminative reading. The rest of this chapter elaborates on this proposal by developing a compositional analysis of both free choice *any* and indiscriminative *just any*. §4.1 covers the meaning contribution of *just*. It discusses the meaning contribution of exclusive particles generally and pinpoints the relevant points of distinction for *just*, using the framework developed by Coppock & Beaver (2014). §4.2 applies the semantic model to an updated version of Krifka's (1995) semantic

model of *any*, and it explains how key properties of free choice *any* are borne out. Basically, *any* is an existential quantifier that activates subdomain alternatives and presupposes that some propositional alternative to the assertion, with a more specific restriction, is true. §4.3 finally introduces the proposed semantic model of indiscriminative *just any*. It combines Coppock & Beaver’s (2014) semantic model of exclusive particles with the Krifka (1995) inspired model of *any* to create a compositional account of *just any*, capturing the key traits of indiscriminatives discussed in Chapter 1. It even goes so far as to explain how *just any* may gain free choice readings by means of minimal sufficiency evaluation. §4.4 concludes the chapter with a summary of results.

## 4.1 The semantics of *just*

A compositional analysis of the indiscriminacy of English *just any* demands analyses of the individual meaning contributions of *any* and *just*. This section begins the discussion with the less contentious issue of the semantics of the exclusive particle *just*. It provides a review of observations on the meaning of *just* from the most recent literature, and it presents a semantic model of *just* that will be adequate for capturing its relevant features for the composition of indiscriminative *just any*. Some semantic features of *just* were already discussed in Chapter 3, such as its compatibility with minimal sufficiency readings on sentences. This section delves much deeper into its general meaning contribution and discourse functions, to better understand its grammar in a formal manner. It starts with a brief introduction to the general study of exclusive particles, a lexical category to which *just* belongs. It then discusses more modern takes on the meaning contribution of exclusive particles that account for their scalar readings. Later, the particular qualities that distinguish *just* among exclusive particles are discussed. Finally, Coppock & Beaver’s (2014) semantic model of the general meaning contribution of exclusive particles is provided.

### 4.1.1 *The standard account of exclusive particles*

Exclusive particles are phrase modifiers whose meaning contribution is a grammatically complex form of exhaustification. Their inventory in English consists of at least the words *only, just, exclusively, merely, purely, solely, simply, sole, pure, exclusive, and alone* (Coppock & Beaver, 2014). These English exclusive particles are semantically interchangeable in many cases, contributing the same meaning with little perceptible difference. In example (139) below, *just* is replaced by *only* and *merely*, with the resulting assertion unchanged.

- (139) a. This is **just** for fun.  
b. This is **only** for fun.  
c. This is **merely** for fun.

All of the sentences above are truth-conditionally equivalent since they are paraphraseable in the same way, as something like *This is for nothing other than fun*. This truth-conditional equivalence derives from the shared meaning components between *just, only, and merely* as exclusive particles. These meaning components are best explained by the history of research on *only*, the exclusive particle that has received the most attention in the literature.

#### The two meaning components

The standard or traditional account of *only* is that it is a propositional operator with two meaning components, called POSITIVE and NEGATIVE in the literature (Horn, 1969, 1996, 2011; Rooth, 1985, 1992; van Rooij & Schulz, 2007; Beaver & Clark, 2008). The positive component is a presupposition that the PREJACENT, or the sentence that *only* modifies, is true. The negative component is the assertion that all sentences similar to the prejacent, differing only in having a portion called the FOCUS VALUE replaced by grammatically similar material, are false.<sup>1</sup> For example, take a sentence *Only John won* with *John* as the focus

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1. Beyond the standard account, other accounts have offered variations on the division of semantic features among the positive and negative components. For example, Atlas (1991, 1993) offers positive and

value for computing the negative component. Then, the prejacent will be *John won*, and the presupposition and assertion will be as in (140).

(140) Only **John** won.

a. PRESUPPOSITION: **John** won.

b. ASSERTION: It is false that [**Mary** won], and it is false that [**Bill** won].

Here, the prejacent is used for producing the positive component, an identical presupposition. The negative component is then computed as the negation of all sentences that take the form of the prejacent with *John* replaced by other names. The result is an assertion that *Mary won* is false and *Bill won* is false.

The calculation of the negative component results in the paraphraseability of *only* as *no more than*, *nothing other than*, or *no one other than*. This style of paraphrase captures the asserted content of a sentence with *only*, while dismissing its presupposition. As such, the negative component can be re-characterized as the content of this type of paraphrase. In the case of the previous example, *Only John won*, the appropriate paraphrase in this fashion would be as in (141).

(141) **Only** John won.  $\implies$  **No one other than** John won.

Here, *only* is replaced by *no one other than* without a perceptible change in what is asserted. What differs is the presupposition that John won, which seems to only exist for the original sentence with *only*. Therefore, the paraphrase is truth-conditionally equivalent to the calculated negative component. The positive and negative components of *only*'s meaning contribution can then be re-characterized as follows:

- **Positive** component:

the sentence that *only* modifies, called the *prejacent*, which is presupposed

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negative components with reorganized features, while Taglicht (1984) combines all features into the negative component.

- **Negative** component:

the paraphrase of *only* as *no more than*, *nothing other than*, or *no one other than*

This basically says that *only* presupposes the truth of its prejacent, and it asserts that its paraphrase as *no more than*, *nothing other than*, or *no one other than* also produces a true sentence.

## Focus association

In order to resolve what portion of the prejacent is replaced for calculation of the negative component, focus marking is invoked. Focus marking refers to any grammatical mechanism by which new information is marked within a phrase. In English, focus is often marked with prosodic prominence, such as in stress or loudness. By itself, focus marking has pragmatic effects on the interpretation of a sentence, often contributing a sense of highlighting new or requested information. Example (142) by Rooth (1985) shows how the same sentence can take on different pragmatically enriched meanings when focus marking occurs on different phrases.

- (142) a. Carl likes **herring**<sub>F</sub>.  
 b. **Carl**<sub>F</sub> likes herring.

(Rooth, 1985, 2)

Here, the speaker adds prominence to *Carl* and *herring*, respectively. The location of prominence in this example lacks a truth-conditional effect, but there remains a sense that each sentence is associated with a distinct set of presuppositions. When *herring* takes prominence in (142a), the speaker seems to be explaining to the addressee what Carl likes. When *Carl* takes prominence in (142b), the speaker seems to be talking to the addressee about who likes Herring.

Although focus marking inherently lacks a truth-conditional effect, it can modify truth-conditions in the right semantic environment. This is particularly true while it occurs with

exclusive particles, which, like other FOCUS-SENSITIVE particles, rely on focus marking for calculating their meaning contribution. In the case of *only*, focus marking determines how the negative component is calculated, with consequences for truth-conditions.<sup>2</sup> Example (143) below shows how focus marking changes the truth-conditions of the same sentence.

- (143) a. I only introduced **Bill**<sub>F</sub> to Sue.  
b. I only introduced Bill to **Sue**<sub>F</sub>.

(Rooth, 1985, 2)

Here, the meaning of *only* interacts with prominence so as to produce distinct truth conditions for each example. When *Bill* takes prominence in (143a), the speaker says that everyone that they introduced to Sue was Bill. When *Sue* takes prominence in (143b), the speaker says that everyone that they introduced Bill to was Sue. The first example is not compatible with scenarios where the speaker introduced other people besides Bill to Sue, whereas the second example is compatible with this scenario. Similarly, the second example is not compatible with scenarios where the speaker introduced Bill to other people besides Sue, whereas the first example is compatible with this scenario.

#### 4.1.2 *Scalarity in exclusive meaning*

The standard account of the meaning of *only* provides a fair starting point for modelling the meaning of exclusive particles generally, but it falls short of explaining their full grammatical behavior. More recent treatments of exclusive particles consider them to also have a scalar meaning component, in which the focus value is necessarily evaluated for rank on a relevant scale (Beaver & Clark, 2008; Coppock & Beaver, 2014). Coppock & Beaver (2014) claim that the capacity for exclusive particles to be paraphrased as *no more than* already explicates the inherently scalar nature of their meaning contribution. Further evidence for the scalarity of

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2. When a linguistic item interacts with focus marking in this way, it is said to *associate with focus* (Jackendoff, 1972), or display FOCUS ASSOCIATION.

exclusive particles comes from their sensitivity to the ranking of focus values on evaluative scales, which in turn affects both their felicity and paraphraseability. The evidence motivates a reformulation of the positive and negative components of the standard account in scalar terms.

## Scalar readings and felicity

Beyond the exhaustivity that exclusive particles apply to the focus value, they also observe non-truth-conditional felicity conditions which restrict their distribution (Beaver & Clark, 2008). While an exclusive particle is present, the focus value must also be evaluated as bearing a low rank relative to whatever items it is being contrasted with. Example (144) below shows how *just* can become felicitous or infelicitous depending on whether the focus value is evaluated with low or high rank, relative to another term in the sentence.

- (144) *Context*: I'm checking in at a hotel with exclusive options between suites and single rooms.
- a. I really expected a **suite**, but just got a **single room with two beds**<sub>F</sub>.
  - b. # I really expected a **single room with two beds**, but just got a **suite**<sub>F</sub>.

The first sentence in (144a) is felicitous, while the second sentence in (144b) is not. The reason for this difference is that the focus value is *single room with two beds* in the first sentence and *suite* in the second sentence. These two items bear rankings on a scale of quality of hotel offerings, which itself seems to be invoked as a relevant scale in the discourse context. On this quality of hotel offerings scale, *single room with two beds* is ranked lower than *suite*. Therefore, while the two items are contrasted in this way, *just* necessarily associates with the lower scalar term as the focus value. This result is unexpected if the meaning of *just* were nothing more than the positive and negative components as laid out by the standard account of exclusive particles.

These additional felicity conditions on exclusive particles are not always clearly observed.

A change in the discourse context of (144) allows for the infelicitous sentence to become felicitous in (145).

(145) *Context*: I'm checking in at a hotel with a bunch of friends and expecting two different types of rooms for everyone.

- a. I really expected a **suite**, but just got a **single room with two beds**<sub>F</sub>.
- b. I really expected a **single room with two beds**, but just got a **suite**<sub>F</sub>.

Such cases shed light on the polysemy of exclusive particles and the issue of whether they are lexically ambiguous or simply display several semantically related readings. Coppock & Beaver (2011, 2014) define two of the most commonly identified readings for exclusive particles in the literature: the *complement exclusion* reading and *rank-order* reading.

- **Complement Exclusion** readings (Hole, 2004):

exclude everything in the complement set of the things described by the focus

- **Rank-order** readings (Horn, 2000):

set the prejacent as an upper bound on a scale that orders elements by rank

Complement exclusion readings are the simple exhaustified readings that are predicted by the standard account of the meaning of *only*. Rank-order readings are those where it is clear that the exclusive particle is observing non-truth-conditional felicity conditions, imposing a condition that the focus value be evaluated as a lower ranking scalar term relative to contrasted items. Rank-order readings of exclusive particles are identifiable by their strong preference for a paraphrase as *at most*, rejecting paraphrases as *nobody/nothing other than*. Complement exclusion readings differ in displaying no preference for either paraphrase.

## The ubiquity of scalar readings

Coppock & Beaver (2011, 2014) claim that complement exclusion readings of exclusive particles constitute a subset of rank-order readings. To support this claim, they note that not

all contexts permit paraphrases of exclusive particles as *nobody/nothing other than*, whereas paraphrases as the more scalar *at most* are always acceptable. In example (146) below, *just* has a complement exclusion reading, permitting a paraphrase as either *nobody other than* or *at most*.

- (146) Mary invited **just** John and Mike.
- a.  $\Rightarrow$  Mary invited **nobody other than** John and Mike.
  - b.  $\Rightarrow$  Mary invited **at most** John and Mike.

This example shows that complement exclusion readings are not particular about the choice of paraphrase between *nobody other than* and *at most*. Both paraphrases are acceptable. However, the paraphrase *nobody other than* becomes awkward in the example (147), which imposes a rank-order reading on *just*. Meanwhile, scalar *at most* remains acceptable as a paraphrase.

- (147) John is **just** a graduate student.
- a.  $\nRightarrow$  John is **nothing other than** a graduate student.
  - b.  $\Rightarrow$  John is **at most** a graduate student.

The paraphrase *nothing other than* fails because the phrase *graduate student* is interpreted as a scalar term on an evaluative scale. In typical circumstances, the original sentence does not say that John is nothing other than a graduate student and, therefore, that he is not also an instructor. Rather, it says that his rank is up to the level of graduate student on some relevant scale, such as one of institutional rank within a research department, or that he is not a professor.

Coppock & Beaver even argue that the presupposition of exclusive particles must be understood in scalar terms. They cite evidence that the presupposition is better represented as the prejacent modified by *at least*, rather than as the prejacent alone. Example (148) below shows that negation on *just* with a complement exclusion reading displays no pref-

erence for the prejacent modified by *at least* over the prejacent alone for representing the presupposition.

- (148) Mary didn't invite **just** John and Mike.
- a.  $\Rightarrow$  Mary invited John and Mike.
  - b.  $\Rightarrow$  Mary invited **at least** John and Mike.

The prejacent modified by *at least* and the prejacent alone seem to be providing the same meaning contribution, and therefore, both serve as identical presuppositions. However, negation on *just* with a rank-order reading more clearly distinguishes the prejacent modified by *at least* as the preferred representation of the presupposition. While a presupposition of the prejacent alone survives negation for complement exclusion readings, the same is not true for rank-order readings. In example (149), *just* has a rank-order reading, and only the prejacent modified by *at least* survives negation as a presupposition.

- (149) John isn't **just** a graduate student.
- a.  $\nRightarrow$  John is a graduate student.
  - b.  $\Rightarrow$  John is **at least** a graduate student.

Negation on *just a graduate student* expresses that John is something of higher rank than graduate student, possibly a professor, department chair, or provost. Meanwhile, the prejacent alone is not presupposed. It is not necessarily the case that John is still a graduate student if he is something else of higher rank.

Taken altogether, the data shows that, under all discourse contexts, the assertion of exclusive particles can be represented as the original sentence with *at most* replacing the particle, and their presupposition can be represented as the original sentence with *at least* replacing the particle. This ultimately speaks to the ubiquity of scalar interpretations on the focus value in all occurrences of exclusive particles. As such, complement exclusion readings are really a kind of rank-order reading, invoking entailment scales in particular, and the meaning contribution of exclusive particles is better characterized in scalar terms.

## Reformulating the negative and positive components

The preponderance of rank-order readings of exclusive particles led Coppock & Beaver to suggest that they always associate with a relevant scale, on which the focus value is ranked as a scalar term. As such, the negative and positive components of the standard account of *only* must be modified to account for the scalarity imposed on the focus value. They propose a model of exclusive meaning drawn from the semantic analysis of *only* by Beaver & Clark (2008). According to Beaver & Clark, the discourse function of *only* is to modulate the flow of discourse by addressing a current question under discussion in the discourse, or CQ, with a true answer that is weaker than expected. The prejacent is marked by *only* as representing the strongest true answer to the CQ, despite that other stronger answers on the same strength scale were possible. In other words, discourse participants may expect a higher ranking possible answer to be true, but *only* explicates that the prejacent is the highest ranking answer that is true, guiding the discourse to more calibrated information exchange. The strength scale is contextually determined and corresponds to whatever scale the ranking of the focus marked phrase is evaluated on.

With this general approach to the meaning contribution of *only* and other exclusive particles, the positive and negative components of their meaning may be reformulated as the MIN and MAX conditions below, respectively, with  $\pi$  representing the prejacent.

- MIN( $\pi$ ): There is an answer to the CQ that is both true and as strong as the prejacent.
- MAX( $\pi$ ): There is no answer to the CQ that is both true and stronger than the prejacent.

The MIN condition has that the prejacent represent a lower bound among candidates for the strongest true answer to the CQ. Meanwhile, the MAX condition has that the prejacent, despite being the weakest possible answer under consideration, is the strongest true answer.

### 4.1.3 *Idiosyncrasies of just*

Having laid out the basic semantic properties of exclusive particles, this section now turns to the specific example of *just*. Adverbial *just* is a polysemous item with a widely variable paraphraseability that is dependent on semantic environment (Cohen, 1969; Lee, 1987, 1991; Kishner & Gibbs, 1996; Lindemann & Mauraanen, 2001; Grant, 2011). However, its distinct senses are similar enough to be consolidated into a consistent set of semantic properties that are typical of exclusive particles. The only realm in which *just* is very unique is its lack of constraints on association with evaluative scales. Furthermore, it is distinguished in also occurring within the preajcent of other focus particles.

#### No constraints on associated scale

Although Coppock & Beaver (2011, 2014) claim that exclusive particles share the same MIN and MAX components in their meaning contribution, they also elaborate on how exclusive particles differ among themselves beyond these components. Through their surveys, they compile a list of three parameters along which exclusive particles differ grammatically, which are as follows.

- The quantity of options for their semantic type, determining their syntactic behavior and distributional properties.
- The constraints placed on the form of the CQ, or what kind of current question is being addressed, e.g., *who*, *what*, etc.
- The constraints placed on the nature of the scale on which the preajcent is ranked in strength relative to other possible answers to the CQ.

Even along these parameters, exclusive particles do not display a great deal of grammatical variance. Most exclusive particles display many options for semantic type and very lax

constraints on the form of the CQ being answered with the prejacent. Most exclusive particles also tend to associate with entailment scales for ranking the prejacent against possible answers to the CQ, as is evident from a general preference for complement exclusion readings.

Even *just* is not extremely unique. It has many semantic type realizations and displays lax constraints on the form of the CQ being addressed. Where *just* does differ from most other exclusives is in its lack of constraints placed on the scales it may associate with, often permitting association with evaluative or non-entailment scales. The prejacent of *just* may then be evaluated for ranking on scales of cultural value, chronologies of events or states, and much more. Example (150) below shows how both *just* and *only* respond differently to a focus value whose denotation is evaluated on a non-entailment scale.

- (150) a. They're not **just** ENGAGED<sub>F</sub>, they're MARRIED!  
b. # They're not **only** ENGAGED<sub>F</sub>, they're MARRIED!

Horn (2000, 150)

Being married and being engaged do not entail one another, but they do exist on a culturally imposed scale where one necessarily precedes the other in chronology. *only* displays a preference for association with entailment scales, which makes its occurrence with the term *engaged* infelicitous, at least while *engaged* is contrasted with *married*. On the other hand, *just* has no such preference for association with entailment scales, so it felicitously occurs with the same contrast.

### Occurrence within the prejacent

There is another unusual feature of *just* regarding its distribution, which Coppock & Beaver overlook in their discussion. *just* seems to be able to co-occur with other exclusive particles like *only*, as well as other focus particles. Example (151) shows *just* co-occurring with the exclusive particle *only*.

- (151) *Context*: A news article reports on the shrinking of the average American family.

- a. Today, one in five American families has **only just** one child.

(web example)

The proposed analysis of exclusive particles as having a MIN and MAX component in their meaning contribution does not make predictions about the co-occurrence of different exclusive particles, as observed above. The best it can do is predict that either *only* or *just* takes the basic prejacent, while it is itself interpreted within the prejacent of the other exclusive particle.

Further data shows that the prediction above is partially correct, at least in predicting that *just* may be interpreted within a prejacent to *only*. The two exclusive particles observe mutual ordering constraints, such that *just* cannot occur directly before *only*. Example (152) below reverses the ordering of the two exclusive particles from the example above.

- (152) \* Today, one in five American families has **just only** one child.

The result of *just* occurring directly before *only* is an unacceptable string, or at least a less acceptable one. This suggests an asymmetrical or hierarchical relationship between the two particles, in which only *just* may be interpreted within the prejacent of *only*.

It turns out that *just* also frequently co-occurs with other focus particles, like *even*. Example (153) below shows *just* occurring directly after *even* with what seems to be an explicated minimal sufficiency reading.

- (153) *Context*: Someone expresses their thoughts on romance.

- a. **Even just** one second with the right person can feel like more than a lifetime.

(web example)

Note further that *only* is incapable of co-occurring with *even* in the same manner, as example (154) shows.

- (154) \* **Even only** one second with the right person can feel like more than a lifetime.

These data point to a general capacity for *just* to be interpreted within the preajacent of other focus particles, in addition to operating on its own preajacent.

#### 4.1.4 *Compositional analysis of exclusive particles*

With the scalar approach to the semantics of exclusive particles settled as the most descriptively adequate, the compositional analysis can be introduced. What follows is a compositional analysis as laid out by Coppock & Beaver, who account for not only the MIN and MAX components, but also the CQ and the relationships among them. The general meaning of exclusive particles combines all of these features into an operator ONLY, which operates on a proposition. Beyond this common feature, exclusive particles may differ among themselves in the syntactic means by which they arrive at the propositional argument for ONLY, such as by first taking a predicate or quantifier argument, then taking another argument to combine with the first to form a proposition. The analysis also accommodates the most crucial component for the eventual analysis of indiscriminative *just any*: the interaction of *just* with negation.

### Modelling MIN and MAX

The model of the MIN and MAX components relies on a semantic formalization of the current question under discussion, or CQ. To model the CQ, Coppock & Beaver (2011, 2012, 2013, 2014) invoke the approach of Hamblin (1973) by modelling questions as sets of their possible answers. For example, in (155), a CQ like *Who won?* may have the possible answers *Bill won*, *John won*, and *Bill and John won*.

(155) CQ = ‘Who won?’ = {‘Bill won’, ‘John won’, ‘Bill and John won’}

What constrains the size of the CQ is its utterance in a context  $S$  and an associated common ground  $\text{INFO}_S$ , the set of possible worlds representing the knowledge base of interlocutors in a discourse. Possible answers to the CQ are propositions representing distinct sets of possible

worlds contained in  $\text{INFO}_S$ . For refinement of the common ground, interlocutors select a possible answer to serve as an update (Roberts, 1996, 2004). Therefore, given a context  $S$ , we derive  $\text{CQ}_S$ , the set of possible answers to the CQ for updating and refining a common ground  $\text{INFO}_S$ . Table 4.1 provides an example of the answers to the  $\text{CQ}_S$  *Who won?* being associated with sets of possible worlds that verify them.

$\text{CQ}_S$	=	'Who won?'	=	$\{B, J, BJ\}$
$B$	=	'Bill won'	=	$\{w_{01}, w_{11}\}$
$J$	=	'John won'	=	$\{w_{10}, w_{11}\}$
$BJ$	=	'Bill and John won'	=	$\{w_{11}\}$

Table 4.1: Example of  $\text{CQ}_S$  with answers and possible world representations

The context  $S$  may also impose a strength ranking over possible answers  $\geq_S$ , modelled as a binary relation over them.<sup>3</sup> For the  $\text{CQ}_S$  in Table 4.1, the strength ranking is represented in (156) as the set of ordered pairs among its answers.

$$(156) \quad \geq_S = \{\langle BJ, B \rangle, \langle BJ, J \rangle, \langle BJ, BJ \rangle, \langle B, B \rangle, \langle J, J \rangle\}$$

Finally, the positive and negative components of the meaning of exclusive particles can be modelled as operations on a proposition  $p$ , as in (157). The letters  $p$  and  $q$  are variables over propositions, i.e., functions from possible worlds to truth values  $\langle s, t \rangle$ . The type  $w$  is a variable over worlds.

$$(157) \quad \begin{aligned} \text{a. } \text{MIN}_S &= \lambda p_p \lambda w_s. \exists q_p \in \text{CQ}_S [q(w) \wedge [q \geq_S p]] \\ \text{b. } \text{MAX}_S &= \lambda p_p \lambda w_s. \forall q_p \in \text{CQ}_S [q(w) \rightarrow [p \geq_S q]] \end{aligned}$$

$\text{MIN}_S$  is a proposition that comments on the set of true propositions of  $\text{CQ}_S$ , essentially saying that there is a true proposition  $q$  in  $\text{CQ}_S$  that is at least as strong as  $p$ .  $\text{MAX}_S$  similarly comments on the true propositions of  $\text{CQ}_S$ , saying that every true proposition is no stronger than  $p$ .

---

3. Formally, the strength ranking contains all the information of the context  $S$ , since it contains all the answers to the current question  $\text{CQ}_S$ , while  $\text{CQ}_S$  is itself constrained by the common ground  $\text{INFO}_S$ .

## Focus association

What is missing from the above analysis of the  $CQ_S$  and the  $MIN_S$  and  $MAX_S$  components is the account of deciding focus values. Coppock & Beaver account for focus values with an additional condition on the meaning of exclusive particles, called the **FOCUS PRINCIPLE**. This principle is basically an additional presupposition that the prejacent and its **ROOTH-HAMBLIN ALTERNATIVES** form a subset of the possible answers contained in the  $CQ_S$ . Rooth-Hamblin alternatives refer to the distinct versions of a sentence after the focus value has been replaced with other material of identical semantic type (Rooth, 1985, 1992). They state the principle as follows in (158):

(158) **Focus Principle:**

- a. Some part of a declarative utterance should give an answer the current question.
- b. If  $Q$  is a set of Rooth-Hamblin alternatives, and  $A$  is a natural language expression, then  $A$  gives an answer to  $Q$  if  $A$  with its Rooth-Hamblin alternatives entails a subset of  $Q$ .<sup>4</sup>

The first part of the principle simply says that the prejacent, or some part of it, should give an answer to the  $CQ_S$ . The second part elaborates on what constitutes giving an answer to the  $CQ_S$ . The portion of the prejacent that gives an answer to the  $CQ_S$  by definition is contained in  $CQ_S$ , along with all the prejacent's Rooth-Hamblin alternatives. In other words, the prejacent and all its Rooth-Hamblin alternatives are all themselves taken to be possible answers to the  $CQ_S$ .

## Modelling exclusive meaning

The general meaning of exclusive particles is finally defined below in (159) in terms of the  $MIN$  and  $MAX$  components as follows.

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4. The original principle has been modified here to accommodate a the condensed explanation of focus association with exclusive particles.

$$(159) \quad \text{ONLY}_S = \lambda p_p \lambda w_s : \text{MIN}_S(p, w) . \text{MAX}_S(p, w)$$

This is a propositional operator  $\text{ONLY}_S$  that takes a proposition  $p$  and applies it to its presupposition  $\text{MIN}_S$  and its assertion  $\text{MAX}_S$ . This is a fair general representation of the meaning of exclusive particles like *just*. However, exclusive particles are adverbials that are broad in their distributions and able to syntactically modify many items across a large variety of grammatical categories. They may syntactically modify quantifiers and predicates alike. In order to account for this distribution,  $\text{ONLY}_S$  must be geached<sup>5</sup> so as to apply to semantically distinct items. Below in (160) are some geached examples of  $\text{ONLY}_S$  as the denotation of *just*.

$$(160) \quad \begin{array}{l} \text{a. } \llbracket \text{just}_P \rrbracket^S = \lambda P_{\langle e, p \rangle} \lambda x_e \lambda w_s . \text{ONLY}_S(P(x), w) \\ \text{b. } \llbracket \text{just}_Q \rrbracket^S = \lambda Q_{\langle \langle e, p \rangle, p \rangle} \lambda P_{\langle e, p \rangle} \lambda w_s . \text{ONLY}_S(Q(P), w) \end{array}$$

These denotations of *just* allow it to apply to expressions denoting either predicates or quantifiers. In order to apply to a name like *John*, the denotation of *just* that applies to quantifiers is chosen. Following Partee (1986), a proper noun can be lifted into a quantifier with the LIFT operation, converting an individual of type  $e$  into a function of type  $\langle \langle e, p \rangle, p \rangle$ , as in (161).

$$(161) \quad \llbracket \text{John} \rrbracket^S = \lambda P_{\langle e, p \rangle} \lambda w_s . P(j, w)$$

The meaning of a sentence like *Just John won* can then be represented as in (162).

$$(162) \quad \llbracket \text{Just John won.} \rrbracket^S = \begin{array}{l} \text{a. } \llbracket \text{just}_Q \rrbracket^S(\llbracket \text{John} \rrbracket^S, \llbracket \text{won} \rrbracket^S) \\ \text{b. } \lambda w_s . \text{ONLY}_S(\lambda w_s . \text{WON}(j, w), w) \\ \text{c. } \lambda w_s : \text{MIN}_S(\lambda w_s . \text{WON}(j, w), w) . \text{MAX}_S(\lambda w_s . \text{WON}(j, w), w) \end{array}$$

---

5. This means that it has undergone the Geach rule, which takes a function  $f$  of some type  $\langle a, b \rangle$  and converts it into a function  $\lambda R_{\langle c, a \rangle} \lambda x_c . f(R(x))$  of type  $\langle \langle c, a \rangle, \langle c, b \rangle \rangle$ .

- d.  $\lambda w_s : \exists q_p \in \text{CQ}_S[q(w) \wedge [q \geq_S \lambda w_s.\text{WON}(j, w)]]$   
 $\cdot \forall q_p \in \text{CQ}_S[q(w) \rightarrow [\lambda w_s.\text{WON}(j, w) \geq_S q]]$

The resulting semantic calculation says that the sentence presupposes a true proposition  $q$  in  $\text{CQ}_S$  that is at least as strong as the proposition *John won* on  $\geq_S$ . It also asserts that every proposition in  $\text{CQ}_S$  that is true is no stronger on  $\geq_S$  than *John won*. This entails that the possible answer to the  $\text{CQ}_S$  *Bill and John won* is not true.

## Negation

A key feature of this model for our purposes is the account of interaction with negation. Negators like *not* have two options for composition with sentences with *just*. The first option is for them to be interpreted with narrow scope with respect to *just*, so as to occur within the prejacent itself. This means that negation enters into the calculation of both the  $\text{MIN}_S$  and  $\text{MAX}_S$  components of *just*. The  $\text{MIN}_S$  component has that the negated prejacent represent a lower bound on  $\geq_S$  among options for the highest ranking true answer to the  $\text{CQ}_S$ . The  $\text{MAX}_S$  component has that the negated prejacent also represent the highest ranking true answer to the  $\text{CQ}_S$ . Example (163) below shows how a composition of *just* with negation taking low scope results in negation occurring in both the presupposition and assertion.

- (163)  $\llbracket \text{Just John did not win.} \rrbracket^S =$
- a.  $\llbracket \text{just}_Q \rrbracket^S(\llbracket \text{John} \rrbracket^S, \llbracket \text{did not} \rrbracket^S(\llbracket \text{win} \rrbracket^S))$
  - b.  $\lambda w_s.\text{ONLY}_S(\lambda w_s.\neg\text{WON}(j, w), w)$
  - c.  $\lambda w_s : \text{MIN}_S(\lambda w_s.\text{WON}(j, w), w).\text{MAX}_S(\lambda w_s.\neg\text{WON}(j, w), w)$
  - d.  $\lambda w_s : \exists q_p \in \text{CQ}_S[q(w) \wedge [q \geq_S \lambda w_s.\neg\text{WON}(j, w)]]$   
 $\cdot \forall q_p \in \text{CQ}_S[q(w) \rightarrow [\lambda w_s.\neg\text{WON}(j, w) \geq_S q]]$

In this example, the sentence *Just John did not win* has negation taking low scope with respect to *just*. This results in the prejacent being identical to *John did not win* and the calculation of the  $\text{MIN}_S$  and  $\text{MAX}_S$  components with a negated prejacent. The prejacent

*John did not win* is then presupposed to be the the weakest option on  $\geq_S$  for the highest ranking true answer to the  $CQ_S$ . It is also asserted to represent the highest ranking true answer to the  $CQ_S$ .

The second option is for negation to be interpreted with wide scope with respect to *just*, so that it is operating on the exclusive particle itself. The result of this configuration is no effect on the  $MIN_S$  component of *just*, but a different effect on the  $MAX_S$  component. In this case, negation is interpreted as operating on  $MAX_S$ , rather than being interpreted within the prejacent. Negation on the  $MAX_S$  component has the interesting communicative effect of expressing that the prejacent is not the highest ranking true answer to the  $CQ_S$ , and that there is some stronger true answer, although it is not explicitly given. Example (164) below shows how a composition of *just* with negation taking high scope results in negation on the  $MAX_S$  component.

- (164)  $\llbracket \text{Not just John won.} \rrbracket^S =$
- a.  $\llbracket \text{not} \rrbracket^S(\llbracket \text{just}_Q \rrbracket^S(\llbracket \text{John} \rrbracket^S, \llbracket \text{won} \rrbracket^S))$
  - b.  $\lambda w_s. \neg \text{ONLY}_S(\lambda w_s. \text{WON}(j, w), w)$
  - c.  $\lambda w_s : \text{MIN}_S(\lambda w_s. \text{WON}(j, w), w). \neg \text{MAX}_S(\lambda w_s. \text{WON}(j, w), w)$
  - d.  $\lambda w_s : \exists q_p \in CQ_S[q(w) \wedge [q \geq_S \lambda w_s. \text{WON}(j, w)]]$   
 $\quad \exists q_p \in CQ_S[q(w) \wedge [q >_S \lambda w_s. \text{WON}(j, w)]]$

In this example, the sentence *Not just John won* has negation taking high scope with respect to *just*. This results in *John won* interpreted as the prejacent and no effect on the  $MIN_S$ , but the  $MAX_S$  component is negated. The negated  $MAX_S$  gives an assertion that the prejacent *John won* is not the highest ranking true answer to the  $CQ_S$ . There is a higher ranking true answer, although what that answer is is not yet expressed. This statement provides what Beaver & Clark (2008) call a PARTIAL ANSWER to the  $CQ_S$ , which is one that only narrows down the list of candidates for strongest true answer by removing the answer matching the prejacent.

### 4.1.5 Summary

This section introduced a proposal of the meaning of *just* by way of discussion on the general meaning of exclusive particles. Exclusive particles are frequently characterized as having a negative and positive component to their meaning contribution, i.e., a presupposition of their prejacent and an assertion that all Rooth-Hamblin alternatives of the prejacent are false. Coppock & Beaver provide evidence that these components are better characterized in scalar terms, such that the prejacent and Rooth-Hamblin alternatives are necessarily ranked in strength according to the scalar value of their distinct focus values. They propose an updated model of exclusive particles in which the prejacent and its Rooth-Hamblin alternatives correspond to the ranked possible answers of a current question, and positive and negative components are reformulated as conditions on the strength of the highest ranking true answer. The new positive component says that the prejacent is the weakest candidate for possible answer that is true, while the new negative component says that the prejacent is also the strongest answer that is true. They provide a compositional semantics of the components and combine them into a general semantics of exclusive particles. Many of *just*'s semantic attributes are explained by this general semantic account. However, it is distinguished from other exclusive particles in freely associating with a variety of scales for ranking the prejacent against its Rooth-Hamblin alternatives, and also being able to occur within the prejacent of other focus particles.

## 4.2 The semantics of *any*

Having laid out the semantics of *just*, this section now offers an analysis of *any* in order to complete the semantic components that will compose into an indiscriminate. The proper semantic model for English *any* is a hotly debated topic, and many competing accounts exist in the literature. However, the capacity for *any* to combine with exclusive particles like *just* suggest the adequacy of scalar approaches, and such scalar approaches will be necessary for

capturing the very scalar nature of indiscriminative meaning. This section presents an analysis of *any* adapted from Krifka (1995) to accommodate the semantics of exclusive particles. It is proposed that *any* combines with a restriction to denote an existential quantifier and inherently activates subdomain alternatives to its restriction. It also bears a presupposition that at least one of these subdomain alternatives also produces a true sentence with the same semantic environment. Since subdomain alternatives are stronger than superdomain alternatives, this proposal predicts the polarity sensitivity of *any* by requiring that it occur in semantic environments with inferential strength reversing properties, so that its assertion will be stronger than its presupposition. The section first discusses licensing by negation, then licensing by minimal sufficiency evaluation. Quantificational variability is also predicted, since the inherent activation of domain alternatives ensures that *any* with its restriction is interpreted as a bottom scalar term. Combination with minimal sufficiency evaluation then results in truth-conditional equivalence with a distributive universal quantifier.

#### 4.2.1 *Licensing any under negation*

The meaning of *any* has puzzled researchers of language since the time of De Morgan (Horn, 2000), preceding modern Linguistics itself. It has a meaning contribution that is famously difficult to capture in Predicate Logic or with other modern semantics tools. As with free choice indefinites, the primary puzzles associated with *any* are its quantificational variability and its polarity sensitivity. However, *any* differs from free choice indefinites in that it is not anti-episodic, but does require negation or negative words for licensing in episodic statements. Much research on negative polarity has analyzed this phenomenon as the result of reference to a bottom scalar value with a lexical requirement to be interpreted with inferential strength reversal (Kadmon & Landman, 1993; Lee & Horn, 1994; Krifka, 1995; Lahiri, 1998; Chierchia, 2006, 2013). The scope of negation and negative words provide a downward entailing environment for such a requirement to be fulfilled, while few other operators are able to provide such an environment. Outlined below is an analysis that

follows this scalar tradition, with many borrowings from Krifka’s (1995) approach.

## The denotation

Critical to the meaning of *any* is its exploitation of a scale for which to denote the bottom value. In the treatment of Krifka (1995), this bottom value is simply an existential quantifier, well known to semanticists as a bottom scalar value on quantificational Horn scales. However, for Krifka, the scale that *any* exploits is not quite a Horn scale, but one of subdomain and superdomain relations. The higher scalar terms on this scale are existential quantifiers over increasingly smaller domains, with these smaller domains represented by subsets of *any*’s restriction. Such a scale has been called one of subdomain alternatives (Chierchia, 2013) and can be modelled as  $\geq_D$  in example (165) below.

$$(165) \quad \geq_D = \{\langle G \subset B, B \subset D \rangle, \{\langle G \subset B, D \rangle, \langle B \subset D, D \rangle, \langle G, G \rangle, \langle B, B \rangle, \langle D, D \rangle\}$$

In this example, the scale  $\geq_D$  is represented as a set of ordered pairs, where the first item in the pair is considered “at least as strong as” the second item. The set introduces three items  $D, B$ , and  $G$ , and it provides their strength relationships among themselves. Additionally,  $D, B$ , and  $G$  are explicated to be sets in containment relationships, where stronger items are also further embedded within subdomains of  $D$ .

The meaning of *any* can now be modelled as an existential quantifier that exploits a scale of subdomain alternatives, as in (166). The denotation has two components: an assertion of existential quantification over individuals that satisfy the descriptions of the restriction and semantic environment, and a presupposition that some propositional alternative to the assertion with a subdomain restriction is true.<sup>6</sup>

$$(166) \quad \llbracket \text{any} \rrbracket^S = \lambda R_{\langle e,p \rangle} \lambda Q_{\langle \langle \langle e,p \rangle, p \rangle, p \rangle} \lambda w_s. \text{ANY}(R, Q, w) =$$

---

6. It might be possible to replace  $\geq_D$  with the relation  $\supseteq$  in order to better capture the set containment relationships of *any*’s domain alternatives. For composing *any* with *just* to form indiscriminatives, it seems optimal to reinforce the scalar interpretation of  $\geq_D$  for consistency with the scalar semantics of exclusive particles. It is not yet certain that there are significant consequences to this reformulation.

$$\lambda R_{\langle e,p \rangle} \lambda Q_{\langle \langle \langle e,p \rangle, p \rangle, p \rangle} \lambda w_s : \exists X_{\langle e,p \rangle} >_D R[Q(\lambda P_{\langle e,p \rangle} \lambda w_s. \exists x_e [X(x, w) \wedge P(x, w)], w)] \\ .Q(\lambda P_{\langle e,p \rangle} \lambda w_s. \exists x_e [R(x, w) \wedge P(x, w)], w)$$

In this denotation, *any* takes a predicate of individuals and a predicate of quantifiers. The predicate of individuals defines the existential quantifier's restriction. *any* then applies the predicate of quantifiers to the existential quantifier to build its assertion and presupposition, which are identical except that the presupposition's restriction involves some subdomain. This resembles Krifka's (1995) approach in the form of the assertion as an existentially quantified proposition and the activation of subdomain alternatives with increasing specificity corresponding to scalar rank.<sup>7</sup>

Given a restriction to compose with, like *thing*, *any* and its restriction then becomes a quantifier that takes predicates of quantifiers as arguments, as in (167).

$$(167) \quad \llbracket \text{anything} \rrbracket^S = \lambda Q_{\langle \langle \langle e,p \rangle, p \rangle, p \rangle} \lambda w_s \\ : \exists X_{\langle e,p \rangle} >_D \text{THING}[Q(\lambda P_{\langle e,p \rangle} \lambda w_s. \exists x_e [X(x, w) \wedge P(x, w)], w)] \\ .Q(\lambda P_{\langle e,p \rangle} \lambda w_s. \exists x_e [\text{THING}(x, w) \wedge P(x, w)], w)$$

The composed word *anything* is then an existential quantifier with a special presupposition. It presupposes that a sentence resembling its assertion, but with a subdomain of *thing* replacing the restriction *thing*, is also true.

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7. Krifka (1995) originally used a variety of focus semantics called STRUCTURED MEANINGS to capture the interpretation and grammatical behavior of English *any*. In this framework, the semantics of focus involves a non-focused predicate called the background (or B), a focus marked constituent given in bold, and a set of alternatives to the focus marked constituent. English *any* is then treated as a particular type of focus marker, which takes its restriction as the focus marked constituent and imposes association with a set of subdomain alternatives P. Example (1) below is the result of composition of *any* with a restriction *thing*.

(1) *anything*:  $\langle B, \mathbf{thing}, \{P | P \subset \mathbf{thing}\} \rangle$

In this denotation, *any* marks *thing* as the focused constituent and produces a set of subdomain alternatives to *thing*.



This analysis distinguishes itself a lot from Krifka (1995) in the derivation of polarity sensitivity. In his account, *any* must be detected as a low scalar term and is required to have its assertion modified by one of two assertion operators. SCALASSERT is like Coppock & Beaver’s (2014) ONLY and applies an exhaustified interpretation on *any*’s assertion, while EMPHASSERT marks the assertion as less likely than propositional alternatives. Since *any* activates subdomain alternatives to the restriction, and subdomain alternatives produce stronger propositions in upward entailing environments, either of these assertion operators will produce a communicative conflict of some sort. SCALASSERT exhaustifies the assertion so that all of the propositional alternatives are rendered false. A proposition that has all more informative versions of it interpreted as false produces a contradiction, and polarity sensitivity is derived in this manner. With EMPHASSERT, the assertion is presupposed to be less likely than all of its more informative propositional alternatives, rendering *any* infelicitous.

Criticisms of Krifka’s (1995) and similar scalar accounts hold that the generation of contradicting alternatives is an implausible predictor of polarity sensitivity, citing the grammatical acceptability of other forms of contradiction in language (Lahiri, 1998; Giannakidou, 2011). Scalar accounts based on likelihood requirements are also said to be too limited in their predictions and descriptive adequacy (Giannakidou, 2007). In contrast, the account sketched here involves no exhaustification (yet) nor an evaluation of likelihood. Instead, the unacceptability of *any* in upward entailing environments follows naturally from the infelicitous pairing of a weak assertion with a stronger presupposition. This difference allows the account to avoid the criticisms of Krifka’s (1995) and other scalar accounts regarding how polarity sensitivity is cashed out.

## Negation on *any*

In order to render *any* felicitous, its existential quantifier must occur within the scope of a inferential strength reversing operator, and this is where negation comes in. If the semantic

environment is such that the existential quantifier will be embedded under negation, the strength of *any*'s assertion and presupposition will be reversed to satisfy its discourse function. Take for example the semantic environment of the predicate *Max did not hear* in (170), similarly represented as a predicate of quantifiers.

$$(170) \quad \llbracket \text{Max did not hear } x. \rrbracket^S = \lambda X_{\langle \langle e,p \rangle, p \rangle} \lambda w_s. \neg X(\lambda x_e \lambda w_s. \text{HEAR}(m, x, w), w)$$

When combined with the indefinite *anything*, the sentence becomes *Max did not hear anything* with the semantics as below in (171).

$$(171) \quad \llbracket \text{Max did not hear anything.} \rrbracket^S =$$

- a.  $\llbracket \text{anything} \rrbracket^S(\llbracket \text{Max did not hear } x. \rrbracket^S)$
- b.  $\lambda w_s : \exists X_{\langle e,p \rangle} >_D \text{THING} \neg \exists x_e [X(x, w) \wedge \text{HEARD}(m, x, w)]$   
 $\quad \quad \quad \neg \exists x_e [\text{THING}(x, w) \wedge \text{HEARD}(m, x, w)]$

The assertion is one identical to that of *Max did not hear a thing*. Meanwhile, the presupposition is nearly the same proposition, but with a subdomain alternative to *thing* as the restriction. In a downward entailing environment, with reversed inferential strength, subdomains are weaker than superdomains because they produce less informative propositions. In this way, the occurrence of *anything* becomes appropriate because it fulfills its intended discourse function of providing a stronger assertion with a bottom scalar value.

#### 4.2.2 Capturing free choice readings of any

Although the account provided above may explain the licensing of *any* by negative words, it does not explain how *any* becomes acceptable by other licensing operators, such as modal verbs, conditional clauses, etc. Fortunately, minimal sufficiency evaluation steps in to complete the picture of *any*'s polarity sensitivity. In brief, since *any* denotes an existential quantifier, minimal sufficiency evaluation generates inferences with *any* in the same fashion that it does with disjunction. Instead of evaluating the degree associated with an individual

for their satisfaction of a predicate, what gets evaluated is a set of degrees associated with each member of an explicit domain. For each individual defined by *any*'s restriction, their associated degree is evaluated to exceed the minimum sufficient for satisfaction of a predicate, resulting in the interpretation of distributive universal quantification, and therefore, free choice. Additionally, quantificational variability is cashed out due to *any*'s activation of subdomain alternatives, which ensure that *any* is interpreted as a strictly distributive universal quantifier. Paraphrase with *every* is then permitted whenever collective and distributive readings on predicates converge. Paraphraseability is lost when only a distributive reading is preferred.

### Minimal sufficiency evaluation on *any*

Unlike with negative sentences, building positive sentences that license *any* requires the added step of combining a minimal sufficiency environment to a predicate with a licensing operator. Take for example the semantic environment of the predicate *Max can hear* in (172), represented as a predicate of quantifiers.

$$(172) \quad \llbracket \text{Max can hear } x. \rrbracket^G = \lambda X_{\langle \langle e,p \rangle, p \rangle} \lambda w_s. \exists w'_s \in \text{ACC}(w) X(\lambda x_e \lambda w_s. \text{HEAR}(m, x, w), w')$$

The sentence above presents a case of a non-monotonic environment. Scalar terms inserted into this environment will not generate inferences about other scalar terms.<sup>8</sup> To create scalar inferences, a minimal sufficiency evaluation must be added with the operator  $\xi$ , as in (173).

$$(173) \quad \llbracket \text{Max } \xi_X \text{ can hear } x. \rrbracket^G =$$

a.  $\llbracket \xi_X \rrbracket^G(\llbracket \text{Max can hear } x. \rrbracket^G)$

---

8. One might question why the minimal sufficiency evaluation is necessary if direct application of an *any* indefinite on a non-monotonic environment would not result in an assertion that is weaker than its presupposition. The lexeme *anything* could be applied to the predicate *Max can hear* without a minimal sufficiency evaluation, and the result would be an assertion and a presupposition without an inferential relationship. However, recall that the denotation of *any* relies on a scale  $\geq_D$  for its interpretation. This scale adds a presupposition to *any* that the semantic environment create inferential relationships between subdomains and superdomains. So, without minimal sufficiency evaluation or negation, the scalar relationship between the assertion and the presupposition of *any* cannot be built.

- b.  $\lambda X_{\langle\langle e,p\rangle,p\rangle} \lambda w_s$   
 $\cdot \xi_G(\lambda X_{\langle\langle e,p\rangle,p\rangle} \lambda w_s \cdot \exists w'_s \in \text{ACC}(w) X(\lambda x_e \lambda w_s \cdot \text{HEAR}(m, x, w), w'), X, w)$
- c.  $\lambda X_{\langle\langle e,p\rangle,p\rangle} \lambda w_s \cdot \{d : X(\lambda x_e \lambda w_s \cdot [d \geq \sigma_G(x, w)], w)\} \subset$   
 $\{d : \exists w'_s \in \text{ACC}(w) [X(\lambda x_e \lambda w_s \cdot [\text{HEAR}(m, x, w) \wedge d \geq \sigma_G(x, w)], w')]\}$

The  $\xi$  operator applies a sufficiency conditions to the predicate *Max can hear*, and the value of  $G$  is set to a scale of loudness. When combined with the indefinite *anything*, the sentence becomes *Max can hear anything* with the semantics as below in (174).

(174)  $\llbracket \text{Max } \xi_X \text{ can hear anything.} \rrbracket^G =$

- a.  $\llbracket \text{anything} \rrbracket^G (\llbracket \text{Max } \xi_X \text{ can hear } x. \rrbracket^G)$
- b.  $\lambda w_s : \exists X_{\langle e,p\rangle} >_D \text{ THING} \{d : \exists x_e [X(x, w) \wedge d \geq \sigma_G(x, w)]\} \subset$   
 $\{d : \exists w'_s \in \text{ACC}(w) \exists x_e [X(x, w') \wedge \text{HEAR}(m, x, w') \wedge d \geq \sigma_G(x, w')]\}$   
 $\cdot \{d : \exists x_e [\text{THING}(x, w) \wedge d \geq \sigma_G(x, w)]\} \subset$   
 $\{d : \exists w'_s \in \text{ACC}(w) \exists x_e [\text{THING}(x, w') \wedge \text{HEAR}(m, x, w') \wedge d \geq \sigma_G(x, w')]\}$

The assertion here is a bit complex, but it basically says that the union of the sets of loudness degrees equal to or greater than those associated with *things* is contained in the set of loudness degrees consistent with a *thing* satisfying *Max can hear*. The containment of this union of loudness sets entails that every individual described by *thing* has a loudness that exceeds the minimum sufficient for Max to hear a *thing*. An appropriate paraphrase for the assertion might be *Everything that is a thing is loud enough so that Max can hear it*. Meanwhile, the presupposition says that a similar proposition is true for individuals satisfying some more specific description than *thing*, such as *bird* or *wasp*. The appropriate paraphrase for the assertion might be *For some description more specific than ‘thing’, everything that fits that description is loud enough so that Max can hear it*. From these paraphrases, it is clearer that the assertion is suddenly inferentially stronger than the presupposition after minimal sufficiency evaluation.

## Paraphrase with *every*

The application of minimal sufficiency evaluation on *any* generates its paraphraseability with *every* in semantic environments where collective and distributive readings of universal quantifiers become ambiguous. This is because minimal sufficiency evaluation on *any* produces an assertion that each individual in the domain associates with a degree that exceeds the minimum sufficient for their satisfaction of a predicate. The collection of these inferences is truth conditionally equivalent to distributive universal quantification over the same domain for satisfaction of the predicate. For example, the sentence *Max can hear anything* provides a case in which *any* will be paraphraseable as *every*. The sentence *Max can hear anything* will have the following inferences in (175), among many others.

- (175)  $\llbracket \text{Max } \xi_X \text{ can hear anything.} \rrbracket^G \implies$
- a.  $\llbracket \text{Max } \xi_X \text{ can hear a bird.} \rrbracket^G$
  - b.  $\llbracket \text{Max } \xi_X \text{ can hear a can.} \rrbracket^G$
  - c.  $\llbracket \text{Max } \xi_X \text{ can hear a flea.} \rrbracket^G$
  - d.  $\llbracket \text{Max } \xi_X \text{ can hear a finch.} \rrbracket^G$
  - e.  $\llbracket \text{Max } \xi_X \text{ can hear a Cocos finch.} \rrbracket^G$

The inferences generated will exhaust the set of individuals within a domain described by *thing*. After exhaustion of the domain, the ultimate result is conjunction of propositions that is truth conditionally equivalent to *Max can hear everything*, where *everything* is a straightforward universal quantifier.

(176)  $\llbracket \text{Max can hear everything.} \rrbracket^G =$

$$\lambda w_s. \forall x_e \exists w'_s \in \text{ACC}(w) [\text{THING}(x, w') \wedge \text{HEAR}(m, x, w')]$$

This sentence says that every sentence of the form *Max can hear x* with *x* being a thing is true. This is identical to the inferences of *Max can hear anything* with minimal sufficiency evaluation. Thus, *any* earns its paraphrase as *every*.

In the calculation of these inferences with subdomains, it is worth mentioning a contrast between this account and so-called DOMAIN WIDENING accounts, such as that of Kadmon & Landman (1993). These analyses of *any* propose that it bears a lexical specification for expanding the domain of potential referents considered for calculating truth conditions. This would predict that sentences with *any* always end up involving quantification over sets of individuals beyond the what is contextually salient. Such analyses might be consistent with emphatic readings of *any*, but their predictions are too strong in most cases. Critics of domain widening have pointed out that *any* can have interpretations with restricted domains, such that quantification only involves a relevant set of individuals, given discourse contextual factors (Duffley & Larrivé, 2010; Giannakidou, 2011). This account contrasts with domain widening in that expansion of the domain is not considered at all in the model. What is involved is simply the division of a given domain into subdomains, plus the imposition of inferential strength relationships between these subdomains either by negation or minimal sufficiency evaluation. Whether or not domain widening is involved for deriving emphatic readings is another matter not considered here.

### When the paraphrase fails

The English universal quantifier *every* prefers collective readings on a semantic environment, while *any* prefers distributive readings. Semantic environments that distinguish the two readings clarify that *any* has a strictly distributive reading by rendering the paraphrase with *every* inappropriate. Take for example the predicate *Max can offer this job to*, which will assign a scale of competence to  $G$  after minimal sufficiency evaluation. Combining with *any person*, the resulting inferences are as follows in (177).

- (177)  $\llbracket \text{Max } \xi_X \text{ can offer this job to any person.} \rrbracket^G \implies$
- a.  $\llbracket \text{Max } \xi_X \text{ can offer this job to a staff member.} \rrbracket^G$
  - b.  $\llbracket \text{Max } \xi_X \text{ can offer this job to a lawyer.} \rrbracket^G$

- c.  $\llbracket \text{Max } \xi_X \text{ can offer this job to a shaman.} \rrbracket^G$
- d.  $\llbracket \text{Max } \xi_X \text{ can offer this job to a department member.} \rrbracket^G$
- e.  $\llbracket \text{Max } \xi_X \text{ can offer this job to a department chair.} \rrbracket^G$

Similarly, minimal sufficiency evaluation exhausts the list of individuals described by *person* express the sufficiency of their degree of competence in their satisfaction of *Max can offer this job to*. The resulting conjunction of inferences is truth conditionally equivalent to a proposition that all of these inferences are true at the same time. This ultimate proposition can be represented with universal quantification in the semantics. However, this proposition is not an appropriate translation for *Max can offer this job to every person*.

$$(178) \quad \llbracket \text{We can offer this job to every person.} \rrbracket^G \neq \\ \lambda w_s. \forall x_e \exists w'_s \in \text{ACC}(w) [\text{PERSON}(x, w') \wedge \text{OFFER-JOB-TO}(m, x, w')]$$

The translation does not work here because *every* prefers a collective reading on the semantic environment, which would be inappropriate for the predicate *Max can offer this job to*. In most cases, a job is only offered to a single person, but this is not in conflict with the possibility that all people are potential candidates for the job. Thus, although universal quantification on a distributive reading of *Max can offer this job to* is appropriate, this is not the meaning conveyed by *every*. With all of this in mind, the free choice reading of *any* with minimal sufficiency evaluation is verified.

### 4.2.3 Summary

This section offered an analysis of English determiner *any* that derives its polarity sensitivity and interpretation. This analysis has *any* denote an existential quantifier that associates with the bottom value of a scale of specificity for its restriction. The alternative values of the scale are other existential quantifiers whose restrictions increase in specificity with higher rank. The presupposition of *any* is nearly identical to the assertion that results from composition with a semantic environment, except that the restriction is more specific. Composition

with an upward entailing environment for *any* will then produce an assertion that is weaker than the presupposition, because the assertion involves a less specific nominal restriction. Composition with a semantic environment that embeds *any*'s existential quantifier within a downward entailing environment or a minimal sufficiency evaluation instead produces an assertion that is stronger than the presupposition. A requirement that the semantic environment produce a stronger assertion and weaker presupposition is how the polarity sensitivity of *any* is cashed out. This model of *any* also predicts quantificational variability, since the resulting inferences of *any* under minimal sufficiency evaluation taken together result in truth-conditional equivalence with distributive, and not collective, universal quantification.

### 4.3 The semantics of *just any*

Having laid out the semantic models of *just* and *any*, this section now presents what may be the first compositional model of the meaning contribution of indiscriminatives, using the example of English indiscriminative *just any*. Indiscriminative *just any* is proposed to derive its meaning contribution in a compositional manner, i.e., as a product of the composition of its parts: the exclusive particle *just* and the indefinite marker *any*. However, the semantic complexity of these items allows for several options for how they may compose together, with consequences for the explanatory adequacy of the semantic model with regards to deriving free choice readings. The section begins by discussing the two means by which *just* and *any* may compose together. The exclusive particle *just* may modify to a quantifier with *any*, thereby directly applying the ONLY function to the denotation of the quantifier, or *just* may be interpreted within the predicate argument of *any*. The different strategies for composition only result in differences in *any*'s presupposition, where the interpretation of *just* in the predicate argument of *any* results in its additional interpretation within the presupposition. The section then shows how the model of indiscriminative *just any* predicts its characteristic semantic behavior with negation, as well as its capacity to undergo minimal sufficiency evaluation to gain free choice readings. The section ends with a review of the

semantic criteria for free choice indefinites, and it explains how indiscriminative *just any* under minimal sufficiency evaluation satisfies them.

### 4.3.1 Licensing *just any* under negation

As pointed out before, bare *any* and *just any* do not differ strongly in their polarity sensitivity or meaning contributions. The only major difference is that *just any* is an indiscriminative marker, with a distinct meaning contribution in the particular environment of scope of negation. Otherwise, *any* and *just any* are too similar to distinguish significantly, such that most of their characteristics may be attributed to the indefinite marker *any*. The Krifka (1995) inspired model of *any* already offers an adequate mechanism for modelling polarity sensitivity and licensing by both negation and minimal sufficiency evaluation. What is left to explain then is how the Coppock & Beaver (2014) model of *just* changes the way that *any* interacts with negation to create the indiscriminative reading. In particular, it does so by directly modifying *any* and its weak assertion. The exhaustified weak assertion, when negated, produces a new assertion that is identical to, and compatible with, the presupposition.

#### Direct modification on *any*

When *just* enters into a proposition with *any*, there are at least two potential attachment sites for its interpretation. Recall the Krifka (1995) inspired denotation of *anything* as a function from predicates of quantifiers to propositions. The predicate of quantifiers may host a number of logical operators, including exclusive particles like *just*. Therefore, the options for composition with *just* include direct modification on *anything* or interpretation within the predicate of quantifiers argument of *any*. These options produce slightly different meanings with *any*, resulting in similar assertions but also distinct presuppositions.

For indiscriminative readings, direct modification of *any* is required, since this is the manner in which *just* makes itself available to negation. When *just* directly modifies *any*, it is geached to take on the semantic valence appropriate for modification of *any*. An appropriate

geached *just* for direct modification of *anything* has the denotation below in (179).

$$(179) \quad \llbracket \text{just}_A \rrbracket^S = \lambda P_{\langle \langle \langle e,p \rangle, p \rangle, p \rangle} \lambda Q_{\langle \langle \langle e,p \rangle, p \rangle, p \rangle} \lambda w_s. \text{ONLY}_S(P(Q), w)$$

The composition of the indiscriminative *just anything* can then proceed as follows in (180).

$$(180) \quad \llbracket \text{just}_A \text{ anything.} \rrbracket^S =$$

- a.  $\llbracket \text{just}_A \rrbracket^S(\llbracket \text{anything} \rrbracket^S)$
- b.  $\lambda P_{\langle \langle \langle e,p \rangle, p \rangle, p \rangle} \lambda Q_{\langle \langle \langle e,p \rangle, p \rangle, p \rangle} \lambda w_s. \text{ONLY}_S(P(Q), w)(\text{ANY}(\llbracket \text{thing} \rrbracket^S))$
- c.  $\lambda Q_{\langle \langle \langle e,p \rangle, p \rangle, p \rangle} \lambda w_s : \exists X_{\langle e,p \rangle} >_D \text{THING}[Q(\lambda P_{\langle e,p \rangle} \lambda w_s. \exists x_e[X(x, w) \wedge P(x, w)], w)]$   
 $\quad . \text{ONLY}_D(\lambda w_s. Q(\lambda P_{\langle e,p \rangle} \lambda w_s. \exists x_e[\text{THING}(x, w) \wedge P(x, w)], w), w)$

Here, *just anything* is a function that takes a predicate of quantifiers as its argument. It creates an assertion by applying the predicate of quantifiers to a built-in existential quantifier, then it applies the ONLY operator to the resulting proposition. Since *any* already associates with a scale of subdomain alternatives  $D$ , this scale becomes the one that ONLY associates with as well. Application of the ONLY operator then creates an assertion that the resulting proposition is the strongest true proposition on a scale  $D$ . Meanwhile, *any*'s presupposition says that at least one higher ranked propositional alternative on  $D$  is true.

## Modelling polarity sensitivity

To derive the incompatibility of indiscriminatives with episodic statements, the Krifka (1995) inspired model of *any* is already set up so that a weak assertion is infelicitously contrasted with a stronger presupposition in such environments. The only thing that *just* adds is an exhaustive interpretation that only reinforces the scalar relationship between *any*'s assertion and presupposition, and polarity sensitivity is derived in much the same way as with bare *any*. To demonstrate, indiscriminative *just anything* may combine with a predicate of quantifiers like the one in (181) below.

$$(181) \quad \llbracket \text{Max heard } x. \rrbracket^S = \lambda X_{\langle \langle e,p \rangle, p \rangle} \lambda w_s. X(\lambda x_e \lambda w_s. \text{HEAR}(m, x, w), w)$$

The composition proceeds as in (182).

$$(182) \quad \llbracket \text{Max heard just}_A \text{ anything.} \rrbracket^S =$$

- a.  $\llbracket \text{just}_A \text{ anything} \rrbracket^S (\llbracket \text{Max heard } x. \rrbracket^S)$
- b.  $\lambda w_s : \exists X_{\langle e,p \rangle} >_D \text{ THING} [\exists x_e [X(x, w) \wedge \text{HEAR}(m, x, w)]]$   
 $\text{.ONLY}_D (\lambda w_s. \exists x_e [\text{THING}(x, w) \wedge \text{HEAR}(m, x, w)], w)$

The resulting assertion says that, on a scale of specificity, the proposition *Max heard some thing* is the strongest true proposition. Meanwhile, the resulting presupposition is that there is another proposition more specific than the assertion that is also true. In other words, the assertion says that Max heard something no more specific than *thing*, while the presupposition is that he indeed heard something more specific than *thing*. The assertion and presupposition conflict, and even contradict each other, although infelicity is already derived from the weakness of the assertion compared to the presupposition. In the case of an episodic statement, the combination of contradiction and infelicity ensures the desirable result of an uninterpretable statement, and therefore, polarity sensitivity for *just any*.

It is worth reiterating the contribution of *any*'s presupposition to the derivation of polarity sensitivity. Without this presupposition, indiscriminative *just any* would not feature polarity sensitivity, and its occurrence in positive episodic statements would be predicted to be fine. To demonstrate the importance of this feature for polarity sensitivity, consider an alternative determiner that lacked the presupposition, such as a toy example of the indefinite determiner *some* in (183) below.

$$(183) \quad \llbracket \text{some}_{toy} \rrbracket^S = \lambda R_{\langle e,p \rangle} \lambda Q_{\langle \langle \langle e,p \rangle, p \rangle, p \rangle} \lambda w_s. Q(\lambda P_{\langle e,p \rangle} \lambda w_s. \exists x_e [R(x, w) \wedge P(x, w)], w)$$

This determiner has the same semantics as *any*, except that it lacks the presupposition. When it combines with a restriction, *just*, and a predicate of quantifiers *Max heard* with episodic features, it will produce the semantics of (184) below.

$$(184) \quad \llbracket \text{Max heard just}_A \text{ some}_{toy} \text{ thing.} \rrbracket^S =$$

- a.  $\llbracket \text{just}_A \rrbracket^S (\llbracket \text{some}_{toy} \rrbracket^S (\llbracket \text{thing} \rrbracket^S)) (\llbracket \text{Max heard } x. \rrbracket^S)$
- b.  $\lambda w_s. \text{ONLY}_S (\lambda w_s. \exists x_e [\text{THING}(x, w) \wedge \text{HEAR}(m, x, w)], w)$

The result is an assertion that says *Max heard something* is the strongest true proposition on a scale  $S$ . The proposition is still evaluated as weak compared to propositional alternatives, but there is no added condition that any of the stronger propositional alternatives are true. There is only an assertion concerning the strength of the strongest true proposition on  $S$ , without a conflicting presupposition. There are actually not even any lexical constraints on the kind of scale that  $S$  becomes, allowing for flexibility in the form of the activated alternatives. Even if  $S$  were set to the scale  $D$ , the assertion would be that Max heard nothing more specific than *thing*, which is not clearly unacceptable as a proposition by itself. Activating subdomain alternatives with  $D$  might result in a contradiction in the way that Krifka's (1995) exact model derives polarity sensitivity for unstressed *any*. However, this approach would be subject to the same criticisms, and it is not clear that contradiction alone is sufficient for deriving polarity sensitivity. As such, the feature of polarity sensitivity for indiscriminative *just any* is really sourced to *any*'s meaning contribution, and the conflict of the weak assertion with a stronger presupposition.

### Negation on *just any*

The licensing of indiscriminative *just any* with negation is the one point where it differs considerably from bare *any* in its meaning contribution. Where negation licenses bare *any* by making its assertion stronger than its presupposition, negation licenses *just any* by undoing the exhaustification from *just* on the weak assertion, declaring the truth of some unknown stronger alternative proposition. Example (185) below shows how this is accomplished with negation occurring directly on the indiscriminative.

- (185)  $\llbracket \text{not just}_A \text{ anything.} \rrbracket^S =$
- a.  $\llbracket \text{not} \rrbracket^S (\llbracket \text{just}_A \rrbracket^S (\llbracket \text{anything} \rrbracket^S))$

- b.  $\lambda P_{\langle\langle\langle e,p\rangle,p\rangle,p\rangle} \lambda Q_{\langle\langle\langle e,p\rangle,p\rangle,p\rangle} \lambda w_s. \neg \text{ONLY}_S(P(Q), w) (\text{ANY}(\llbracket \text{thing} \rrbracket^S))$
- c.  $\lambda Q_{\langle\langle\langle e,p\rangle,p\rangle,p\rangle} \lambda w_s : \exists X_{\langle e,p \rangle} >_D \text{THING}[Q(\lambda P_{\langle e,p \rangle} \lambda w_s. \exists x_e [X(x, w) \wedge P(x, w)], w)]$   
 $\quad \cdot \neg \text{ONLY}_D(\lambda w_s. Q(\lambda P_{\langle e,p \rangle} \lambda w_s. \exists x_e [\text{THING}(x, w) \wedge P(x, w)], w), w)$

Here, the negator *not* is interpreted as directly modifying the indiscriminative *just any*. The result is the interpretation of negation on the ONLY operator in the assertion of *just any*. There is no other difference, and the expression *not just anything* may take a predicate of quantifiers as an argument as before. If the predicate of quantifiers is a predicate like *Max heard*, the derivation of the meaning of *Max heard not just anything* would proceed as follows in (186).

- (186)  $\llbracket \text{Max heard not just}_A \text{ anything.} \rrbracket^S =$
- a.  $\llbracket \text{not just}_A \text{ anything} \rrbracket^S (\llbracket \text{Max heard } x. \rrbracket^S)$
  - b.  $\lambda w_s : \exists X_{\langle e,p \rangle} >_D \text{THING}[\exists x_e [X(x, w) \wedge \text{HEAR}(m, x, w)]]$   
 $\quad \cdot \neg \text{ONLY}_D(\lambda w_s. \exists x_e [\text{THING}(x, w) \wedge \text{HEAR}(m, x, w)], w)$

The result of calculating the meaning of *Max heard not just anything* is an assertion that it is not true that Max heard something no more specific than *thing*, or that Max heard something more specific than *thing*. The presupposition remains one that there is something more specific than *thing* that Max heard. The assertion therefore reinforces the meaning of the presupposition, and licensing is ensured.

## The kind of exclusive meaning matters

The proposed model here captures the meaning of *just any* with three semantic ingredients. Existential quantification and the activation of subdomain alternatives on a scale *D* are provided by *any* to produce polarity sensitivity and the desired inferential patterns. Meanwhile *just* provides the key exclusive meaning for deriving indiscriminacy under negation. However, it is worth mentioning the caveat that the ability to combine these ingredients assumes the compatibility of exclusive meaning with the scale *D*. This compatibility is not

observed with all exclusive particles, because not all exclusive particles are able to associate with non-entailment scales, much less scales that rank subdomain alternatives. Therefore, not just any exclusive particle can produce an indiscriminative with *any*.

Recall that *just* is distinct from other exclusive particles in two respects. It bears no restrictions in the kinds of scales it may associate with (Coppock & Beaver, 2014), and it may occur in the preadjacent of other propositional operators. The former quality in particular is what allows *just* to modify *any*. It is free to associate with scales that rank subdomain alternatives, making it compatible with *any*'s obligatory invocation of a scale like *D*. Other exclusive particles are more restrictive with respect to the scales they may associate with. For example, *only* displays a strong preference for entailment scales, or at least those not involving formal relationships between subdomains and superdomains. The incapacity for *only* to associate with scales that rank subdomains would predict its incompatibility with modification of *any*, which seems to be the case given examples like (187).

(187) \* Max heard not **only** anything.

Similar constraints can be proposed for all other English exclusive particles since, again, *just* is unique in freely associating with a variety of scale types. Therefore, to be more precise about the ingredients to indiscriminacy, the association of exclusive meaning with scales of subdomain alternatives is key to the composition of indiscriminatives.

#### 4.3.2 *Capturing free choice readings of just any*

Beyond its distinct interpretation under negation, *just any* inherits much of its distributional and inferential properties from bare *any*. It not only matches bare *any* in being a polarity sensitive item, but it is also licensed within semantic environments compatible with minimal sufficiency evaluation, within which it bears free choice readings. However, for minimal sufficiency evaluation to work, *just* must be interpreted within the predicate argument of *any*, rather than as directly modifying it. Minimal sufficiency evaluation may then proceed as

it would with bare *any*, resulting in an identical licensing mechanism. A minimal sufficiency evaluation occurs within the predicate argument of *any* to create a minimal sufficiency environment, and the inferential strength relationships between the restriction of *any* and its more specific alternative predicates are reversed, making the weak assertion stronger than its presupposition. The result is truth-conditional equivalence with bare *any* in these environments, meaning that *just any* has a free choice reading and displays the key property of quantificational variability.

### Embedding within the semantic environment

The second option for interpreting *just* with *any* is to interpret it as embedded within the predicate of quantifiers that *any* takes as an argument, instead of directly modifying *any*.<sup>9</sup> For example, *just* may embed itself in the predicate *Max heard just*, represented as a predicate of quantifiers as in (188) below.

$$(188) \quad \llbracket \text{Max heard just } x. \rrbracket^G = \lambda X_{\langle \langle e,p \rangle, p \rangle} \lambda w_s. \text{ONLY}_G(\lambda w_s. X(\lambda x_e \lambda w_s. \text{HEAR}(m, x, w), w), w)$$

When combined with the indefinite *anything*, the sentence becomes *Max heard just anything*, with the semantics as in (189) below.

$$(189) \quad \llbracket \text{Max heard just anything.} \rrbracket^G =$$

- a.  $\llbracket \text{anything} \rrbracket^G(\llbracket \text{Max heard just } x. \rrbracket^G)$
- b.  $\text{ANY}(\llbracket \text{thing} \rrbracket^G, \llbracket \text{Max heard just } x. \rrbracket^G)$
- c.  $\lambda w_s : \exists X_{\langle e,p \rangle} >_D \text{THING}[\text{ONLY}_G(\lambda w_s. \exists x_e [X(x, w) \wedge \text{HEAR}(m, x, w)], w)]$   
 $\quad \quad \quad \cdot \text{ONLY}_G(\lambda w_s. \exists x_e [\text{THING}(x, w) \wedge \text{HEAR}(m, x, w)], w)$

The resulting assertion is identical to to the assertion from direct modification of *just* on *anything*. The difference comes with the presupposition, which itself now comes with an

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9. The suggestion that *just* may be embedded within *any*'s predicate argument may have support from earlier evidence of its capacity to embed itself within the preadjacent of other focus particles. The relationship between these two features is worth investigation, but it is unfortunately beyond the scope of this work.

embedded exclusive meaning. Here, the presupposed alternative proposition with a more specific restriction than *thing* is also exhausted, as with the assertion.

### Minimal sufficiency evaluation on *just any*

Minimal sufficiency evaluation may now operate in a fashion no different from its interaction with bare *any*. In order to license an indiscriminate with minimal sufficiency evaluation, a logical operator must be present in the semantic environment to bind the world variable of the  $\sigma_G$  operator. As before, this step is required to avoid that  $\xi$  operator produce an assertion that the degree associated with an individual exceeds itself. Then, an indefinite like *anything* may take the semantic environment as a predicate argument to form a proposition. However, a crucial specification for this arrangement is that the semantic environment have the operator ONLY interpreted with narrow scope with respect to logical operators. Take the example of the predicate *Max can hear just*, represented as a predicate of quantifiers in (190) below.

$$(190) \quad \llbracket \text{Max can hear just } x. \rrbracket^G = \\ \lambda X_{\langle \langle e,p \rangle, p \rangle} \lambda w_s. \exists w'_s \in \text{ACC}(w) \text{ONLY}_G(\lambda w_s. X(\lambda x_e \lambda w_s. \text{HEAR}(m, x, w), w), w')$$

Here, the operator ONLY occurs with narrow scope with respect to the possibility modal operator, so as to anchor the exclusive meaning component to a modal base.

To generate scalar inferences, a minimal sufficiency evaluation must be applied to the semantic environment with the operator  $\xi$ , as shown in (191).

$$(191) \quad \llbracket \text{Max } \xi_X \text{ can hear just } x. \rrbracket^G = \\ \text{a. } \llbracket \xi_X \rrbracket^G(\llbracket \text{Max can hear just } x. \rrbracket^G) \\ \text{b. } \lambda X_{\langle \langle e,p \rangle, p \rangle} \lambda w_s. \{d : X(\lambda x_e \lambda w_s. [d \geq \sigma_G(x, w)], w)\} \subset \\ \{d : \exists w'_s \in \text{ACC}(w) \text{ONLY}_G(\lambda w_s. X(\lambda x_e \lambda w_s. \text{HEAR}(m, x, w) \wedge d \geq \sigma_G(x, w), w), w')\}$$

When combined with the indefinite *anything*, the sentence becomes *Max can hear just anything* with the semantics as in (192) below.

$$\begin{aligned}
(192) \quad & \llbracket \text{Max } \xi_X \text{ can hear just anything.} \rrbracket^G = \\
& \text{a. } \llbracket \text{anything} \rrbracket^G (\llbracket \text{Max } \xi_X \text{ can hear just } x. \rrbracket^G) \\
& \text{b. } \lambda w_s : \exists X_{\langle e,p \rangle} >_D \text{ THING} \{d : \exists x_e [X(x, w) \wedge d \geq \sigma_G(x, w)]\} \subset \\
& \quad \{d : \exists w'_s \in \text{ACC}(w) \text{ ONLY}_G (\lambda w_s. \exists x_e [X(x, w) \wedge \text{HEAR}(m, x, w) \wedge d \geq \sigma_G(x, w)], w')\} \\
& \quad \cdot \{d : \exists x_e [\text{THING}(x, w) \wedge d \geq \sigma_G(x, w)]\} \subset \{d : \exists w'_s \in \text{ACC}(w) \\
& \quad \quad \text{ONLY}_G (\lambda w_s. \exists x_e [\text{THING}(x, w) \wedge \text{HEAR}(m, x, w) \wedge d \geq \sigma_G(x, w)], w')\}
\end{aligned}$$

Similar to before, the assertion basically says that the union of the sets of loudness degrees equal to or greater than those associated with *things* is contained in the set of loudness degrees consistent with something no more specific than *thing* satisfying *Max can hear*. The containment of this union of loudness sets then entails that every individual described by *thing* has a loudness that exceeds the minimum sufficient for Max to hear a something no more specific than *thing*. The only difference is that an exhaustive interpretation is applied to the predicate *thing* in the definition of sufficiency conditions, although there is no truth-conditional import due to the scope relationship between the  $\text{ONLY}_G$  and modal operators. So, the proposition can again be paraphrased as *Everything that is a thing is loud enough so that Max can hear it*. The presupposition also still gives a similar proposition with a more specific description than *thing* for the restriction.

### Quantificational variability with *just any*

Quantificational variability is attained in a somewhat indirect manner. Since minimal sufficiency evaluation licenses *just any* as if it were bare *any*, with *just* interpreted within the predicate argument of *any*, the paraphraseability with *every* would seem to be predicted for *any* and not *just any*. However, the result is actually that indiscriminative *just any* attains the paraphraseability, showing that it is *just any* that receives the interpretation of a free choice expression.

Since exclusive meaning is interpreted within both the assertion and the presupposition of *any*, the collection of inferred propositions from minimal sufficiency evaluation will also

feature exclusive meaning. In the end, however, the conjunction of these inferred propositions will still become truth-conditionally equivalent to distributive universal quantification over the same predicate, since the exclusive operator is still interpreted with narrow scope. For example, the sentence *Max can hear just anything* with minimal sufficiency evaluation has the following inferences in (193), among many others.

- (193)  $\llbracket \text{Max } \xi \text{ can hear just anything.} \rrbracket^G \implies$
- a.  $\llbracket \text{Max } \xi \text{ can hear just a bird.} \rrbracket^G$
  - b.  $\llbracket \text{Max } \xi \text{ can hear just a can.} \rrbracket^G$
  - c.  $\llbracket \text{Max } \xi \text{ can hear just a flea.} \rrbracket^G$
  - d.  $\llbracket \text{Max } \xi \text{ can hear just a finch.} \rrbracket^G$
  - e.  $\llbracket \text{Max } \xi \text{ can hear just a Cocos finch.} \rrbracket^G$

Every inference here features exclusive meaning interpreted with narrow scope with respect to the modal operator. The conjunction of these inferences is truth conditionally equivalent to *Max can hear everything*, where *everything* is a straightforward universal quantifier, as shown in (194).

(194)  $\llbracket \text{Max can hear everything.} \rrbracket^G =$   
 $\lambda w_s. \forall x_e \exists w'_s \in \text{ACC}(w) [\text{THING}(x, w') \wedge \text{HEAR}(m, x, w')]$

As such, the equivalence of the inferences of English *every* and *Max can hear just anything* with minimal sufficiency evaluation predict the paraphraseability of *just any* with *every*.

As before, the paraphrase with *every* for *just any* fails with semantic environments that disambiguate between collective and distributive readings of universal quantifiers. In the case of the the predicate *Max can offer this job to just*, composition with *any person*, results in the following inferences in (195).

- (195)  $\llbracket \text{Max } \xi \text{ can offer this job to just any person.} \rrbracket^G \implies$
- a.  $\llbracket \text{Max } \xi \text{ can offer this job to just a staff member.} \rrbracket^G$

- b.  $\llbracket \text{Max } \xi \text{ can offer this job to just a lawyer.} \rrbracket^G$
- c.  $\llbracket \text{Max } \xi \text{ can offer this job to just a shaman.} \rrbracket^G$
- d.  $\llbracket \text{Max } \xi \text{ can offer this job to just a department member.} \rrbracket^G$
- e.  $\llbracket \text{Max } \xi \text{ can offer this job to just a department chair.} \rrbracket^G$

Again, exclusive meaning is interpreted within each propositional alternative, but within the scope of the modal operator. The conjunction of these inferences may still be summarized by distributive universal quantification over the domain in satisfaction of the same predicate, as in (196), but the resulting summarization is not an appropriate translation for *Max can offer this job to every person*.

$$(196) \quad \llbracket \text{We can offer this job to every person.} \rrbracket^G \neq \\ \lambda w_s. \forall x_e \exists w'_s \in \text{ACC}(w) [\text{PERSON}(x, w') \wedge \text{OFFER-JOB-TO}(m, x, w')]$$

Thus, the free choice reading of *just any* with minimal sufficiency evaluation is verified, despite that *just* is interpreted within the predicate argument of *any*.

### 4.3.3 Summary

This section offered what may be the first ever compositional model of indiscriminative semantics, with the case of *just any*. Indiscriminative *just any* was analyzed as itself being the result of composition of exclusive *just* and the Krifka (1995) inspired denotation of *any*. Two options for *just* to combine with *any* were proposed: direct modification on *any* or interpretation within the predicate of quantifiers that *any* takes as an argument. Polarity sensitivity is predicted for both options, because the method for deriving it is sourced to the conflict of *any*'s assertion and presupposition, and this does not change. However, both options also permit distinct licensing options, because they differ in the resulting form of *any*'s presupposition, which further affects its coherence with the assertion. Direct modification is preferred for licensing *just any* with negation, while interpretation within the predicate

argument of *any* is preferred for licensing by minimal sufficiency evaluation. Negation licenses *just any* by negating the exhaustified assertion and undoing the conflict between the weak assertion and stronger presupposition. Minimal sufficiency evaluation licenses *just any* in the same way that it licenses bare *any*. It results in the same free choice reading on *just any* as with bare *any*, with a nullified meaning contribution from exclusive *just* due to its embedding within the scope of other logical operators.

#### 4.4 Conclusion

This chapter developed an account of the compositional semantics of indiscriminative of *just any* and its derivation from the composition of the meanings of *just* and *any*. The chapter began with an observation that the meaning contribution of indiscriminatives under negation resembled that of exclusive particles under negation. The fact that indiscriminative *just any* explicitly features an indiscriminative only supported the suggestion that exclusive meaning is an inherent feature of indiscriminatives. So, the general meaning of exclusive particles was then discussed, with special attention granted to standard accounts and more recent scalar approaches. This dissertation settled on a scalar approach, in which exclusive particles presuppose that their prejacent represents the weakest answer to a presupposed question on a strength scale, and assert that the prejacent is also the strongest answer that is true. Then, a semantic model of the meaning of *any* was presented, capturing its polarity sensitivity and its capacity for free choice readings with minimal sufficiency evaluation. A Krifka (1995) inspired model of *any* was shown to use the conflict of a weak assertion and strong presupposition in order to derive unacceptability without inferential strength reversing operators. Composition with predicates featuring negation or minimal sufficiency evaluation produces the reversed inferential strength needed for interpretation of *any*. Through minimal sufficiency evaluation, *any* gains the property of quantificational variability, added to its inherent polarity sensitivity. Finally, the composition of indiscriminative *just any* was provided, capturing its characteristic meaning contribution with negation. The model allows

*just* to combine with *any* directly or be interpreted within the predicate of quantifiers that *any* composes with to form a proposition. Direct composition of *just* and *any* produces the desired semantics for deriving the characteristic meaning contribution with negation. Interpretation of *just* within the predicate argument of *any* allows for compatibility with minimal sufficiency evaluation, so that *just any* may gain free choice readings.

This analysis of indiscriminative *just any* serves as an initial example for how to model indiscriminatives in other languages. Its main contribution is the reduction of indiscriminative meaning to just three semantic ingredients, which are existential quantification, activation of subdomain alternatives, and exclusive meaning. No previous analysis of indefinites has made a similar proposal of decomposing the meaning of indiscriminatives in such a way. The proposal also provides the resources for an analysis of the derivational link that indiscriminatives have with free choice indefinites. The semantic model of *just any*, with its three principal ingredients, made room for the derivation of free choice readings with minimal sufficiency evaluation. This method of deriving free choice readings with *just any* will be the foundation for the analysis of the derivational relationship between indiscriminatives and free choice indefinites more generally across languages. Indiscriminatives and free choice indefinites in other languages often differ from English *any* and *just any* in their internal structure and distributions. The account of English *just any* must then be further modified still to account for these differences. Fortunately, the necessary modifications will amount to little more than reorganizations of the principal semantic ingredients.

## CHAPTER 5

### INDISCRIMINATIVES IN CUEVAS MIXTEC

The previous chapter developed the basic semantics of English bare *any*, free choice *any*, and indiscriminative *just any*, reducing their meaning compositions to four basic ingredients. This analysis accounted for the polarity sensitivity of bare *any* and *just any*, and it also explained the relationship between free choice *any* and indiscriminative *just any* with respect to the four ingredients. It was shown how indiscriminative *just any* could undergo minimal sufficiency evaluation to gain a free choice reading, securing the criteria for status as a free choice indefinite. This analysis therefore achieves the goal of this dissertation at least for English. The next step towards the goal is to evaluate data from other languages regarding their polarity sensitive indefinites, and to test the explanatory adequacy of the proposed four ingredients model beyond English. This chapter begins this step by reviewing data from an underdescribed minority language, Cuevas Mixtec, and assessing the derivational relationship between its free choice indefinites and indiscriminatives. Chapter 1 already presented some data from this language, which was used to argue that free choice indefinites may be derived from indiscriminatives more broadly across languages. This chapter is dedicated to elaborating further on the evidence for this claim from Cuevas Mixtec.

Cuevas Mixtec is a Mixtec language of southern Mexico, also belonging to the greater Otomanguan stock (Rensch, 1976). It is primarily spoken in San Miguel Cuevas<sup>1</sup> (17°14'35" N, 98°02'40" W), a Oaxacan village of 522 inhabitants located near the middle of the border with Guerrero state. Of the total number of inhabitants, only 441 of those over the age of three years are considered to speak an indigenous language (233 male and 208 female) (INGE, 2010). Therefore, the Cuevas Mixtec speaker community is small, but there is broad mutual intelligibility with similar Mixtec languages spoken in surrounding villages.<sup>2</sup>

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1. The Cuevas Mixtec name for this village is *ñuu nùù yukù* 'the village on the mountain'.

2. Speakers of Cuevas Mixtec are also found in the United States, having immigrated for work and established themselves in Delaware, the Portland metropolitan region of Oregon, and Fresno county in California.

In Cuevas Mixtec, indiscriminatives and free choice indefinites take on similar forms and have identical interpretations in the same environments, implying a derivational relationship. However, indiscriminatives are simpler in their internal structure compared to free choice indefinites, suggesting a derivational relationship from the indiscriminative to the free choice indefinite. Indiscriminatives are formed by a simple or complex *wh*-word attaching to a verb base *kuu* ‘happen’. In example (197) below, the indiscriminative *ndyé kárró kũũ* ‘just any car’ occurs under scope of negation to express that Juan bought some special car.

- (197) kòó ìsyiin [tyà juáàn] [**ndyé kárró kuu** (va)]  
 NEG buy.COMPL the.SG.M Juan which car happen.IPFV FOC  
 ‘Juan did not buy just any car. (he bought a certain/special kind of car.)’<sup>3</sup>

This example also shows that the indiscriminative may take on an optional focus particle *va*, which does not change the meaning of the sentence. Free choice indefinites are similarly formed, with a *wh*-word and the verb base *kuu*. The difference is that, in the case of free choice indefinites, *va* becomes obligatory. Example (198) below has a free choice indefinite *yuu kuu va* ‘anyone’.

- (198) kuvi katasyà’á [**yuu kuu** \*(va)]  
 can dance.IRR who happen.IPFV FOC  
 ‘Anyone can dance.’

In this case, the free choice indefinite takes on the appearance of an indiscriminative *yuu kuu* with the particle *va*. The particle cannot be removed while the acceptability of the sentence is maintained. Therefore, free choice indefinites are morphologically more complex than indiscriminatives and would seem to be derived from them by means of the particle *va*.

This conclusion is important because it refutes a common assumption in the description of indiscriminatives, that their meaning contribution is a type of pragmatic enrichment on free choice meaning (Sæbø, 2001; Chierchia, 2013). It provides evidence that the direction

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3. For glossing style, this work follows the conventions developed by Cisneros (2019) for transcribing and translating Cuevas Mixtec.

of derivation is rather from the indiscriminative to the free choice indefinite. This validates indiscriminatives as a more basic class of indefinite that deserves more proper crosslinguistic description, and whose acknowledgment may ensure progress in research on the grammatical formation of free choice indefinites. The rest of the paper elaborates on the evidence for the proposed derivational relationship with the following organization. §5.1 discusses the structure and meaning contribution of indiscriminatives. They are always composed of a *wh*-word and a verb base and their occurrence is only acceptable under one of two conditions: under the scope of negation or in a preverbal position that is likely a focus position. §5.2 covers free choice indefinites, which are shown to resemble indiscriminatives in their internal structure and distribution, bearing the same interpretations as indiscriminatives in the same environments. However, they also have expanded distributions that include typical licensing environments for free choice expressions. They structurally differ from indiscriminatives only in the obligatoriness of a focus particle *va*. §5.3 explores the meaning contribution of the particle *va* in an attempt to understand how it may contribute to the grammatical formation of free choice indefinites. It is shown that *va* is a polysemous particle, resembling English *just* and *still*, and its capacity to mark minimal sufficiency readings on items provides a likely source for the derivational link between indiscriminatives and free choice indefinites in Cuevas Mixtec. §5.4 concludes the chapter with a summary of results.

## 5.1 Indiscriminatives in Cuevas Mixtec

Indiscriminatives in Cuevas Mixtec are morphologically simpler items compared to free choice indefinites. Therefore, it seems most appropriate to begin their grammatical comparison with discussion of indiscriminatives. This section briefly covers their basic features, which are their morphology, distribution, and interpretation. It first describes their internal structure, which has two components: a simple or complex *wh*-word combined with a verb base. The section then explains the distribution of indiscriminatives, which consists of two licensing environments: the scope of negation, and a non-canonical preverbal position. The interpretation of

the indiscriminative changes between the two environments, with a typical indiscriminative reading under negation, but a free choice reading in the preverbal position.

### 5.1.1 *Basic Structure of indiscriminatives*

There are two morphological components to the construction of indiscriminatives in Cuevas Mixtec. They all feature a verb base that attaches to a simple or complex wh-word. Additional elements beyond these components are modifiers.

#### Verb base

The common morphological component that all indiscriminatives in Cuevas Mixtec share is the verb base, forming their morphological foundation. The verb base is *kuu*, most easily translated as an existential predicate of events. It occurs independently with a meaning approximate to ‘happen’, as exemplified below in (199), which is an exchange between speakers both using this word.

- (199) a. ñáá **kuu**  
          what happen.IPFV  
          ‘What’s happening?’
- b. **kuu**           vikò  
          happen.IPFV party  
          ‘A party is happening.’

As an existential predicate of events, *kuu* is semantically impoverished in content meaning. It is also grammatically impoverished in that it is apparently incapable of inflection, distinguishing itself from most other verbs of the language, which typically host at least three inflectional forms.

## Wh-words

The verb base attaches to a wh-word to form an indiscriminate, conforming to an extremely common strategy for indefinite construction across languages (Haspelmath, 1997). Most of the wh-word inventory may be used for constructing distinct indiscriminatives, with the choice of wh-word corresponding to distinct restrictions of time, place, manner, and more. Below in (200) is a brief list of some common indiscriminatives in Cuevas Mixtec.<sup>4</sup>

- (200) a. **yuu** kuu  
who happen.IPFV  
'just anyone'
- b. **ndyéé** kuu  
where happen.IPFV  
'just anywhere'
- c. **ñama** kuu  
when happen.IPFV  
'just any time'
- d. **ñixi** kuu  
how happen.IPFV  
'just any way'

Indiscriminatives can also be formed with complex wh-words. In such a case, the overt constituency of the wh-determiner with the nominal restriction is maintained. In example (201) below, the restriction of the free choice item is preceded by the wh-determiner 'which', then followed by a base verb *kuu*.

- (201) **ndyéé** tutu **kuu**  
which paper happen.IPFV  
'just any book'

When the wh-word is a complex one, it is also possible for the restriction to take on certain types of modifiers, such as numerals. Below in (202), the numeral retains adjacency to the nominal within the free choice item.

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4. The word *ndyéé* is interchangeable with *ndyíí*.

- (202) ndyé ùvì tutu kuu  
 which two paper happen.IPFV  
 ‘just any two books’

The data above suggest that the *wh*-word forms a distinct constituent from the verb base, resulting in a superficial resemblance to free relative clauses in other languages.

### 5.1.2 *Distribution of indiscriminatives*

There are exactly two conditions which license the occurrence of indiscriminatives in Cuevas Mixtec. They are nearly always licensed under the scope of negation. They are also licensed in semantic environments that typically license free choice indefinites, but this only works while the indiscriminative occurs in a certain preverbal position. This preverbal position seems to be reserved for focus marking.

#### In a preverbal position

Indiscriminatives in Cuevas Mixtec are licensed in a preverbal position within a sentence. Cuevas Mixtec has a set number of preverbal slots for nominal expressions to occupy, likely corresponding to topic and focus positions. While indiscriminatives occupy one of these positions, they bear the interpretation of a free choice indefinite. Example (203) below presents a case of this arrangement with the indiscriminative *yuu kuu* ‘just anyone’ expressing freedom of choice in selection of person to dance.

- (203) [**yuu kuu**]            kuvi katasyà’á  
 who happen.IPFV can dance.IRR  
 ‘Anyone can dance.’

Here, the indiscriminative occurs in a preverbal position before the modal operator *kuvi* ‘can’. Without the preverbal position, indiscriminatives of this form do not occur outside the scope of negation. Examples (204-205) below show the unacceptability of the indiscriminatives

*yuu kuu* ‘just anyone’ and *ndyí kárró kuu* ‘just any car’ in the canonical postverbal position, despite the occurrence of *kuvi* ‘can’.

- (204) \* *kuvi katasyà’á [yuu kuu]*  
 can dance.IRR who happen.IPFV  
 ‘Anyone can dance.’
- (205) \* *kuvi kuiin ún [ndyí kárró kuu]*  
 can buy 2SG which car happen.IPFV  
 ‘You can buy any car.’

In the first example, *yuu kuu* ‘just anyone’ occurs in the canonical subject position after *katasyà’á* ‘dance’, and in the second example, *ndyí kárró kuu* ‘just any car’ occurs in the canonical object position after the phrase *kuiin ún* ‘you buy’. In both examples, the sentence is uninterpretable because the indiscriminative does not occupy the preverbal position.

While the indiscriminative occurs in the preverbal position, the semantic environment must also reflect a typical licensing environment for free choice expressions. In episodic statements, the preverbal position alone cannot license an indiscriminative. In the following example (206), the indiscriminative *ndyé kárró kuu* ‘just any car’ occurs in a preverbal position with a verb inflected for the perfective past, to produce an unacceptable sentence.

- (206) \* [*ñdyé kárró kuu*]      *ìsyiin*      [*tyà juáàn*]  
 which car happen.IPFV buy.COMPL the.SG.M Juan  
 (‘Juan did not buy just any car.’)

Here, *ñdyé kárró kuu* ‘just any car’ occurs before the verb *ìsyiin* ‘bought’. Although the indiscriminative occurs in the preverbal position, the lack of a typical licensing environment for free choice expressions prevents licensing.

### Licensing by negation

Indiscriminatives are also licensed under scope of negation, as would be required for their status as indiscriminatives. In such cases, they may occur in canonical postverbal positions.

With negation, they have the characteristic property of expressing the specificity or noteworthiness of a yet to be revealed candidate for satisfaction of a predicate. Examples (207-208) below present cases of the indiscriminatives *ñdyé kárró kuu* ‘just any car’ and *ñixi kuu* ‘just any way’ under negation.

(207) ✓ **kòó** ìsyiin [tyà juáàn] [**ñdyé kárró kuu**]  
 NEG buy.COMPL the.SG.M Juan which car happen.IPFV  
 ‘Juan did not buy just any car. (He bought a certain/special kind of car.)’

(208) ìì kuvi ku’ùn ún yà’vi [**ñixi kuu**]  
 NEG can go.to.IRR 2SG market how happen.IPFV  
 ‘You cannot go to the market just any way.  
 (You have to go with someone.) (You have to take a certain route.)’

In example (207), *ñdyé kárró kuu* ‘just any car’ occurs under negation to express that John bought a special kind of car, without indicating the specific car. In example (208), *ñixi kuu* ‘just any way’ occurs under negation to express that the addressee has limited options for manner of making a trip to the market.

While the indiscriminative occurs with negation, it is necessary that it occur in some position after the negator, usually in a canonical postverbal position. Indiscriminatives cannot occur before negators. In examples (209-210) below, different indiscriminatives occur in a syntactic position before the negator, preventing their licensing.

(209) \* [**ñdyé kárró kuu**] **kòó** ìsyiin [tyà juáàn]  
 which car happen.IPFV NEG buy.COMPL the.SG.M Juan  
 (‘Juan did not buy just any car.’)

(210) \* [**yuu kuu**] ìì kuvi katasyà’á  
 who happen.IPFV NEG can dance.IRR  
 ‘Anyone cannot dance.’

In (209), the indiscriminative *ñdyé kárró kuu* ‘just any car’ occurs in an episodic statement with negation, yet is not licensed because it occurs before the negator instead of after. In

(210), indiscriminative *yuu kuu* ‘just anyone’ is not licensed in the preverbal position, even though a modal operator *kuvi* ‘can’ is present.

## Other restrictions

It is worth noting a number of counterexamples to the licensing potential of negation for indiscriminatives. Although negation is generally able to license the occurrence of indiscriminatives, certain additional conditions may interfere in licensing. For example, the subject position does not permit the licensing of these indiscriminatives under negation. In example (211) below, *yuu kuu* ‘just anyone’ occurs in the canonical subject position after the main verb. The resulting sentence is not acceptable.

- (211) \* ìì kuvi katasyà’á [**yuu kuu**]  
 NEG can dance.IRR who happen.IPFV  
 ‘Not just anyone can dance. (Only a select few.)’

Here, *yuu kuu* ‘just anyone’ occurs after the negated verb *katasyà’á* ‘dance’ in the canonical subject position. For whatever reason, the resulting sentence is not acceptable to speakers.

Indiscriminatives are also barred from occurring in imperatives generally. Negation does not license the occurrence of the indiscriminative in these cases. Below in (212), the indiscriminative *ñáá kuu* ‘just anything’ is unacceptable

- (212) \* ìì kuiin ún [**ñáá kuu**]  
 NEG buy.IRR 2SG how happen.IPFV  
 ‘Do not buy just anything.’

Here, *ñáá kuu* ‘just anything’ occurs in the canonical object position after the negated verb *kuiin* ‘buy’. Typically, this arrangement would permit the occurrence of the indiscriminative. However, something about the imperative status of the sentence interferes with the licensing potential of negation for indiscriminatives.

The reason that the subject position and imperative status would interfere with the licensing potential of negation is mysterious. However, what is certain is that it has nothing

to do with the meaning of indiscriminacy. As is shown in the next section on free choice indefinites in Cuevas Mixtec, indiscriminatives can indeed be interpretable in subject positions and imperatives, but the indiscriminative must take on an alternative form. Free choice indefinites may occur in the semantic environments above with indiscriminative readings. Therefore, the incompatibility of indiscriminatives with the semantic environments above has less to do with the meaning of indiscriminacy, and more to do with some semantic deficiency that is accounted for by the additional morphology of the free choice indefinite.

### 5.1.3 *Summary*

This section covered the basics of indiscriminative structure and distribution in Cuevas Mixtec. Indiscriminatives in this language are indefinites with two morphological components, a verbal base and a wh-word that can be simple or complex. There are two types of conditions on a semantic environment that permit the occurrence of indiscriminatives. These are scope of negation and a preverbal position corresponding to either topic or focus marking. Negation on the indiscriminative results in the characteristic meaning contribution of anti-indiscriminacy, the expression of noteworthiness for some entity yet to be revealed in the discourse. The preverbal position endows the indiscriminative with a free choice reading. There are some environments which interfere with the licensing potential of negation for indiscriminatives, and these are the canonical subject position after the main verb, and imperative sentences.

## 5.2 **Free choice indefinites in Cuevas Mixtec**

Having settled the structure and distribution of indiscriminatives, free choice indefinites can be described as elaborations on indiscriminatives in both regards. Therefore, if there is a derivational relationship between the two items, it is more likely that it is in the direction of the indiscriminative to the free choice indefinite. This section expounds on this argu-

ment by covering the basic internal structure, distribution, and interpretation of free choice indefinites. It first describes their internal structure, which resembles that of indiscriminatives, except for the added presence of the focus particle. Free choice indefinites also display additional variation in the verb base, giving the greater impression of free relative clauses. However, free choice indefinites may themselves take relative clauses, substantiating their status as pronouns. The section then covers their distribution and interpretation. It shows that they are very typical in their distributional properties compared to free choice indefinites in other languages. They display both polarity sensitivity and quantificational variability. However, they are also licensed by negation with indiscriminative readings, as well as by certain non-monotonic operators that preserve episodicity.

### 5.2.1 *Basic Structure of free choice indefinites*

Cuevas Mixtec free choice indefinites are nearly identical to indiscriminatives in appearance, differing only in the presence of a focus particle. Like indiscriminatives, they are built with a verb base and *wh*-words. Derivation with *wh*-words is extremely common for indefinite constructions across languages (Haspelmath, 1997), and it is observed for free choice indefinites in languages of the Mediterranean and Scandinavian regions (Giannakidou, 2001; Giannakidou & Cheng, 2006; Menéndez-Benito, 2007, 2010; Sæbø, 2001; Chierchia, 2013). On the other hand, these free choice indefinites are quite distinct in their internal structure. Instead of displaying an internal structure that resembles a determiner combining with a nominal restriction, they resemble free relative clauses by featuring a bare or complex *wh*-word combining with a gapped clause.<sup>5</sup>

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5. In fact, they bear a striking resemblance to what Haspelmath (1997, 55) called “abbreviated non-specific free relative clauses”, an intermediate diachronic state in the grammaticalization of conventionalized free relative clauses into free choice determiners.

## The focus particle

The main morphological difference between free choice indefinites and indiscriminatives is the additional presence of a focus particle *va* on the free choice indefinite. This particle is attached at the end of the verbal base, as in example (213) below.

- (213) **ndyé** tutu **kuu** **va**  
which paper happen.IPFV FOC  
'any book'

With the focus particle, the free choice indefinite takes on a broader range of licensing environments, corresponding to the typical licensing environments of free choice indefinites across languages.

The choice of the focus particle *va* for construction of free choice indefinites is fixed, and there are no other particles or similar items that fulfill the same compositional role as *va*. The particle *va* may not be replaced by other items. Example (214) below is an unsuccessful attempt to form a free choice indefinite with the exclusive adjective *uun* 'alone'.

- (214) \*kuvi kuiin ún [ndyí kárró kuu **uun**]  
can buy 2SG which car happen.IPFV alone  
(‘You can buy any car.’)

Here, the adjective *uun* 'alone' replaces the particle *va* in the construction of a free choice indefinite *ndyí kárró kuu va* 'any car'. However, the result is an ungrammatical string, and the free choice indefinite is not interpretable.

## Alternative verbal bases

The presence of the particle also appears to permit some variation in the internal composition of the free choice indefinite. While the particle is present, there are at least two other verbs that may serve as the verb base besides *kuu* 'happen'. These include the verbs *kúni* 'want' and *íyá* 'there is', each enriching the free choice indefinite with either additional semantic

or morpho-syntactic features.<sup>6</sup> The verb base, *íyá* ‘there is’ adds a deictic component to the meaning of the free choice indefinite, confining a domain of quantification to individuals within the immediate space occupied by the speakers. In example (215) below, the free choice indefinite *yuu íyá va* is best translated as ‘anyone around’.

- (215) ✓ *kuvi katasyà’á [yuu íyá va]*  
 can dance.IRR who exist.IPFV FOC  
 ‘Anyone around can dance.’

The other verb base *kúnì* ‘want’ adds emphasis to the addressee’s own freedom of choice in selecting candidates for satisfaction of a predicate. In example (216) below, the free choice indefinite *ndyé ñà kúnì va ún* is best translated as ‘anything you want’.

- (216) *kuvi kei ún [ndyé ñà kúnì va ún]*  
 can eat.IRR 2SG which 3.INA want.IPFV FOC 2SG  
 ‘You can eat anything you want.’

While *kúnì* ‘want’ is the verb base, the free choice indefinite takes on a verb subject argument. The choice for this argument ranges at least among the pronoun inventory. In example (217) below, the free choice indefinite *ndyé kárró kúnì va ra* ‘any car he wants’ takes on the clitic pronoun *ra* ‘he’ after the focus particle, rather than the pronoun *ún* ‘you’ as in (216).

- (217) *kuvi kuiin ra [ndyé kárró kúnì va ra]*  
 can buy.IRR 3SG.M which car want.IPFV FOC 3SG.M  
 ‘He can buy any car he wants.’

These examples with *kúnì* ‘want’ as the verb base are the only cases in which the free choice indefinite may host an additional morpheme.

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6. The addition of these features might qualify these alternate constructions as “free choice free relatives”, as described by Giannakidou & Cheng (2006), rather than free choice indefinites. For this reason, they are only mentioned briefly in this subsection, while the rest of the chapter concentrates on the case of the verbal base *kuu* ‘happen’.

## Nominal status

The internal structure and flexibility of free choice indefinites in Cuevas Mixtec may give the impression that they are actually free relative clauses. However, some additional facts discredit the claim that they may be relative clauses of any sort. For one, free choice indefinites are able to take on relative clauses themselves. Relative clauses in Cuevas Mixtec take the form of a sentence with an argument gap and a relative pronoun, as in example (218) below.

- (218) *tutu ñà*    *ìsya'a*    [*ñá*    *márió*] -    [*nùù ra*]  
book the.INA give.COMPL the.F Maria GAP face 3SG.M  
'the book that Maria gave to him'

In this case, *tutu* 'book' takes on a relative clause with the relative pronoun *ñà*. The same relative clause may attach to a free choice indefinite, as in example (219) below.

- (219) *ndyé tutu kuu*    *va*    [*ñà*    *ìsya'a*    *ñá*    *márió* -    *nùù ra*]  
which paper happen.IPFV FOC the.INA give.COMPL the.F Maria GAP face 3SG.M  
'any book that Maria gave to him'

In this case, the same relative clause attaches to the free choice indefinite *ndyé tutu kuu va* 'any book'. This would indicate the nominal status of the free choice indefinite, despite its clause-like internal structure.

Another point is that free choice indefinites are not as grammatically flexible as relative clauses. Within the free choice indefinite, the verb base is grammatically static and does not inflect or take modifiers. The following examples in (220) show that only the imperfective form of *íyá* 'exist', and not the irrealis form or completive forms, is acceptable for the verb base.

- (220) a. \**kuvi katasyà'á* [*yuu koo*    *va*]  
can dance.IRR who exist.IRR FOC  
(‘Anyone that will be around can dance.’)

- b. \*kuiin ún [ndyé kárró ìsyoo va]  
 buy.IRR 2SG which car exist.COMPL FOC  
 ('Buy any car that there was.')

The data altogether show that free choice indefinites, despite their resemblance to free relative clauses, are too inflexible in their internal structure to be relative clauses. There is more grammatical evidence that the grammar of Cuevas Mixtec treats them as a special subcategory of indefinite pronoun.

### 5.2.2 *Distribution with free choice reading*

The distribution of free choice indefinites in Cuevas Mixtec is as one might expect. They occur in most semantic environments, with the characteristic exception of positive or affirmative episodic statements.<sup>7</sup> Table 5.1 compares the distribution of Cuevas Mixtec free choice indefinites with the general distribution described by Giannakidou & Cheng (2006) for free choice indefinites crosslinguistically. These free choice indefinites also display the expected quantificational variability. In most compatible semantic environments, they are truth-conditionally approximate to distributive universal quantifiers, permitting paraphrases with lexical universal quantifiers in some cases and not others.

### Polarity sensitivity

In a typical positive or affirmative episodic statement, Cuevas Mixtec free choice indefinites are predictably unacceptable. In example (221), the presence of the free choice indefinite

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7. Cuevas Mixtec free choice indefinites are not acceptable in every environment that license free choice indefinites for other languages. For example, in Cuevas Mixtec they seem unable to occur as comparative standards, as observed in (1).

- (1) \*katasyà'á va vi [tyà juáàn] ñà kuuu [yuu kuu va]  
 dance.IRR FOC much the.SG.M Juan COMP be.IRR who happen.IPFV FOC  
 ('Juan will dance much more than anyone.')

I have little to comment on concerning the awkwardness of this example. However, it is important to recall that the distributional properties of free choice items crosslinguistically are not completely uniform. This issue is left for future work.

Environment	Cuevas Mixtec	General
Episodic negation	✓	*
Episodic questions	✓	*
Conditionals	✓	✓
Restriction of universal	✓	✓
Future/will	✓	✓
Modal verbs	✓	✓
Imperatives	✓	✓
Generics	✓	✓
Affirmative episodic sentences	*	*
Epistemic intensional verbs	*	*

Table 5.1: Comparison of free choice indefinite distributions

*ndyé kárró kuu va* ‘any car’ within an episodic statement makes the sentence altogether uninterpretable.

- (221) \* **iku**      **ìsyiin**      [tyà      juáàn] [ndyé kárró kuu      va]  
yesterday buy.COMPL the.SG.M Juan      which car      happen.IPFV FOC  
(‘Yesterday, Juan bought any car.’)

In this example, the verb *ìsyiin* ‘bought’ is inflected for the perfective past, and the adverb *iku* ‘yesterday’ is topicalized to place the event of the statement at a unique time. The unacceptability of the sentence would indicate that the free choice indefinite is anti-episodic.

Cuevas Mixtec free choice indefinites are otherwise acceptable in a variety of semantic environments that interfere with episodicity. These include conditional clauses, as in example (222) with the free choice indefinite *yuu kuu va* ‘anyone’.

- (222) ✓ **tátu** naa ndakava [yuu kuu      va], ka’àn      ndó syí’ín ì  
if      SBJV fall      who happen.IPFV FOC speak.IRR 2PL with 1SG  
‘If anyone falls, tell me.’

They include the restriction of universal quantifiers, as in example (223) with the free choice indefinite *ndyé kárró kuu va* ‘any car’.

- (223) ✓ **ndyìkuii** nà tyàa [nà ìsyiin ndyé kárró kuu va]  
 all the.HUM man the.HUM buy.COMPL which car happen.IPFV FOC  
 kuànu'ù na ve'e na  
 go.home.IPFV 3.HUM house 3.HUM  
 'Every man that bought any car went home.'

They include sentences where the main verb is inflected for future tense, as in example (224) with the free choice indefinite *ndyé kárró kuu va* 'any car'.

- (224) **kuiin** [tyà juáàn] [ndyé kárró kuu va]  
 buy.IRR the.SG.M Juan which car happen.IPFV FOC  
 'Juan will buy just any car.'

They include sentences with modal verbs, as in example (225) with the free choice indefinite *yuu kuu va* 'anyone'.

- (225) **kuvi** katasyà'á [yuu kuu va]  
 can dance.IRR who happen.IPFV FOC  
 'Anyone can dance.'

They include imperatives, as in example (226) with the free choice indefinite *ndyé tūtū kūū vā* 'any book'.

- (226) **ka'vi** [ndyé tutu kuu va]  
 read.IRR which book happen.IPFV FOC  
 'Read any book.'

Finally, they include generic statements, as in example (227) with the free choice indefinite *ndyé tyìín kūū vā* 'any mouse'.

- (227) [tyí chítú] **syéí** rí [ndyé tyìín kuu va]  
 the.AML cat eat.IPFV 3SG.AML which mouse happen.IPFV FOC  
 'A cat eats any mouse.'

These environments have been recognized across languages to be typical licensing environments for free choice indefinites. The grammatical behavior of Cuevas Mixtec free choice indefinites is therefore typical in this area.

## Quantificational variability

Like free choice indefinites in other languages, Cuevas Mixtec free choice indefinites are approximate to distributive universal quantifiers in their meaning contribution. This quality results in a paraphraseability with lexical universal quantifiers, as long as the semantic environment conflates collective and distributive readings. Truth-conditional proximity with lexical universal quantifiers tends to occur in generic statements, where collective and distributive readings on nominal expressions may converge. In example (228) below, *yuu kuu va* ‘anyone’ may be translated into English as ‘anyone’ or ‘everyone’, without loss of meaning.

- (228) **kuvi** *katasyà'á* [yuu kuu va]  
can dance.IRR who happen.IPFV FOC  
‘Anyone can dance.’  $\rightsquigarrow$  ‘Everyone can dance.’

The predicate *kuvi katasyà'á* ‘can dance’ is generic, conflating distributive and collective readings on arguments.

Non-generic semantic environments may make stronger distinctions between distributive and collective readings. Therefore, even though the free choice indefinite may still be interpreted as a sort of universal quantifier, collective readings are not entailed. In example (229) below, the free choice indefinite *ndyé tutu kuu va* ‘any book’ applies a strictly distributive reading of the sentence, evidenced by the followup statement.

- (229) ✓ *ka'vi* [ndyé tutu kuu va], **suu** [iin va ña]  
read.IRR which book happen.IPFV FOC but one FOC 3.INA  
‘Read any book, but just one (of them).’

In this example, the speaker allows the addressee freedom of choice in their selection of a book. However, the speaker felicitously restricts the addressee to choosing one book, and not the entire collection from which they may choose. The next example (230) below provides a similar interpretation on the free choice indefinite *ndyé kárró kuu va* ‘any car’, which is attached to a relative clause.

- (230) ✓ [tyà juáàn] kuiin ra [ndyé kárró kuu va] ñà  
 the.SG.M Juan buy.IRR 3SG.M which car happen.IPFV FOC the.INA  
 ìkunì [ñá mاریá], **suu** [iin va dú] kuiin ra  
 want.COMPL the.F Maria but one FOC 3.STR buy.IRR 3SG.M  
 ‘Juan will buy any car that Maria wants, but he will buy just one of them.’

Here, the sentence states that Juan will buy a car, which may vary in its identity across possible cars desired by Maria. At the same time, the follow up sentence says that Juan will buy only one car, whereas the original sentence did not specify any quantity to be bought. As such, paraphraseability with lexical universal quantifiers would be lost.

### 5.2.3 *Distribution with other readings*

In contrast to Greek free choice indefinites, Cuevas Mixtec free choice indefinites are not anti-episodic, but display a more common form of polarity sensitivity. Unlike Greek free choice indefinites, they are licensed under scope of negation with indiscriminative readings. This quality is common and shared with free choice indefinites in many other common languages, such as French (Jayez & Tovená, 2005) and Norwegian (Sæbø, 2001). Besides negation, Cuevas Mixtec free choice indefinites seem to be licensed at least marginally by certain non-monotonic operators that preserve the episodicity of a semantic environment.

#### Under negation

Negation is able to license Cuevas Mixtec free choice indefinites in episodic statements. In such cases, the free choice indefinite is interpreted more clearly as an indiscriminative. In example (231) below, the free choice indefinite *ñáá kuu va* ‘anything’ occurs under the scope of negation to contribute a meaning similar or identical to anti-indiscriminacy.

- (231) **kòó ìsyiin** [tyà juáàn] [ñáá kuu va]  
 NEG buy.COMPL the.SG.M Juan what happen.IPFV FOC  
 ‘Juan did not buy just anything. (He bought something special.)’

The example says that Juan indeed bought something, but it is more special than the addressee expects. this is a typical indiscriminative meaning contribution, as if the free choice indefinite *ñáá kuu va* were just *ñáá kuu* without the particle.

The indiscriminative interpretation of the free choice indefinite is identical under different negators. In the following example (232), the free choice indefinite *ndyé tyàa kuu va* ‘any man’ occurs under the scope of the propositional negator *ìsuu* to express anti-indiscriminacy.

- (232) a. [tyà        tyàa yó’o] **ìsuu** [ndyé tyàa kuu            va] **kúú** ra  
           the.SG.M man here NEG which man happen.IPFV FOC be.IPFV 3SG.M  
           ‘This man is not just any man.’
- b. tyàxìnì kúú ra  
           headman be.IPFV 3SG.M  
           ‘He is the current village leader!’

The indiscriminative interpretation even comes about when negation clearly occurs at the propositional level. The following example (233) has the free choice indefinite *ñáá kuu va* ‘anything’ occurring within the proposition that is asserted to be false. The negated phrase *ñà ndàà* translates to ‘the truth’.

- (233) ✓ **ìsuu** [ñà        ndàà] ñà    ìsyiin        tyà        juáàn [ñáá kuu  
           NEG the.INA straight COMP buy.COMPL the.SG.M Juan what happen.IPFV  
           va]  
           FOC  
           ‘It is not true that Juan bought just anything. (He bought something special.)’

On the other hand, negation does not always help license the free choice indefinite. An existential predicate as the main verb does not accept free choice indefinites as arguments, and the meaning of negation within the negative existential predicate does not help licensing. In example (234) below, *ndyé tyìna kuu va* ‘any dog’ is unacceptable as the argument of the negative existential predicate *kòó*.

- (234) \* **kòó**        [ndyé tyìna kuu            va]  
           NEG.exist which dog happen.IPFV FOC  
           (‘There is not just any dog here.’)

As such, negation alone does not serve as a licensing operator of the free choice indefinite, even if only to have it interpreted as an indiscriminative.<sup>8</sup>

## Negation with other licensing operators

Beyond episodic statements, other typical licensing environments for free choice indefinites may co-occur with negation to license Cuevas Mixtec free choice indefinites with indiscriminative readings. The set of examples (235-237) below represent cases of negation with modal verbs, generic statements, and imperatives, where a free choice indefinite is licensed with an indiscriminative reading.

- (235) ✓ [tyí tyìna] **kòó** syéí rí [ndyé tyìin kuu va]  
 the.AML dog NEG eat.IPFV 3SG.AML which mouse happen.IPFV FOC  
 ‘A dog does not eat just any mouse. (They eat certain mice.)’

- (236) ✓ ìì kuiin [tyà juáàn] [ñáá kuu va]  
 NEG buy.IRR the.SG.M Juan what happen.IPFV FOC  
 ‘Juan will not buy just anything. (He will buy certain things.)’

- (237) ìì kuiin ún [ndyé kárró kuu va]  
 NEG buy.IRR 2SG which car happen.IRR FOC  
 ‘Don’t buy just any car! (buy a certain/special one!)’

In all of these cases, the free choice indefinite co-occurs with negation to express the characteristic anti-indiscriminative meaning, that there is a noteworthy candidate for satisfaction of a predicate that is yet to be revealed in the discourse.

As with indiscriminatives, the free choice indefinite must occur in a canonical argument position to be interpreted within the scope of negation. It cannot occur in a preverbal position if the main predicate is negated. Example (238) below shows negation on *kuvì katasjà’á* ‘can dance’ with *yuu kuu va* ‘anyone’ in a preverbal position.

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8. Here, the meaning of negation and the existential predicate are fused into a single word. This might be related to the unacceptability of the free choice indefinite in this case, but the language does not seem to permit negation on positive existential predicates, so as to better understand what meaning the free choice indefinite displays an aversion to.

- (238) \* [yuu kuu va] ìì kuvi katasyà'á  
 who happen.IPFV FOC NEG can dance.IRR  
 ('Not just anyone can dance.')

The result of negation on *kuvi katasyà'á* 'can dance' with preverbal *yuu kuu va* 'anyone' is an unacceptable string. In order to render the string acceptable, the free choice indefinite must be relocated to its canonical postverbal position, as in (239).

- (239) ✓ ìì kuvi katasyà'á [yuu kuu va]  
 NEG can dance.IRR who happen.IPFV FOC  
 'Not just anyone can dance. (Only a select few.)'

Here, *yuu kuu va* 'anyone' occurs in its canonical postverbal position after the negated predicate *kuvi katasyà'á* 'can dance'. In this arrangement, it regains an indiscriminative interpretation.

A curious phenomenon occurs when negation itself occurs within the licensing environment. In these cases, the free choice indefinite suddenly becomes ambiguous between two readings. It may still have an indiscriminative reading, as with the examples above, but it may also have a pure existential reading, similar to a negative polarity item, like English *any*. Examples (240-241) below have both the free choice indefinite and negation occurring within a licensing environment.

- (240) ✓ tátu ìì kuiin [tyà juáàn] [ñáá kuu va], kuiin [ñá  
 if NEG buy.IRR the.SG.M Juan what happen.IPFV FOC buy.IRR the.F  
 máriá] tutu  
 Maria paper  
 'If Juan buys something special, Maria will buy paper.'  
 'If Juan does not buy anything, Maria will buy paper.'

- (241) ✓ ndyìkuii [nà tyàa] nà kòó ìsyiin [ndyé kárró kuu  
 all the.HUM man the.HUM NEG buy.COMPL which car happen.IPFV  
 va] kuànu'ù na ve'e na  
 FOC go.home.IPFV 3.HUM house 3.HUM  
 'All the men that bought a special car went home.'  
 'All the men that did not buy any car (even a special one) went home.'

The examples above represent negation and free choice indefinites co-occurring within a conditional clause and the restriction of a universal quantifier, respectively. In both examples, the free choice indefinite is ambiguous between its indiscriminative readings and a pure existential reading under negation.

## Episodicity and non-monotonicity

Cuevas Mixtec free choice indefinites display marginal acceptability in episodic statements while co-occurring with certain non-monotonic operators. These include polar question markers, which can at least marginally license free choice indefinites with an indiscriminative or low interest or value reading. In example (242) below, the free choice indefinite *ndyé kárró kuu va* ‘any car’ occurs within an episodic statement embedded within a polar question.

- (242) ✓ **á isyiin** [tyà juáàn] [ndyé kárró kuu va]  
 Q buy.COMPL the.SG.M Juan which car happen.IPFV FOC  
 ‘Did Juan buy just any car?’

Due to the episodic nature of the embedded sentence, the free choice indefinite lacks a free choice reading. Instead, the question asks if Juan bought only some car of low interest or value.

With negation also embedded within the question, a similar ambiguity occurs as with negation embedded in other licensing environments. The free choice indefinite is interpreted with either an indiscriminative or pure existential reading. In example (243) below, the free choice indefinite *ndyé kárró kuu va* ‘any car’ is negated within an episodic statement embedded within a polar question.

- (243) ✓ **á kòó isyiin** [tyà juáàn] [ñdyé kárró kuu va]  
 Q NEG buy.COMPL the.SG.M Juan which car happen.IPFV FOC  
 ‘Did Juan buy a special car?’  
 ‘Did Juan not buy a car (at all)?’

Here, negation on the free choice indefinite creates an ambiguity. The question either asks if Juan had bought a special car or it asks if Juan did not buy a car at all. The first reading of the question corresponds to a indiscriminative reading on the free choice indefinite, while the second reading corresponds to a pure existential reading on the free choice indefinite.

#### 5.2.4 *Summary*

Free choice indefinites in Cuevas Mixtec are nearly identical in appearance to indiscriminatives, except for the presence of the focus particle *va*, which cannot be replaced by other items. They also permit more flexibility in the choice of the verb base compared to indiscriminatives, giving the impression that they may be free relative clauses. However, They can take relative clauses themselves, and the verb base does not take modification, as would be possible in the case of relative clauses. Their distribution is typical, encompassing many common licensing environments for free choice indefinites across languages. They display polarity sensitivity and quantificational variability, key properties of free choice indefinites. However, they are also licensed under negation with indiscriminative readings, although this quality has also been identified for free choice indefinites in other common languages. They are also at least marginally acceptable with certain non-monotonic operators that may preserve episodicity, such as polar questions. Whenever the free choice indefinite is compatible with episodicity in the semantic environment, it loses its free choice reading and instead takes on a low interest or low value reading, which may just constitute non-negated indiscriminacy.

### 5.3 **The focus particle *va***

Indiscriminatives and free choice indefinites in Cuevas Mixtec have so far been shown to be very similar in their structure, distributions, and meaning contributions. Both feature indiscriminative readings under negation and free choice readings in licensing environments, while free choice indefinites also feature expanded distributions in canonical argument po-

sitions without negation. Since these two items differ structurally only in the presence or absence of the *va* particle, it seems that the particle is the source for the capacity for free choice readings in canonical argument positions. This section considers the meaning contribution of the *va* particle to better understand its role in the accommodation of free choice readings in canonical argument positions and, ultimately, the derivation of free choice indefinites from indiscriminatives. It starts by discussing the distribution of the particle, which attaches to various classes of words, but not phrases. It then covers the polysemy of the particle, which includes an aspectual sense in the verbal domain and a concessive sense in the nominal domain, similar to English *still*. The section ends with two senses of *va* that more closely resemble the meaning contribution of exclusive particles. The particle sometimes contributes a restrictive reading or a minimal sufficiency reading. This capacity may be the factor contributing to the derivation of free choice indefinites from indiscriminatives.

### 5.3.1 *Distribution of the particle*

The particle *va* is a focus particle, which is to say that it performs a discourse function related to focus. It modifies words and marks them as presenting novel information, similar to focus particles in other languages, like English *just* and *even*. Unlike focus particles in English, *va* seems only capable of modifying words, and not larger phrases. Among the classes of words that it may modify are nouns, quantifiers, verbs, and adjectives.

#### Marking focus value

Within the noun phrase, *va* may attach to nouns and quantifiers. The choice of modified item determines the focus meaning that is conveyed. Example (244) below contrasts two near identical sentences, differing in the placement of *va* on either a numeral *iin* ‘one’ or a noun *kárró* ‘car’.

- (244) a. [tyà        juáàn], ìsyiin        ra        [iin **va** kárró]  
           the.SG.M Juan    buy.COMPL 3SG.M one FOC car

‘As for Juan, he still bought ONE car.’

- b. [tyà juáàn], ìsyiin ra [iin kárró va]  
the.SG.M Juan buy.COMPL 3SG.M one car FOC  
‘As for Juan, he still bought a CAR.’

In example (244a) above, *va* attaches to the numeral *iin* to indicate that the number of cars bought by Juan is novel information. In example (244b) above, *va* instead attaches to the noun *kárró* to mark the car itself that Juan bought as the novel information.

### Restriction to words

While *va* is able to modify words, it cannot modify phrases, e.g., full sentences. There are also some word classes that the particle is unable to modify, such as clitic pronouns. Example (245) below is a demonstration of these two restrictions with two similar sentences. Sentence (245a) presents a case where *va* is attached to a proper noun, while sentence (245b) is a misapplication of *va* to a sentence with a pronominal subject *ra*.

- (245) a. ìndakava [tyà juáàn va]  
fall.COMPL the.SG.M Juan FOC  
‘It’s just that Juan fell.’
- b. \* [ìndakava ra] va  
fall.COMPL 3SG.M FOC  
(‘It’s just that he fell.’)

In sentence (245a), *va* is placed at the end of the sentence after the noun subject. It may appear ambiguous as to whether *va* is attached to the noun or the entire sentence itself, but the unacceptable sentence (245b) clarifies the internal structure. The unacceptability of *va* at the end of the bad sentence shows that *va* does not attach to the pronoun *ra*, nor does it attach at the sentence level.

### 5.3.2 Basic senses

The focus particle *va* is polysemous between several distinct senses that are not obviously related, although this is typical of similar focus particles encountered in other languages. Among the more common senses of *va* are its aspectual and concessive senses, which correspond to the aspectual and concessive senses of English *still* (Ippolito, 2004, 2007) and *anymore*.

#### The aspectual sense

Like English aspectual *still*, aspectual *va* attaches to verbs and adjectival predicates to express that the denoted event or state is ongoing since a previous time. In the examples (246) below, *va* is attached to the verb *syítasyà'á* ‘dancing’ inflected for the imperfective. The examples are similar except that the second example features negation.

- (246) a. syítasyà'á **va** ra  
dance.IPFV FOC 3SG.M  
‘He is still dancing.’
- b. **kòó** syítasyà'á **va** ra  
NEG dance.IPFV FOC 3SG.M  
‘He is not dancing anymore.’

Both the positive and negative versions of this sentence express that the man being discussed was dancing at a previous time, regardless of whether he has stopped or continued. This shows that the meaning contribution of *va* on verbs is a presupposition about the sentence’s truth value at a time before the time of utterance, similar to the presuppositions of English *still* and *anymore*.

Results for verbs are replicable for adjectival predicates. In example (247) below, two individuals, Juan and Maria, are compared in height, and the particle *va* attaches to the adjectival predicate *súkún* ‘tall(er)’. The two sentences differ only in that the second one features negation.

- (247) a. *súkún va* [tyà juáàn] [nùù ñá mária]  
 tall.(er) FOC the.SG.M Juan to the.F Maria  
 ‘Juan is still taller than Maria.’
- b. *kòó súkún va* [tyà juáàn] [nùù ñá mária]  
 NEG tall.(er) FOC the.SG.M Juan to the.F Maria  
 ‘Juan is not taller than Maria anymore.’

In (247a), *va* adds that not only is Juan taller than Maria at the time of utterance, but also some time before. Example (247b) shows that the inference that Juan was taller than Maria before is in fact a presupposition. With negation, it asserts that Juan is not taller than Maria, although he used to be taller than her. As such, *va* appears to contribute a presupposition that the content of the predicate without negations was true at a previous time.

### The concessive sense

While attached to nouns and quantifiers, *va* instead takes on a concessive sense, indicating that the resulting assertion is true in spite of speakers’ expectations of the contrary. In example (248) below, *va* attaches to the quantifier *ndyi’i* ‘all’ to indicate that the resulting assertion is marginally true, or true despite expectations that it would be false.

- (248) *Context:* There is a catastrophe with expected casualties, but obstacles reduce the likelihood of total annihilation of a group.

[ndyi’i **va** na] ìsyì’ì  
 all FOC 3.HUM die.COMPL

‘Still all of them died. (We were hoping for fewer deaths, more survivors.)’

Above, *va* marks the sentence as being true despite speakers’ beliefs that it should not be true given other information. The speaker had information that reduces the likelihood of the sentence being true, perhaps knowledge that there were some measure taken to reduce casualties in the catastrophe. The sentence is a concession that the entire group perished

despite speakers' expectations. The particle also specifically marks the quantifier *ndyi'i* 'all' as providing the novel information, where speaker knowledge would have predicted that not all of the group would perish.

### 5.3.3 Other senses

Beyond the aspectual and concessive senses of *va*, the particle also has some capacity for other senses often identified with exclusive particles. These include a restrictive sense, frequently identified as the prototypical meaning contribution of exclusive particles (Cohen, 1969; Lee, 1987, 1991; Kishner & Gibbs, 1996; Lindemann & Mauraanen, 2001; Grant, 2011), and a minimal sufficiency reading. Both of these senses suggest greater similarity with the English exclusive particle *just*, although they occur in narrower sets of contexts compared to the aspectual and concessive senses of *va*.

#### A restrictive sense

While modifying quantifiers associated with Horn scales, *va* sometimes displays a restrictive or exhaustive sense, as if it could be translated as English *just*. Example (249a) below shows *va* attached to a quantifier *sava* 'half' in a sentence describing the unfortunate passing of some members of a group of people. A follow up sentence (249b) infelicitously adds an detail to the description.

- (249) a. [sava **va** nà yivi] ìsyì`ì  
 half FOC the.HUM people die.COMPL  
 'Just half of the people died.'
- b. # tya [ndyi'i nà yivi] ìsyì`ì  
 and all the.HUM people die.COMPL  
 '... and all of the people died.'

(249a) says that half of the group died, while the follow up (249b) says that a larger amount of the group died. These sentences would normally be compatible, but *va* occurs on the

quantifier *sava* ‘half’ and seems to contribute an exhaustive reading to it. The occurrence of *va* would then indicate that the number of people that died was no larger than half the group. This would contradict the follow up sentence that more than half of the group died, creating a bizarre pairing of sentences.

On the other hand, this restrictive sense of *va* seems to come about only from the explicit comparison of items associated with Horn scales, e.g., *half* versus *all*. The same result does not obtain for nominal expressions not associated with Horn scales. In example (250a) below, *va* attaches to the expression *tyà tyàa* ‘the man’ in a sentence describing the people that died in some event. A follow up sentence (250b) felicitously adds that a woman died as well.

- (250) a. [tyà        tyàa **va**] ìsyì`ì  
           the.SG.M man FOC die.COMPL  
           ‘Still, the man died.’
- b. tya [ñá     ña`à] ìsyì`ì  
           and the.F woman die.COMPL  
           ‘... and the woman died.’

Normally, an exclusive particle would add an exhaustive interpretation on the modified noun, and (250a) would say that only the man died. However, the compatibility of (250a) with the follow up sentence (250b) indicates that there is no exhaustive meaning conveyed here.

Further evidence that *va* is not inherently restrictive comes from its interaction with negation. The particle does not behave at all like an exclusive particle under negation, which would create an assertion that some stronger propositional alternative to the non-negated prejacent is true. Instead, the particle *va* does not seem to interact with negation at all. Example (251) below provides two sentences expressing the quantity of people that died in some catastrophe. The particle *va* occurs under negation in the first sentence.

- (251) a. **kòní** ìsyì`ì        [sava **va**    nà        yivi]  
           NEG die.COMPL half FOC the.HUM people  
           ‘It’s not that half of the people still died.’
- b. tya [nì    iin    nà        yivi] ìsyì`ì  
           and not one the.HUM people die.COMPL

‘... and none of them died.’

(251a) says that half of the people did not die and (251b) says that not even one person died. This is an odd result if *va* were an exclusive particle, since the expected entailment from the first sentence would be the stronger assertion that more than half of the population died, conflicting with the second sentence. Instead, the meaning of (251a) is only that half of some population did not die, which is compatible with the assertion of the follow up sentence (251b) after *tya*, saying that no one died after all. Therefore, even with lexical items associated with Horn scales, *va* does not always bear a restrictive sense.

### The minimal sufficiency sense

In addition to an occasional restrictive sense, *va* even follows English *just* in having a minimal sufficiency sense, in which it explicates that a minimal sufficiency evaluation has occurred. In order for this sense to come about, *va* must attach to a word associated with the appropriate scale, i.e., the scale by which sufficiency for satisfaction of the main predicate is evaluated. Example (252) below contrasts two sentences that are nearly identical, except that the placement of *va* differs, resulting in a minimal sufficiency reading for one sentence.

- (252) a. [ùvì nà        tyàa **va**] kuvi kani'i    mésá  
          two the.HUM men FOC can lift.IRR table  
          ‘Still, two men can lift the table.’
- b. [ùvì **va** nà        tyàa] kuvi kani'i    mésá  
          two FOC the.HUM men can lift.IRR table  
          ‘As little as two men can lift the table.’

In (252a), *va* is attached to *tyàa* ‘man’, resulting in only a concessive reading. In (252b), *va* is attached to *ùvì* ‘one’, resulting in a minimal sufficiency reading. The minimal sufficiency reading comes about because the numeral *ùvì* ‘two’ is naturally associated with a quantity scale, which also happens to be the scale by which sufficiency of the predicate ‘can lift the

table’ is evaluated. The higher the quantity of men for lifting a table, the more strength there is for the capacity to lift the table.

The particle *va* need not apply to a word associated with a Horn scale for attaining the minimal sufficiency sense. Content words may also be modified by *va* for a minimal sufficiency evaluation, so long as they are associated with the scale by which sufficiency for satisfaction of the main predicate is evaluated. In Example (253) below, *va* attaches to the content noun *tyìkuùí* ‘water’ and indicates a minimal sufficiency reading.

- (253) [syí’ín tyìkuùí **va**] chítú            ì  
           with water FOC fill.up.IPFV 1SG  
           ‘I get full just with water.’

Here, the predicate ‘I get full with’ implies a scale of consumables that vary in their ability to satisfy a hungry person. Water may be considered among those items with the weakest capacity for satisfying a person’s hunger. With the attachment of *va* on *tyìkuùí* ‘water’, a minimal sufficiency evaluation is explicated, indicating that water is indeed enough to satisfy the speaker’s hunger.

### 5.3.4 Summary

The focus particle *va* is a polysemous item with a fairly broad distribution. It may attach to a large variety of words, including verbs, nouns, quantifiers, and adjectival predicates, but it does not attach to phrases. The senses that it seems to display most frequently are its aspectual and concessive senses, which resemble those of English *still*. The aspectual sense expresses that the denoted event or state is ongoing since a previous time. The concessive sense expresses that the resulting assertion is true in spite of speakers’ expectations of the contrary. Besides these primary senses, *va* also has a restrictive sense and a minimal sufficiency sense that come about in a narrower set of contexts. The restrictive sense applies an exhaustive interpretation on the modified item. The minimal sufficiency sense is an explication that a minimal sufficiency evaluation has been applied, and inferential strength reversal

is induced.

## 5.4 Conclusion

This chapter covered the internal structures, distributions, and interpretations of both indiscriminatives and free choice indefinites in Cuevas Mixtec. Indiscriminatives were shown to be formed by a simple or complex *wh*-word combined with a verb base *kuu*. They are licensed only under two conditions: under negation, where they have indiscriminative interpretations, and in a preverbal position where they have free choice readings. Free choice indefinites were shown to have the same internal structure while also attaching the focus particle *va*. Free choice indefinites also have the same interpretations as indiscriminatives in the same environments, but they also display expanded distributions in typical licensing environments for free choice indefinites. In their expanded licensing environments, they predictably have free choice readings. The particle itself was shown to be polysemous between various aspectual and concessive senses shared with the English particle *still*, as well as some additional exclusive and minimal sufficiency senses shared with the English particle *just*.

The data presented here suggests a derivational relationship between the two classes of indefinite, where free choice indefinites are derived from indiscriminatives through the particle *va*. In particular, the fact that the two indefinite classes are structurally similar, and have identical interpretations in the same environments, supports the claim of a derivational relationship. The fact that the attachment of the particle *va* only expands distribution to typical licensing environments for free choice indefinites, with typical free choice readings, supports the claim that the derivational relationship is from indiscriminatives to free choice indefinites. Finally, the capacity of the particle *va* for explicating minimal sufficiency readings should further support the claim that *va* is directly involved in the derivational process between the two indefinite classes, given the information provided in previous chapters. Minimal sufficiency evaluation was previously shown to be responsible for free choice readings on a variety of lexical items, including other indefinite classes. The next and final

chapter considers the data presented here and formulates an analysis of how Cuevas Mixtec indiscriminatives can acquire free choice readings after minimal sufficiency evaluation.

## CHAPTER 6

### FREE CHOICE INDEFINITES FROM INDISCRIMINATIVES

The previous chapter argued for the existence of a derivational relationship between free choice indefinites and indiscriminatives in Cuevas Mixtec, such that the former is grammatically derived from the latter. This final chapter moves on to the ultimate purpose of the dissertation: to provide a general semantics of indiscriminatives that predicts their derivability into free choice indefinites, using the tools that have been developed thus far. The introductory chapter already spelled out the basic elements of the proposal, which involve existential quantification, the activation of subdomain alternatives, minimal sufficiency evaluation, and exclusive meaning. Chapter 4 also already motivated a particular implementation of the proposal for English *just any*. What remains to be shown then is how this model holds up against data on indiscriminatives in other languages, which may not themselves be derived from other polarity sensitive indefinites like bare *any*. Unlike English *just any*, indiscriminatives in many other languages, like French and Cuevas Mixtec, are morpho-syntactically composed of items that do not clearly contribute the essential ingredients for polarity sensitivity and indiscriminacy. Nevertheless, they inherently satisfy the basic criteria for indiscriminative status and bear some derivational relationship with free choice indefinites. This similarity among indiscriminatives across languages suggests the potential to successfully implement a semantic model using the same semantic ingredients, perhaps with some reorganization to derive subtle differences across languages. The data from Cuevas Mixtec provides a guide for how these distinct reorganizations of the semantic ingredients could manifest in other languages.

Although Cuevas Mixtec indiscriminatives are distinct from *just any* in lacking explicit modifiers to contribute the exclusive meaning component, they resemble other indiscriminatives in this way. Indiscriminatives of the Italian *qualunque* and French *n'importe* paradigms also lack overt exclusive particles, as observed in examples (254) and (255), respectively.

- (254) No, non legge **qualunque** libro. Per esempio, odia la saggistica politica  
No not read any book for example hates the essay political  
'No, he doesn't read ANY book. For example, he hates political essays.'

(Chierchia, 2013, 341)

- (255) Ce n'est pas **n'importe quelle** théorie  
it is not not.matter which theory  
'It is not just any theory.'

(Jayez & Tovena, 2005, 59)

These indiscriminatives are also not derived from other polarity sensitive indefinites and display derivational relationships with free choice indefinites. The major difference with Cuevas Mixtec indiscriminatives is that they more clearly serve as the lexical base for constructing free choice indefinites, with the *va* particle contributing free choice indefinite status in some manner. The direction of derivation is otherwise unclear for Italian and French indiscriminatives and free choice indefinites, but if these items are similar enough to Cuevas Mixtec free choice indefinites in their meaning contribution and distributions, that should guide researchers towards a unifying account of some sort. This would mean that, even in French and Italian, free choice indefinites are derived from indiscriminatives, if only because such a view would cover the most data.

This idea that indiscriminatives across languages are grammatically derivable into their free choice indefinite counterparts, rather than the reverse direction of derivation, is the intended argument of this work. Unfortunately, a full survey and analysis of the derivational relationships between indiscriminatives and free choice indefinites across languages is beyond its scope. Instead, this chapter concentrates on Cuevas Mixtec indiscriminatives, which are taken to be exemplary of the non-decomposable type of indiscriminative frequently identified in the literature. The details of this account are then briefly shown to apply to other languages and provide some explanation of the derivational relationship between their indiscriminatives and free choice indefinites, a feature which has otherwise not been given

thorough attention before. The rest of the chapter is as follows. §6.1 is the proposal for the semantics of Cuevas Mixtec indiscriminatives. The proposal is simple in that the same semantic ingredients of existential quantification, the activation of subdomain alternatives, and exclusive meaning are applied. The key difference is that the Cuevas Mixtec indiscriminatives are quantifiers with the exclusive meaning component already embedded within their denotation. §6.2 argues for the advantage of the Cuevas Mixtec analysis in its crosslinguistic applicability and explanation of indiscriminative readings, in contrast to competing accounts of free choice indefinites. It provides tentative denotations for some free choice indefinites in French and Greek based on Cuevas Mixtec model. They differ from the Cuevas Mixtec model in the inherent encoding of either exclusive meaning or minimal sufficiency evaluation. Also, Chierchia's (2013) account is reviewed and compared with the Cuevas Mixtec analysis of this work, and several disadvantages of that account are outlined. §6.3 concludes the chapter with a summary of results.

## 6.1 Modelling Cuevas Mixtec indefinites

With a compositional semantics of indiscriminative *just any* spelled out, this section completes the mission of the dissertation by proposing a semantics of true indiscriminatives and their derivability into free choice indefinites. Cuevas Mixtec indiscriminatives are inherently indiscriminative, unlike English *just any*, which is composed from independent lexemes. Still, they bear the same indiscriminative meaning contribution, and they are both capable of free choice readings. As such, the semantic analysis for *just any* should carry over to a proper analysis of Cuevas Mixtec indiscriminative semantics, and indiscriminative semantics more broadly. This section goes into further detail on how exactly the analysis of *just any* carries over. It first proposes a basic internal syntax and compositional semantics, and then it shows how the semantic model cashes out the polarity sensitivity and characteristic meaning contribution of Cuevas Mixtec indiscriminatives. The section notes some minor differences in the denotation of these indiscriminatives compared to English *just any*, resulting in a similar,

but not identical, denotation. The section ends with a demonstration of the application of minimal sufficiency evaluation, as triggered by *va*, so as to derive the free choice indefinites of Cuevas Mixtec.

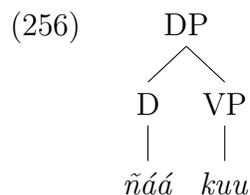
### 6.1.1 *Modelling indiscriminatives*

Unlike English *just any*, Cuevas Mixtec indiscriminatives are not internally composed of any material to which their characteristic meaning contribution may be sourced, such as exclusive particles. Rather, Chapter 5 discussed how these indiscriminatives are composed of a *wh*-word and a verbal base, neither of which displays polarity sensitive behavior alone, nor any explicit exclusive marking. Regardless, Cuevas Mixtec indiscriminatives display the same meaning contribution as other indiscriminatives, and are even capable of free choice readings by attachment of *va* or placement in a preverbal position within the sentence. This indicates that they should be semantically decomposable into all the familiar semantic units: existential quantification, the activation of subdomain alternatives, and an exclusive meaning component. However, the way that these semantic units are combined is slightly different from how they combine within the denotation of English *just any*. Unlike with *just any*, the exclusive meaning component for Cuevas Mixtec indiscriminatives is further embedded in the denotation. This small difference allows for a more fluid conversion into free choice indefinites.

#### Internal syntax

For defining the internal structure of Cuevas Mixtec indiscriminatives, this work relies on evidence for the nounhood of indiscriminatives and free choice indefinites as a starting point. Recall that indiscriminatives and free choice indefinites in Cuevas Mixtec bear a strong resemblance to free relative clauses. Free relative clauses have been proposed to be of syntactic category CP (Caponigro, 2003). However, these items may themselves be modified by relative clauses, supporting their grammatical status as nouns, with syntactic category DP. This

work then proposes an internal structure of indiscriminatives as in (256) below.



Here, the internal structure of Cuevas Mixtec indiscriminatives are analyzed as the combination of a wh-word of category D which selects for a VP. The VP itself is the verbal base. The verbal base is typically *kuu*, but might also take on the form of other potential bases considered in Chapter 5.

### Indiscriminative semantics

With the proposed internal syntactic structure in mind, the compositional semantics for building the indiscriminative can be defined. There are many ways to divide up the semantic ingredients to indiscriminative meaning among the denotations of the indiscriminative's morphological subcomponents. Unfortunately, there is not much useful evidence to argue for one approach versus another. Below in (257-258) is a proposal of the semantics of the lexical subcomponents of an indiscriminative, mostly arbitrarily formulated.

$$\begin{aligned}
 (257) \quad \llbracket kuu \rrbracket^S &= \lambda R_{\langle e,p \rangle} \lambda Q_{\langle \langle \langle e,p \rangle, p \rangle, p \rangle} \lambda w_s \\
 &: \exists X_{\langle e,p \rangle} >_D R[Q(\lambda P_{\langle e,p \rangle} \lambda w_s. \exists x_e [X(x, w) \wedge P(x, w)], w)] \\
 &\quad .Q(\lambda P_{\langle e,p \rangle} \lambda w_s. \text{ONLY}_D(\lambda w_s. \exists x_e [R(x, w) \wedge P(x, w)], w), w)
 \end{aligned}$$

$$(258) \quad \llbracket \tilde{n}\acute{a}\acute{a} \rrbracket^S = \lambda x_e \lambda w_s. \text{THING}(x, w)$$

Here, the verbal base in (257) carries the bulk of the semantic components necessary for composing indiscriminative meaning, while the wh-word in (258) only contributes the nominal restriction. These items compose together to form an indiscriminative *náá kuu* in (259), a quantifier with a very similar semantics to the proposed semantics of indiscriminative English *just anything*.

- (259)  $\llbracket \tilde{n}\acute{a}\acute{a} \text{ kuu} \rrbracket^S =$
- a.  $\llbracket \text{kuu} \rrbracket^S(\llbracket \tilde{n}\acute{a}\acute{a} \rrbracket^S)$
  - b.  $\lambda Q_{\langle \langle \langle e,p \rangle, p \rangle, p \rangle} \lambda w_s : \exists X_{\langle e,p \rangle} >_D \text{THING}[Q(\lambda P_{\langle e,p \rangle} \lambda w_s . \exists x_e [X(x, w) \wedge P(x, w)], w)]$   
 $.Q(\lambda P_{\langle e,p \rangle} \lambda w_s . \text{ONLY}_D(\lambda w_s . \exists x_e [\text{THING}(x, w) \wedge P(x, w)], w), w)$

Like *just anything*,  $\tilde{n}\acute{a}\acute{a} \text{ kuu}$  denotes an existential quantifier with an exclusive operator that activates subdomain alternatives. It even takes a predicate of quantifiers as an argument. The only difference with *just any* is in the location of the operator  $\text{ONLY}_D$ , which is now further embedded within the assertion and takes narrow scope with respect to the predicate of quantifiers variable.

## Polarity sensitivity

Deriving polarity sensitivity with Cuevas Mixtec indiscriminatives proceeds exactly as it would with English *just any*. In typical episodic statements, their weak assertion is infelicitously contrasted with a stronger presupposition, producing unacceptability. The more deeply embedded exclusive operator does not contribute much beyond reinforcement of the scalar relationship between the assertion and presupposition. Consider the same episodic predicate of quantifiers in (260) as before.

$$(260) \quad \llbracket \text{Max heard } x. \rrbracket^S = \lambda X_{\langle \langle \langle e,p \rangle, p \rangle, p \rangle} \lambda w_s . X(\lambda x_e \lambda w_s . \text{HEAR}(m, x, w), w)$$

By combining with this predicate,  $\tilde{n}\acute{a}\acute{a} \text{ kuu}$  yields the unacceptable statement in (261) below.

$$(261) \quad \llbracket \text{Max heard } \tilde{n}\acute{a}\acute{a} \text{ kuu.} \rrbracket^S =$$

- a.  $\llbracket \tilde{n}\acute{a}\acute{a} \text{ kuu} \rrbracket^S(\llbracket \text{Max heard } x. \rrbracket^S)$
- b.  $\lambda w_s : \exists X_{\langle e,p \rangle} >_D \text{THING}[\exists x_e [X(x, w) \wedge \text{HEAR}(m, x, w)]]$   
 $.\text{ONLY}_D(\lambda w_s . \exists x_e [\text{THING}(x, w) \wedge \text{HEAR}(m, x, w)], w)$

The resulting assertion and presupposition are exactly the same as if the predicate were combined with English *just anything* instead of  $\tilde{n}\acute{a}\acute{a} \text{ kuu}$ . The assertion says that the proposition *Max heard some thing* is the strongest true proposition, while the presupposition says

that another stronger proposition about a more specific thing is also true. There is, again, a contradiction between the assertion and presupposition, but infelicity is already derived from a weaker assertion being paired with a stronger presupposition.

## Negation

Negation, as before, allows the indiscriminative to be licensed, and for the same reason. Negating the indiscriminative adds negation to the weak assertion, undoing the potential conflict between it and the stronger presupposition. Consider a case of non-clausemate negation, modelled as a function from propositions to propositions in (262) below.

$$(262) \quad \llbracket \text{It is not the case that} \rrbracket^S = \lambda p_p \lambda w_s. \neg p(w)$$

This non-clausemate negator may take an episodic statement with a Cuevas Mixtec indiscriminative as an argument. Below in (263) is an example of non-clausemate negation on the positive episodic statement *Max heard ñáá kuu* from before.

$$(263) \quad \llbracket \text{It is not the case that Max heard ñáá kuu.} \rrbracket^S =$$

- a.  $\llbracket \text{It is not the case that} \rrbracket^S (\llbracket \text{Max heard ñáá kuu.} \rrbracket^S)$
- b.  $\lambda w_s : \exists X_{\langle e,p \rangle} >_D \text{THING}[\exists x_e [X(x, w) \wedge \text{HEAR}(m, x, w)]]$   
 $\quad . \neg \text{ONLY}_D (\lambda w_s. \exists x_e [\text{THING}(x, w) \wedge \text{HEAR}(m, x, w)], w)$

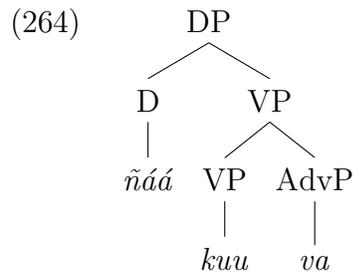
Here, negation on *Max heard ñáá kuu* produces an acceptable sentence. This is because the operator  $\text{ONLY}_D$  is negated, so that the activated subdomain alternatives are no longer asserted to be false. This makes the assertion compatible with the presupposition, and the resulting meaning is an inference that Max heard something more specific than *thing*. Therefore, both polarity sensitivity and the characteristic meaning of indiscriminacy are cashed out.

### 6.1.2 Modelling free choice indefinites

With Cuevas Mixtec indiscriminatives modelled, this section now turns to free choice indefinites and how they are derivable from indiscriminatives. Chapter 5 showed how free choice indefinites in Cuevas Mixtec were formed by attaching the particle *va* to an indiscriminative. This modification expanded the distribution of the indiscriminative, giving it a free choice reading in new semantic environments. Chapter 5 also showed that the particle *va* can explicate minimal sufficiency evaluation while attached to nouns and numerals. Taken altogether, it seems appropriate to model the semantics of *va* as simply the application of minimal sufficiency evaluation. This analysis then differs from that of English *just any* in that minimal sufficiency evaluation is sourced to an explicit morpheme and built into the meaning of the free choice indefinite, rather than into the semantic environment. However, the change of location for where minimal sufficiency evaluation is interpreted does not change the ultimate free choice interpretation.

#### Internal syntax

Cuevas Mixtec free choice indefinites are derived from indiscriminatives, so their internal structures should be similar. The only difference is the modification by the particle *va*, which does not seem to change the syntactic category of the indiscriminative. Therefore, free choice indefinites will be DPs, and an indefinite like *ñáá kuu va* ‘anything’ will have an internal structure as in (264).



Again, the *wh*-word is of category D and selects for a VP, the VP being the verbal base. What differs is the attachment of *va* to the VP as an adverb. This attachment site is

suggested over the other potential site of the DP due to evidence from free choice indefinites with verbal base *kúni* ‘want’. Free choice indefinites with verbal base *kúni* ‘want’ feature the particle *va* nestled in between the verb base and its pronominal argument, suggesting a lower attachment site.

## Deriving free choice indefinites

The exact semantic function of the particle *va* is uncertain because it is polysemous and fluctuates between various senses, including its aspectual sense and its sense as an explication of minimal sufficiency evaluation. Here, the particle will simply be analyzed as contributing minimal sufficiency evaluation itself. Example (265) provides the denotation for the particle, which is a function that applies minimal sufficiency evaluation to the indiscriminative first.

$$(265) \quad \llbracket \text{va} \rrbracket^G =$$

- a.  $\lambda K_{\langle \langle e,p \rangle, \langle \langle \langle e,p \rangle, p \rangle, p \rangle \rangle} \lambda R_{\langle e,p \rangle} \lambda Q_{\langle \langle \langle e,p \rangle, p \rangle, p \rangle} \lambda w_s$   
 $\quad \quad \quad .K(R, \lambda X_{\langle \langle e,p \rangle, p \rangle} \lambda w_s . \xi_G(Q, X, w), w)$
- b.  $\lambda K_{\langle \langle e,p \rangle, \langle \langle \langle e,p \rangle, p \rangle, p \rangle \rangle} \lambda R_{\langle e,p \rangle} \lambda Q_{\langle \langle \langle e,p \rangle, p \rangle, p \rangle} \lambda w_s$   
 $\quad \quad \quad .K(R, \lambda X_{\langle \langle e,p \rangle, p \rangle} \lambda w_s . \{d : X(\lambda x_e \lambda w_s . [d \geq \sigma_G(x, w)], w)\} \subset$   
 $\quad \quad \quad \{d : Q(\lambda P_{\langle e,p \rangle} \lambda w_s . [X(\lambda x_e \lambda w_s . [P(x, w) \wedge d \geq \sigma_G(x, w)], w)], w)\}, w)$

As is shown above, *va* takes the complex semantic type of the verbal base as its first argument, and returns a new function that matches the semantic type of the verbal base. The verbal base itself is applied to several arguments, including a predicate of quantifiers that encodes the minimal sufficiency evaluation. After *va* modifies the verbal base *kuu* of the indiscriminative, it returns a new verbal base with denotation in (266).

$$(266) \quad \llbracket \text{kuu va} \rrbracket^G =$$

- a.  $\llbracket \text{va} \rrbracket^G(\llbracket \text{kuu} \rrbracket^G)$
- b.  $\lambda R_{\langle e,p \rangle} \lambda Q_{\langle \langle \langle e,p \rangle, p \rangle, p \rangle} \lambda w_s$   
 $\quad \quad \quad : \exists X_{\langle e,p \rangle} >_D R[\xi_G(Q, \lambda P_{\langle e,p \rangle} \lambda w_s . \exists x_e [X(x, w) \wedge P(x, w)], w)]$

$$\begin{aligned}
& \cdot \xi_G(Q, \lambda P_{\langle e,p \rangle} \lambda w_s \cdot \text{ONLY}_D(\lambda w_s \cdot \exists x_e [R(x, w) \wedge P(x, w)], w), w) \\
\text{c. } & \lambda R_{\langle e,p \rangle} \lambda Q_{\langle \langle \langle e,p \rangle, p \rangle, p \rangle} \lambda w_s \\
& : \exists X_{\langle e,p \rangle} >_D R \{d : \exists x_e [X(x, w) \wedge d \geq \sigma_G(x, w)]\} \subset \\
& \quad \{d : Q(\lambda P_{\langle e,p \rangle} \lambda w_s \cdot \exists x_e [X(x, w) \wedge P(x, w) \wedge d \geq \sigma_G(x, w)], w)\} \\
& \cdot \{d : \text{ONLY}_D(\lambda w_s \cdot \exists x_e [R(x, w) \wedge d \geq \sigma_G(x, w)], w)\} \subset \\
& \quad \{d : Q(\lambda P_{\langle e,p \rangle} \lambda w_s \cdot \text{ONLY}_D(\lambda w_s \cdot \exists x_e [R(x, w) \wedge P(x, w) \wedge d \geq \sigma_G(x, w)], w), w)\}
\end{aligned}$$

The result is a semantic function that takes a nominal restriction and returns a quantifier over predicates of quantifiers. Both the assertion and presupposition of the verbal base *kuu* now feature minimal sufficiency evaluations with existential quantifiers. The existential quantifiers in the assertion differs from those of the presupposition in that they are exhausted with the exclusive operator. After application on a wh-word that supplies the nominal restriction, like *ñáá* ‘what’, the free choice indefinite *ñáá kuu va* ‘anything’ is formed. Example (267) shows the final product of composing all the subcomponents of the free choice indefinite together.

$$\begin{aligned}
(267) \quad & \llbracket \text{ñáá kuu va} \rrbracket^G = \\
& \text{a. } \llbracket \text{va} \rrbracket^G (\llbracket \text{kuu} \rrbracket^G, \llbracket \text{ñáá} \rrbracket^G) \\
& \text{b. } \lambda Q_{\langle \langle \langle e,p \rangle, p \rangle, p \rangle} \lambda w_s \\
& \quad : \exists X_{\langle e,p \rangle} >_D \text{THING}[\xi_G(Q, \lambda P_{\langle e,p \rangle} \lambda w_s \cdot \exists x_e [X(x, w) \wedge P(x, w)], w)] \\
& \quad \cdot \xi_G(Q, \lambda P_{\langle e,p \rangle} \lambda w_s \cdot \text{ONLY}_D(\lambda w_s \cdot \exists x_e [\text{THING}(x, w) \wedge P(x, w)], w), w) \\
& \text{c. } \lambda Q_{\langle \langle \langle e,p \rangle, p \rangle, p \rangle} \lambda w_s : \exists X_{\langle e,p \rangle} >_D \text{THING}\{d : \exists x_e [X(x, w) \wedge d \geq \sigma_G(x, w)]\} \subset \\
& \quad \{d : Q(\lambda P_{\langle e,p \rangle} \lambda w_s \cdot \exists x_e [X(x, w) \wedge P(x, w) \wedge d \geq \sigma_G(x, w)], w)\} \\
& \quad \cdot \{d : \text{ONLY}_D(\lambda w_s \cdot \exists x_e [\text{THING}(x, w) \wedge d \geq \sigma_G(x, w)], w)\} \subset \\
& \quad \{d : Q(\lambda P_{\langle e,p \rangle} \lambda w_s \cdot \text{ONLY}_D(\lambda w_s \cdot \exists x_e [\text{THING}(x, w) \wedge P(x, w) \wedge d \geq \sigma_G(x, w)], w), w)\}
\end{aligned}$$

This denotation of *ñáá kuu va* ‘anything’ is a function that takes a predicate of quantifiers and returns a proposition. The existential quantifiers of the assertion and presupposition

receive their restrictions, which are *thing* for the assertion and something more specific than *thing* for the presupposition.

## Composing a sentence

Since *ñáá kuu va* ‘anything’ already encodes minimal sufficiency evaluation, it is not necessary for it to combine with a predicate that bears the  $\xi$  operator. It can simply apply to a regular predicate of quantifiers, so long as the  $\sigma_G$  operator occurs within the scope of a some logical operator in the degree set defining sufficiency conditions. For example, it can take a predicate of quantifiers like *Max can hear* as in (268).

$$(268) \quad \llbracket \text{Max can hear } x. \rrbracket^G = \lambda X_{\langle\langle e,p \rangle, p \rangle} \lambda w_s. \exists w'_s \in \text{ACC}(w) X(\lambda x_e \lambda w_s. \text{HEAR}(m, x, w), w')$$

Composition of the free choice indefinite *ñáá kuu va* ‘anything’ and the predicate of quantifiers *Max can hear* will then proceed as in (269).

$$(269) \quad \llbracket \text{Max can hear } \tilde{\text{ñáá kuu va}} \rrbracket^G =$$

- a.  $\llbracket \tilde{\text{ñáá kuu va}} \rrbracket^G (\llbracket \text{Max can hear } x. \rrbracket^G)$
- b.  $\lambda w_s : \exists X_{\langle e,p \rangle} >_D \text{THING} \{d : \exists x_e [X(x, w) \wedge d \geq \sigma_G(x, w)]\} \subset$   
 $\{d : \exists w'_s \in \text{ACC}(w) \exists x_e [X(x, w') \wedge \text{HEAR}(m, x, w') \wedge d \geq \sigma_G(x, w')]\}$   
 $\cdot \{d : \text{ONLY}_D(\lambda w_s. \exists x_e [\text{THING}(x, w) \wedge d \geq \sigma_G(x, w)], w)\} \subset \{d : \exists w'_s \in \text{ACC}(w)$   
 $\text{ONLY}_D(\lambda w_s. \exists x_e [\text{THING}(x, w) \wedge \text{HEAR}(m, x, w) \wedge d \geq \sigma_G(x, w)], w')\}$

The result is a proposition in which an exhaustified existential quantifier with restriction *thing* undergoes a minimal sufficiency evaluation for the predicate *Max can hear*. Its assertion says that the set of loudness degrees equal to or greater than those associated with individuals described only by *thing* is contained in the set of loudness degrees consistent with just a *thing* satisfying *Max can hear*. This would entail that something need only be a thing to be loud enough that Max can hear it. From this, there is also an inference that individuals with more specific descriptions are also loud enough that Max can hear them, cashing out

the free choice reading. The presupposition reinforces this inference from the assertion by making a similar but weaker proposition with a subdomain of *thing* and without exclusive operators.

This arrangement with the particle *va* contributing minimal sufficiency evaluation itself, instead of the predicate of quantifiers supplying it, has the advantage of providing some explanation of the distinct distributions displayed by Cuevas Mixtec indiscriminatives and free choice indefinites. Cuevas Mixtec indiscriminative distributions were more similar to those of negative polarity items, and required occurrence in a preverbal position to gain free choice readings, whereas free choice indefinites free occur in canonical argument positions, so long as they are licensed by the semantic environment. This difference could be explained by the general unavailability of minimal sufficiency evaluation without overt marking from focus particles or the preverbal position in the grammar of Cuevas Mixtec. Overt focus expressions like *va* would then be necessary for introducing minimal sufficiency evaluation overtly, creating the necessary inferential strength reversal to make the indiscriminative's assertion and presupposition compatible. Therefore, the need for overt application of minimal sufficiency with *va* would predict that Cuevas Mixtec indiscriminatives are more restricted in their distributions, while free choice indefinites are freer. This is a desirable prediction given the facts presented in Chapter 5.

### Some weaknesses of the account

The proposal laid out here captures the semantic derivation of free choice indefinites from indiscriminatives in Cuevas Mixtec, although it is not provided without some caveats. It fulfills its main purpose of explaining the semantic relationship between these two indefinite classes, and it may help to explain similar relationships between free choice indefinites and indiscriminatives in other languages. Still, there remain some details regarding the distribution of these items in Cuevas Mixtec that are left unaccounted for.

Recall that free choice indefinites can be interpreted under scope of negation with indis-

criminative readings. This case will be analyzed here as simply negated free choice, which is difficult to distinguish from the meaning of anti-indiscriminacy. For example, example (270) has negation applied to the sentence *Max can hear ñáá kuu va..*

$$\begin{aligned}
(270) \quad & \llbracket \text{It is not the case that Max can hear } \tilde{n}\acute{a}\acute{a} \text{ kuu va} \rrbracket^G = \\
& \text{a. } \llbracket \text{It is not the case that} \rrbracket^G (\llbracket \text{Max can hear } \tilde{n}\acute{a}\acute{a} \text{ kuu va} \rrbracket^G) \\
& \text{b. } \lambda w_s : \exists X_{\langle e,p \rangle} >_D \text{THING} \{d : \exists x_e [X(x, w) \wedge d \geq \sigma_G(x, w)]\} \subset \\
& \quad \{d : \exists w'_s \in \text{ACC}(w) \exists x_e [X(x, w') \wedge \text{HEAR}(m, x, w') \wedge d \geq \sigma_G(x, w')]\} \\
& \quad \cdot \neg \{d : \text{ONLY}_D(\lambda w_s. \exists x_e [\text{THING}(x, w) \wedge d \geq \sigma_G(x, w)], w)\} \subset \{d : \exists w'_s \in \text{ACC}(w) \\
& \quad \text{ONLY}_D(\lambda w_s. \exists x_e [\text{THING}(x, w) \wedge \text{HEAR}(m, x, w) \wedge d \geq \sigma_G(x, w)], w')\}
\end{aligned}$$

The sentence is hardly any different from the non-negated version, differing only in the presence of negation on the assertion. The negated assertion says that not all loudness degrees associated with individuals described only by *thing* are contained in the set of loudness degrees consistent with a *thing* satisfying *Max can hear*. This entails that it is not the case that something need only be a thing to be loud enough that Max can hear it. This is actually a very desirable result. However, Cuevas Mixtec free choice indefinites are also licensed by negation in episodic statements. In episodic statements, there are no appropriate logical operators for binding the world variable of the  $\sigma_G$  operator, and minimal sufficiency evaluation should probably not be applicable at all. Even if negation were to somehow license a minimal sufficiency evaluation in the assertion, there would still be a non-negated minimal sufficiency evaluation in the presupposition. Perhaps this can be avoided by preventing a minimal sufficiency evaluation in the presupposition in the first place.

Furthermore, recall that Cuevas Mixtec indiscriminatives seem to be barred from the subject position of a sentence, as well as in imperatives. In order to express the meaning of indiscriminacy, or something approximate to it, the free choice indefinite must be used. It is unclear how the model can be easily adjusted to also explain these phenomena. Surely, in order to explain these constraints, a much deeper investigation into Cuevas Mixtec grammar and the formal properties of these semantic environments is needed. On the other hand,

what this section has succeeded with is a very general model of the derivation of a free choice indefinite from an indiscriminative, which may already be applied to indefinites in other languages.

### 6.1.3 Summary

This section completed the account of the derivational relationship between indiscriminatives and free choice indefinites in Cuevas Mixtec. Indiscriminatives were syntactically defined as items of category DP, with the *wh*-word selecting for a verbal base of category VP. The internal components of the indiscriminatives were given semantic denotations that compose to provide the same semantic units proposed for indiscriminative *just any*: existential quantification, the activation of subdomain alternatives, and an exclusive meaning component. These semantic units are reorganized slightly, yet still provided the same meaning contribution and polarity sensitivity as predicted for English *just any* after composition. The particle *va* was analyzed as an adverb that attaches to the verbal base and acts as an explicit marker for the application of minimal sufficiency evaluation. By attaching to the indiscriminative, which denotes an existential quantifier activating subdomain alternatives, the indiscriminative satisfies the criteria for conversion into a free choice indefinite. The model misses some idiosyncratic details of the grammar of Cuevas Mixtec indiscriminatives and free choice indefinites, but it captures their general semantic and distributional properties, which may easily be transferred to analyses of similar items in other languages.

## 6.2 Advantages of the analysis

The proposal of the semantics of Cuevas Mixtec indiscriminatives and free choice indefinites is really more intended to provide a general semantic model of these items as they occur across languages. Since indiscriminatives and free choice indefinites have similar meaning contributions across languages, and their derivational association is also very frequent, the

Cuevas Mixtec analysis should be expected to carry over in some manner. This section considers the explanatory adequacy of the Cuevas Mixtec analysis by suggesting very brief and preliminary analyses of free choice indefinites in other languages using the same ingredients. Some examples from French and Greek are considered, and the analysis is suggested to transfer fairly easily. Free choice indefinites in French and Greek are not identical to Cuevas Mixtec free choice indefinites in their properties, but their differences are minor and are proposed to be easily accounted for by simply reorganizing the ingredients of minimal sufficiency evaluation and the exclusive meaning component. The account is then compared with one of the more circulated competing accounts for the semantics of free choice indefinites, which is Chierchia's (2013). The basics of this account are reviewed and examined, with particular attention to major points of difference and disadvantages against the Cuevas Mixtec analysis.

### 6.2.1 *Free choice indefinites in other languages*

The semantic account of Cuevas Mixtec indiscriminatives and free choice indefinites is only a particular application of the broader account of these indefinite classes across languages that was briefly proposed in Chapter 1. This broader account says that polarity sensitive indefinites can be characterized by the presence of two features, existential quantification and the activation of subdomain alternatives, for generating stronger presupposition against weaker assertions. Indiscriminatives and free choice indefinites are further characterized by featuring one of two non-mutually exclusive properties. Indiscriminatives bear an exclusive operator for contrasting a prejacent with propositional alternatives with respect to truth value, while free choice indefinites feature a minimal sufficiency evaluation for creating inferential strength reversal. These four ingredients are constant in the construction of indiscriminatives, free choice indefinites, and their derivational relationship across languages. However, individual languages may differ in the organization and composition of these ingredients for their own items. English *just any* has explicit marking for the incorporation

of the exclusive meaning component, while minimal sufficiency evaluation is added from the semantic environment. Cuevas Mixtec indiscriminatives have an inherent exclusive meaning component and an explicit marker for the incorporation of the minimal sufficiency evaluation. Further variation in the organization of these ingredients is possible, and this is suggested for free choice indefinites in other languages.

### False free choice indefinites

Unlike Cuevas Mixtec indiscriminatives, indiscriminatives in French, Spanish, Italian, and many other commonly studied languages do not display overt morpho-syntactic modification in the derivation of free choice indefinites. Indiscriminatives and free choice indefinites look fairly identical, so it is difficult to determine what the direction of derivation is between them. Semanticists and other linguists tend to assume that the indiscriminative is the derived indefinite, often because the indiscriminative is indicated by certain forms of suprasegmental focus marking, such as emphatic stress or other forms of prosodic prominence. However, Haspelmath (1997, 48) noted that free choice indefinites also tend to host prosodic prominence of some sort across languages. It is therefore very tricky to establish whether free choice indefinites are derived from indiscriminatives, or whether it is the reverse derivational relationship, just by looking at examples where the two appear identical.

Perhaps the best we can do is go the route of Occam's Razor and apply the Cuevas Mixtec analysis to such cases. In such an application of this analysis, indiscriminatives like those of the French *n'importe* paradigm would have the same denotation as Cuevas Mixtec indiscriminatives. Example (271) below presents a denotation of the French free choice marker *n'importe*, which matches the denotation of the verbal base for Cuevas Mixtec indiscriminatives.

$$\begin{aligned}
 (271) \quad \llbracket n'importe \rrbracket^S &= \lambda R_{\langle e,p \rangle} \lambda Q_{\langle \langle \langle e,p \rangle, p \rangle, p \rangle} \lambda w_s \\
 &: \exists X_{\langle e,p \rangle} >_D R[Q(\lambda P_{\langle e,p \rangle} \lambda w_s. \exists x_e [X(x, w) \wedge P(x, w)], w)] \\
 &\quad .Q(\lambda P_{\langle e,p \rangle} \lambda w_s. \text{ONLY}_D(\lambda w_s. \exists x_e [R(x, w) \wedge P(x, w)], w), w)
 \end{aligned}$$

Here we have the same ingredients for composing a Cuevas Mixtec indiscriminative: existential quantification, the activation of subdomain alternatives, and the exclusive meaning component. The ingredients are even arranged in the same manner. What is lacking is an explicit marker for supplying minimal sufficiency evaluation. However, such an item in French could simply be unnecessary. The difference from Cuevas Mixtec would then be that, in French, there is no additional focus particle needed to contribute the minimal sufficiency evaluation. Instead, French has the  $\xi$  operator compose with predicates of quantifiers as a silent morpheme, and the indiscriminative takes the modified predicate as an argument, just as in the case of English *any*. This approach should capture the basic facts, including licensing both free choice and indiscriminative readings. As the only proposal of free choice indefinites to also capture indiscriminative readings, the Cuevas Mixtec analysis has the advantage of descriptive adequacy, and perhaps it reveals that these free choice indefinites are better analyzed as indiscriminatives.

### True free choice indefinites in Greek

There is at least one potential counterexample to the explanatory adequacy of the Cuevas Mixtec analysis for free choice indefinites in other languages. Recall that Modern Greek free choice indefinites of the *-dhipote* paradigm lack indiscriminative readings, and are unacceptable under scope of negation with any reading. Example (272) is repeated below from Chapter 1.

- (272) \*I Roxani **dhen** idhe **otidhipote**  
 the Roxanne not see.3SG FCI.thing  
 ('Roxanne didn't see anything.')

(Giannakidou, 2001, 682)

Deriving indiscriminative readings from this indefinite paradigm requires that the free choice marker take the form of an adjective, while an indefinite determiner *enas* is added to the nominal expression, as shown in (273).

- (273) **Dhen** ine **enas opjosdhipote** daskalos. Ine o kaliteros!  
 not be.3sg a FC teacher is the best  
 ‘He is not just any teacher. He is the best teacher!’

(Giannakidou, 2001, 692)

So, it would appear from examples like this that free choice indefinites are not derived from indiscriminatives in Modern Greek, but that it is indeed indiscriminatives that are derived from free choice indefinites. The applicability of the Cuevas Mixtec analysis has suddenly found its limit.

On the other hand, the mechanism for derivation of the indiscriminative reading, in which an adjectival form of the focus marker and an indefinite article occur, is telling. Comparison with other languages like Spanish and Italian reveal that such an indefinite is probably not an indiscriminative after all, but something similar in its meaning contribution. Both Spanish and Italian also have indefinites of this type of construction, and they occur alongside true indiscriminatives that look no different from their free choice indefinite counterparts. Therefore, it is likely that these indefinites with adjectival free choice markers are of a separate class, which may themselves be derived from free choice indefinites. This would also mean that Modern Greek lacks true indiscriminatives, or those of the type considered in this work.

The possible lack of indiscriminatives in Modern Greek raises the question of how its free choice indefinites are semantically constructed. According to the general model of free choice meaning presented in this work, the exclusive meaning component for deriving indiscriminatives is not really needed for creating free choice expressions. The expression of free choice simply requires minimal sufficiency evaluation on a bottom scalar term, and the account of bare *any* showed that an existential quantifier that activates subdomain alternatives would be sufficient for this role. The exclusive meaning component contributed by *just* was optional, and not necessary. Therefore, to explain the lack of reading under the scope of negation, instead of applying the Cuevas Mixtec analysis, it could be that Modern Greek

free choice indefinites instead inherently encode minimal sufficiency evaluation. This would look more like the analysis of bare *any* with an inherent minimal sufficiency evaluation, as below in (274).

$$\begin{aligned}
 (274) \quad \llbracket \text{-dhipote} \rrbracket^G = & \\
 \text{a. } & \lambda R_{\langle e,p \rangle} \lambda Q_{\langle \langle \langle e,p \rangle, p \rangle, p \rangle} \lambda w_s \\
 & : \exists X_{\langle e,p \rangle} >_D R[\xi_G(Q, \lambda P_{\langle e,p \rangle} \lambda w_s. \exists x_e [X(x, w) \wedge P(x, w)], w)] \\
 & \quad \cdot \xi_G(Q, \lambda P_{\langle e,p \rangle} \lambda w_s. \exists x_e [R(x, w) \wedge P(x, w)], w) \\
 \text{b. } & \lambda R_{\langle e,p \rangle} \lambda Q_{\langle \langle \langle e,p \rangle, p \rangle, p \rangle} \lambda w_s : \exists X_{\langle e,p \rangle} >_D R\{d : \exists x_e [X(x, w) \wedge d \geq \sigma_G(x, w)]\} \subset \\
 & \quad \{d : Q(\lambda P_{\langle e,p \rangle} \lambda w_s. \exists x_e [X(x, w) \wedge P(x, w) \wedge d \geq \sigma_G(x, w)], w)\} \\
 & \quad \cdot \{d : \exists x_e [R(x, w) \wedge d \geq \sigma_G(x, w)]\} \subset \\
 & \quad \{d : Q(\lambda P_{\langle e,p \rangle} \lambda w_s. \exists x_e [R(x, w) \wedge P(x, w) \wedge d \geq \sigma_G(x, w)], w)\}
 \end{aligned}$$

Modern Greek free choice indefinites would therefore be true free choice indefinites by encoding free choice meaning without detachable free choice markers. Since minimal sufficiency evaluation is already built in, they are unable to decompose into indiscriminatives, since this would require extracting the minimal sufficiency evaluation and inserting the exclusive meaning component within the scope of the  $\xi$  operator somehow. This approach would capture the general facts that are particular to free choice indefinites of this paradigm.

Although, this preliminary proposal does not support the Cuevas Mixtec analysis specifically, it does support the proposed formulation of the semantic ingredients for free choice indefinites and indiscriminatives, as they were presented in Chapter 1. Further work is necessary for understanding how free choice indefinites of this Modern Greek paradigm may be modified into their adjectival variants.

### 6.2.2 Comparison with Chierchia (2013)

Having proposed some future applications of the Cuevas Mixtec analysis to other languages, this section now considers a competing account of the general semantics of free choice in-

definites that is frequently circulated in the literature. Chierchia’s (2013) account of free choice indefinites is broad and detailed in its ambitious attempt to reduce free choice and other polarity phenomena to a common set of ingredients. Like the analysis of free choice indefinites sketched in this work, it attempts to define the common semantic elements of polarity sensitive indefinites and their points of variation. There is also a fair amount of overlap in the elements involved in the derivation of free choice meaning, such as exclusive meaning and the activation of subdomain alternatives. Chierchia considers a much larger dataset than this work has, and therefore, his account has the advantage of already observing much wider and thoughtful application across a variety of languages, compared to the few cases that this work could manage. However, this section can at least discuss a couple of the more general weaknesses of the account. In particular, the account involves the stipulative activation of quantificational entailment alternatives in addition to exhausted subdomain alternatives. More crucially for comparison with the account proposed in this work, there is no clear means of incorporating an account of indiscriminatives, which feature derivational relationships with most, if not all, of the indefinites that Chierchia discusses.

## Deriving free choice disjunction

The semantic account of free choice indefinites devised by Chierchia (2013) relies on Fox’s (2007) treatment of free choice disjunction. In this analysis, free choice disjunctions arise due to a silent exclusive operator  $O$  that activates alternatives and negates the propositions that are formed with them. Disjunctions may associate with two kinds of alternatives at the same time: subdomain alternatives and so-called “scalar” alternatives, which are basically quantificational entailment alternatives. These alternatives are specified by features on the disjunction operator, labeled as  $+\sigma$  for scalar alternatives and  $+D$  for subdomain alternatives. In order to activate the alternatives, an operator  $O$  takes a the proposition containing the disjunction as an argument and triggers the activation. Several  $O$  operators may be present to activate different alternatives.  $O_{\sigma A}$  activates the scalar alternatives, which are

just conjunctions  $\wedge$  replacing the disjunctions  $\vee$ .  $O_{DA}$  activates the subdomain alternatives, which are just individual disjuncts replacing the disjunctions. There is also a variant of  $O_{DA}$ ,  $O_{Exh-DA}$ , which applies exhaustified interpretations on the subdomain alternatives. Example (275) below shows how the scalar and subdomain alternatives of the sentence *You may have ice cream or cake* are calculated.

(275)  $O_{Exh-DA} O_{\sigma A}$  (You can have ice cream or<sub>[+ $\sigma+D$ ]</sub> cake)

a. ALT:

- i. Assertion:  $\diamond$ [have ice cream  $\vee$  have cake]
- ii. D-alternatives:  $\diamond$  have ice cream,  $\diamond$  have cake
- iii.  $\sigma$ -alternatives:  $\diamond$ [have ice cream  $\wedge$  have cake]

b. Exh-ALT:

- i. Assertion:  $\diamond$ [have ice cream  $\vee$  have cake]
- ii. Exh/D-alternatives:  $O(\diamond$  have ice cream),  $O(\diamond$  have cake)
- iii.  $\sigma$ -alternatives:  $\diamond$ [have ice cream  $\wedge$  have cake]

(Chierchia, 2013, 252)

In the example above, the scalar alternatives produce the propositional alternative *You can have ice cream and cake*, while the exhaustified subdomain alternatives produce the propositional alternatives *You can only have ice cream* and *You can only have cake*.

The combination of  $O_{\sigma A}$  and  $O_{Exh-DA}$  on a proposition with disjunction activate both the scalar and exhaustified subdomain alternatives and negate all of the resulting propositional alternatives. The negation of the propositional alternatives results in a stronger assertion than the original sentence. Namely, negation on the propositional alternatives produced with exhaustified subdomain alternatives undoes the effect of exhaustification, making their prejacent true. Negation on the propositional alternatives produced with scalar alternatives simply has the affect of a negated conjunction. For the sentence *You can have ice cream or cake*, the result will be as in (276).

$$(276) \quad O_{Exh-DA} O_{\sigma A} (\text{You can have ice cream or}_{[+\sigma+D]} \text{cake}) = \\ \diamond \text{ have ice cream} \wedge \diamond \text{ have cake} \wedge \neg \diamond [\text{have ice cream} \wedge \text{have cake}]$$

(Chierchia, 2013, 252)

The prejacent of the propositional alternatives from exhaustified subdomain alternatives, *You can have ice cream* and *You can have cake*, become true propositions that are added to the assertion. Also, the negated propositional alternative from the scalar alternative, *You cannot have ice cream and cake*, is also asserted. This is the meaning of free choice for Fox.

### Deriving the polarity sensitivity of *any*

Chierchia basically analyzes English *any* as an existential quantifier that associates with scalar and exhaustified subdomain alternatives, and requires them to be activated and negated by O operators. Since existential quantifiers are essentially disjunctions, the idea transfers to existential quantifiers fairly easily. The scalar alternative will simply be a universal quantifier, and the subdomain alternatives are just the individuals in the domain that satisfy the restriction's description. The requirement of activating both sets of alternatives with O operators creates conflicting propositions, which is how Chierchia proposes to cash out polarity sensitivity. For example, an episodic statement like *Any student spoke up* has the semantic calculation presented in (277).

(277) **Any student** spoke up.

a. Truth conditions:

$$O_{Exh-DA} O_{\sigma A} (\exists x \in D[\text{STUDENT}(x) \wedge \text{SPEAK-UP}(x)])$$

b. Reduced truth conditions:

$$\forall x \in D[\text{STUDENT}(x) \rightarrow \text{SPEAK-UP}(x)] \wedge$$

$$\neg \forall x \in D[\text{STUDENT}(x) \rightarrow \text{SPEAK-UP}(x)]$$

The scalar alternative produces the propositional alternative *Every student spoke up*. The exhaustified subdomain alternatives produce the propositional alternatives of the form

*Only x spoke up*, where  $x$  is a student in the domain. All of these propositional alternatives are negated to produce the ultimate assertion *Every student spoke up, and it is not the case that every student spoke up*. The assertion is a contradiction, which is meaningless as an utterance and is proposed to explain the unacceptability of *any* in episodic statements.

A modalized sentence provides more mechanics for preventing *any* from producing a contradictory assertion with the O operators. For example, an episodic statement like *Any student could speak up* has the semantic calculation presented in (278).

(278) Any student **could** speak up.

a. Truth conditions:

$$O_{Exh-DA} O_{\sigma A} (\exists x \in D[\text{STUDENT}(x) \wedge \Diamond \text{SPEAK-UP}(x)])$$

b. Reduced truth conditions:

$$\forall x \in D[\text{STUDENT}(x) \rightarrow \Diamond_{FC} \text{SPEAK-UP}(x)] \wedge$$

$$\neg \forall x \in D[\text{STUDENT}(x) \rightarrow \Diamond_{SC} \text{SPEAK-UP}(x)]$$

(Chierchia, 2013, 316)

The propositional alternative from the scalar alternative is the proposition saying *Every student could speak up*. The propositional alternatives from the exhaustified subdomain alternatives are the propositions of the form *Only x could speak up*, where  $x$  is a student in the domain. All of these propositions are negated to produce the ultimate assertion *Every student can<sub>FC</sub> speak up, and it is not the case that every student can<sub>SC</sub> speak up*. This should also be a contradiction, but Chierchia proposes that the modal bases of the modal operators can differ between the propositional alternatives. He proposes a condition that the modal base for propositions with scalar alternatives should be a subset of the modal base for propositions with exhaustified subdomain alternatives. This condition is called Modal Containment, and (279) provides its definition.

(279) Modal Containment:

$$SC \subset FC$$

(where FC are worlds relevant to the FC-implicature and SC those relevant to the scalar one).

(Chierchia, 2013, 316)

Modal Containment ensures the prevention of a contradiction produced with *any*'s invocation of the O operators. Beyond modal expressions, other licensing environments of *any* will also feature mechanisms for preventing a contradictory assertion.

### Applying the model to other indefinites

Finally, free choice indefinites that only have indiscriminatives readings under negation, if they are interpretable at all, are analyzed as having nearly the same semantic functions as English *any*. For example, a sentence with Italian *qualunque* 'any' will have its meaning calculated identically, as shown in (280).

(280) Puoi leggere **qualunque libro**  
 may read any book  
 'You may read any book.'

a. Truth conditions:

$$O_{Exh-DA} O_{\sigma A} (\exists x \in D[\text{BOOK}(x) \wedge \Diamond \text{READ}(\text{YOU}, x)])$$

b. Reduced truth conditions:

$$\forall x \in D[\text{BOOK}(x) \rightarrow \Diamond_{FC} \text{READ}(\text{YOU}, x)] \wedge \\ \neg \forall x \in D[\text{BOOK}(x) \rightarrow \Diamond_{SC} \text{READ}(\text{YOU}, x)]$$

The propositional alternative from the scalar alternative is the proposition saying *You can read every book*. The propositional alternatives from the exhaustified subdomain alternatives are the propositions of the form *You can only read x*, where *x* is a book in the domain. All of these propositions are negated to produce the ultimate assertion *You can<sub>FC</sub> read every book, and it is not the case that you can<sub>SC</sub> read every book*. The modal bases differ among the propositional alternatives, and the resulting assertion is made consistent and non-contradictory.

The only difference that these free choice indefinites have from English *any* is a condition that prevents them from occurring under the scope of negation. This condition is called Proper Strengthening, and (281) provides its definition.

$$(281) \quad O_{ALT}^{PS}(\theta) = \begin{cases} O_{ALT}(\theta), & \text{if } O_{ALT}(\theta) \subset \theta \\ \perp, & \text{otherwise} \end{cases}$$

(Chierchia, 2013, 274)

Basically, what this condition does is force the O operators to produce a stronger assertion than the original sentence. If no stronger assertion is produced with the negated propositional alternatives, the free choice indefinite is barred from occurrence. As such, the free choice indefinite will be licensed in non-monotonic environments where there would be no scalar inferences generated without the O operators. On the other hand, they will not be licensed under negation, since negation is a downward entailing environment and already produces scalar inferences without O operators. This is how the account achieves the avoidance of licensing by negation.

### Disadvantages of the account

There are two areas where Chierchia's (2013) account display certain disadvantages. The first area concerns the general account and its founding idea that free choice meaning can be reduced to exclusive meaning and the dual activation of scalar and exhausted subdomain alternatives. The predictions regarding truth-conditions that this account makes can be said to be too strong. By involving the negation of scalar alternatives, or rather quantificational entailment alternatives, the account makes undesirable predictions about collective quantificational inferences with free choice indefinites, and free choice expressions more broadly. When the scalar propositional alternative is negated after application of the  $O_{\sigma A}$  operator, it asserts that not all individuals described by the restriction will collectively satisfy the predicate described by the semantic environment. Therefore, *Any student could speak up*

means each student could speak up individually, but not every student could speak up collectively. This prediction conflicts with the fact that the sentence *Any student could speak up* can be felicitously followed up by the sentence *And every student could speak up*. When *Any student could speak up* is uttered, it is compatible with a discourse context in which one or more students are allowed to speak up collectively.<sup>1</sup> There is no collective quantificational information attached to the meaning of free choice *any*, which is evident just from the quality of quantificational variability pointed out by Giannakidou & Cheng (2006). Therefore, there is actually long documented evidence against the activation of quantificational entailment alternatives from free choice indefinites and other free choice expressions.

The second issue is more important for the theme of this work, which is a lack of account on the derivation of indiscriminatives. Like other accounts of free choice meaning, there is little to no attention paid to indiscriminatives. Chierchia (2013, 275-276) does consider the possibility that indiscriminative meaning might simply be free choice meaning as it takes scope under negation, but this would not explain how indiscriminatives may occur in episodic statements. It is also unclear as to how a treatment of indiscriminatives could be incorporated into the model with O operators. Chierchia's account and the Cuevas Mixtec analysis are similar in the decomposition of free choice indefinites to existential quantification, the activation of subdomain alternatives, and an exclusive meaning component. However, Chierchia uses the exclusive meaning component to derive free choice readings on indefinites and disjunctions, and his account requires the stipulative application of exclusive meaning on both uttered propositions and their activated propositional alternatives. The Cuevas Mixtec analysis instead uses minimal sufficiency evaluation for deriving free choice readings. Meanwhile, the exclusive meaning component is only used for deriving indiscriminative meaning under negation, which has motivation from the explicit occurrence of exclusive particles in English *just any*. The account here is therefore quite different in its organization of the

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1. In fact, Fox (2007) notes this issue in a footnote and provides some thoughts about how it can be accounted for within his model.

proposed elements and in its predictions.

### 6.2.3 *Summary*

This section discussed the advantages of the model of indiscriminative and free choice indefinite semantics proposed in this work. It is suggested to easily carry over to data regarding free choice indefinites in other languages, such as French and Italian. These languages lack segmental means for differentiating indiscriminatives from free choice indefinites, and so, an analysis that conflates the two types of indefinite is possible. French indiscriminatives differ only in the application of the  $\xi$  operator to a semantic environment to derive the free choice indefinite. Free choice indefinites in Modern Greek are quite different in their lack of indiscriminatives, although this could also be explained by the free choice indefinite's inherent encoding of the  $\xi$  operator. This way, the exclusive meaning component cannot be inserted and is never available to negation, unless it takes scope over the  $\xi$  operator, which still does not derive an indiscriminative. The account was also compared to Chierchia's (2013), which has some elements in common, such as existential quantification, the activation of subdomain alternatives, and a exclusive meaning component. However, his account also proposes the obligatory activation of quantificational entailment alternatives, which predict collective quantificational inferences that free choice indefinites should not have. Finally, the exclusive meaning component is used to derive free choice readings on indefinites instead of indiscriminative readings, and so, there is little room for incorporating an account of indiscriminative meaning.

## 6.3 Conclusion

This chapter developed a compositional account of the semantics of indiscriminatives and free choice indefinites in Cuevas Mixtec, including their derivational relationship. The familiar ingredients of existential quantification, the activation of subdomain alternatives, exclusive

meaning, and minimal sufficiency evaluation, were reorganized to account for subtle differences between the indiscriminatives and free choice indefinites of Cuevas Mixtec and English bare *any* and *just any*. Cuevas Mixtec indiscriminatives differ by inherently encoding exclusive meaning, and this gives them a consistent indiscriminative reading under the scope of negation. Also, the *va* particle is suggested to explicitly encode minimal sufficiency evaluation for the derivation of the free choice indefinite. The other features of the semantics of indiscriminatives and free choice indefinites in Cuevas Mixtec are otherwise identical to those of English bare *any* and *just any*. The chapter then considered the advantages of the account in its application to other languages. In particular, by reorganizing the same semantic ingredients further, the facts regarding indiscriminatives and free choice indefinites in other languages can be derived. French indiscriminatives simply have minimal sufficiency evaluation encoded into the semantic environment, while Greek free choice indefinites are true free choice indefinites, with an inherent encoding for minimal sufficiency evaluation. The account was also compared to Chierchia's (2013) general account of free choice indefinite semantics. Chierchia does not give sufficient attention to indiscriminatives in his account, despite their frequent association with the free choice indefinites he intends to describe. His account is also too strong in its prediction of inferences regarding the quantity of individuals that may satisfy a predicate.

This analysis of the semantics of indiscriminatives and free choice indefinites completes the mission of this work, which was not only to show evidence for the derivability of one indefinite into the other, but also to show how this derivation is predictable from a semantic model. Indiscriminatives are often conceived of as idiomatic or enriched meanings when prosodic prominence or segmental modifiers are added to a free choice indefinite. The data and model presented in these final chapters refuted this assumption with novel data from free choice indefinites and indiscriminatives in Cuevas Mixtec, plus a compositional semantics of how it is actually the former that is derived from the latter. As such, this work offers an alternative view on the relationship between these indefinite classes that hopes to redirect

research on free choice and indefinite semantics on a newer and more productive path. Further work along these lines would consider specific implementations of the model to other languages, to test its explanatory adequacy. Such investigations can include languages that have already had semantic accounts of their free choice indefinites in the literature. By working from the point of view on the semantics of indiscriminatives and free choice indefinites espoused in this work, some linguists may find that, instead of modelling the meaning of a free choice indefinite, they were working with an indiscriminative all along.

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