Getting *even*

by

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Abstract

The focus-sensitive scalar particle *even* has an idiosyncratic distribution: it may associate with a weak element in its immediate surface scope only if it is appropriately embedded. We investigate such occurrences of *even* in two non-downward-entailing environments: in the scope of non-monotone quantifiers and in the scope of desire predicates. We show that they can be properly understood only if we assume that *even* can move at LF (Karttunen & Peters 1979, Lahiri 1998). The insights garnered in this investigation are then applied to the poorly understood occurrences of negative polarity items in these environments. We argue that they can be explained by assuming that their licensing is governed by a covert *even* (Krifka 1995, Chierchia 2006). Finally, a parametric account of the differences in distribution between *even* and other scalar particles is provided. We propose that the distribution of scalar particles is determined by two morphological parameters and their competition for insertion.

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Contents

CHAPTER 1

Introduction

When a sentence is uttered, a set of alternative propositions is made salient. This set is to a great extent conditioned by the intonational structure of the sentence – for example, by which expressions in the sentence bear focal stress. There are operators in language that are sensitive to these alternatives and some of them – most prominently *even* – require the alternatives to be ordered in a particular way with respect to their likelihood or noteworthiness. This ordering is constrained by the axioms of probability theory and logic.

Distribution of *even*. The constraints on the likelihood or noteworthiness ordering of alternatives effectively restrict the distribution of *even*. For example, if the minimal clause in which *even* occurs at surface structure denotes a proposition that is most likely (least noteworthy) among its alternatives – we call such occurrences of *even* 'weak *even*' – then *even* is unacceptable if the clause is unembedded. However, if the clause is embedded under a downward-entailing operator, *even* may be acceptable (Lahiri 1998). In this dissertation, we identify three further types of operators under which weak *even* may be acceptable:

- Weak *even* under non-monotone quantifiers
- Weak *even* under desire predicates (factive and non-factive)
- Weak *even* in imperatives

As in the case of embedding under downward-entailing operators, the felicity of weak *even* under these operators is conditional on the properties of the context. The first objective of the dissertation is to describe and explain these patterns, at least some of which have not been previously discussed. We argue that they provide support for an approach to *even* that assumes that *even* may move at LF (Karttunen & Peters 1979, Lahiri 1998).

Distribution of negative polarity items. The distribution of weak *even* in non-downward-entailing environments mirrors the poorly understood distribution of negative polarity items (NPIs) in these environments. For example, Linebarger (1987) and Kadmon & Landman (1993) have observed that if particular conditions obtain in the context, NPIs may occur under non-monotone quantifiers and under factive desire predicates. We add non-factive desire predicates and imperatives to the list (cf. Giannakidou 2006):

- NPIs under non-monotone quantifiers
- NPIs under desire predicates (factive and non-factive)
- NPIs in imperatives

The second objective of the dissertation is to explain these occurrences of NPIs and their context-dependence. We do this by assuming that their licensing is governed by a covert *even* (cf. Krifka 1995, Chierchia 2006). This effectively reduces their licensing requirements to those of weak *even*.

Concessive scalarity. *Even* is a member of a large family of scalar particles. However, not all expressions commonly characterized as scalar particles have the distribution and semantic import of *even*. A prominent class of expressions that does not are the so-called concessive scalar particles – *esto ke* in Greek, *aunque sea* in Spanish and *magari* in Slovenian (cf. Giannakidou 2007, Lahiri 2010). These expressions may only occur in downward-entailing and modal environments. Intriguingly, their semantic import appears not to be uniform across these two types of environments. The third objective of the dissertation is to account for the distribution and import of these expressions. We achieve this by assuming that they consist of a scalar and an existential component which may take distinct scopes at LF. Their distribution as well as their apparently non-uniform semantic contributions are shown to follow from this decomposition and independent mechanisms in grammar.

Scalar particles and competition. There are other expressions across languages that are classified as scalar particles and have a more restricted distribution than *even*. Moreover, in some languages different scalar particles exhibit complementary distribution. The fourth objective of the dissertation is to explain the variation in the distribution of scalar particles. We argue that this can be achieved by relying on two assumptions. The first assumption is that scalar particles may differ in two respects: whether they are negatively marked and whether they consist of one or two scalar components (cf. Guerzoni 2003, Lahiri 2010). The second assumption is that scalar particles form scales and compete for insertion. These two assumptions allow us to correctly identify five distinct classes of scalar particles.

Additivity. Although the condition that *even* imposes on the ordering of the salient alternatives – its scalar presupposition – plays the decisive role in constraining its distribution, it is not the only inference that *even* generates. It also imposes an additive condition on the context, which exhibits an intricate behavior. The fifth objective of the dissertation is to shed new light on the additive inference triggered by *even*. A partial account is provided for it that makes three assumptions: *even* is composed of a scalar and an additive component; the two components may take distinct scopes at LF; and the additive component may not generate pathological inferences (cf. Rullmann 1997).

1.1 Alternatives

Alternatives of a given sentence are primarily determined by the position of focus. In the following we describe the standard approach to the interpretation of focus (Rooth 1985, 1992), which we are adopting. According to this approach, the focused (or F-marked) constituent introduces alternatives to the constituent. These are then used to build up alternatives to bigger constituents in a compositional manner. An informal example of this is given in (1): the focus alternatives of the sentence in (1-a) in which the capitalized word is focused are the propositions in (1-b). The ordinary meaning of the sentence is in (1-c). The alternatives do not figure in the ordinary meaning of (1-a).

(1)
a. JOHN arrived late
b. Alternatives to (1-a): that Mary arrived late, that Tom arrived late etc.
c. Ordinary meaning of (1-a): that John arrived late

Following Rooth (1992), we assume that the computation of the focus alternatives sketched above proceeds in parallel to the computation of the ordinary meaning of the sentence according to the composition rules in (2) and (3). Thus, each sentence is assigned a focus meaning (= the set of its focus alternatives) in addition to its ordinary meaning.

(2) Terminal nodes
a. If α is a terminal node and is not F-marked, $\mathrm{F}(\alpha) = \{[\![\alpha]\!]^{g,c}\}$
b. If α is a terminal node and is F-marked, $\mathrm{F}(\alpha) = \{[\![\beta]\!]^{g,c} \mid \mathtt{type}(\beta) = \mathtt{type}(\alpha)\}$

(3) Composition principle
If α is a branching node that is not F-marked, with daughters β of type δ and γ of type $\langle \delta, \tau \rangle$, then $\mathrm{F}(\alpha) = \{ \mathrm{a} \in \mathrm{D}_\tau \mid \exists \mathrm{b,c} \, [\, \mathrm{b} \in \mathrm{F}(\beta) \wedge \mathrm{c} \in \mathrm{F}(\gamma) \wedge \mathrm{a} = \mathrm{c}(\mathrm{b}) \,] \}$

Applied to our preceding example, the atomic constituents of the sentence in (1-a) have the focus meanings in (4-b). The meanings of the complex constituents, which are composed according to the principle in (3), are given in (4-cde) where (4-de) are notational variants.

(4)
a. $[\mathbf{John_F} \; [\mathbf{arrived\ late}]]$
b. $\mathrm{F}(\mathbf{arrived}) = \{[\![\mathbf{arrived}]\!]^{g,c}\}$, $\mathrm{F}([\![\mathbf{late}]\!]^{g,c}) = \{[\![\mathbf{late}]\!]^{g,c}\}$,
$\mathrm{F}(\mathbf{John_F}) = \{\mathrm{x} \mid \mathrm{x \text{ is a person}}\}$
c. $\mathrm{F}([\![\mathbf{arrived\ late}]\!]^{g,c}) = \{ \, [\![\mathbf{arrived\ late}]\!]^{g,c} \, \}$
d. $\mathrm{F}(\mathbf{John_F\ arrived\ late}) = \{\mathrm{p} \mid \exists \mathrm{x} \in \mathrm{F}(\mathbf{John_F})[\mathrm{p} = \lambda \mathrm{w}.[\![\mathbf{arrived\ late}]\!]^{g,c}(\mathrm{x,w}) = 1]\}$
e. $\mathrm{F}(\mathbf{John_F\ arrived\ late}) = \{\text{that x arrived late} \mid \text{x is an individual}\}$

There exists a variety of expressions in language whose meaning is sensitive to alternatives, i.e. that incorporate focus alternatives into the ordinary meaning of sentences in which they occur. It is said that such expressions associate with focus (Jackendoff 1972, Dretske 1972, von Stechow 1982 among many others). The most prominent examples of these expressions are the focus particles *only, also* and *even.* Their semantic import is sensitive to alternatives in the sense that their domain of quantification is restricted to a subset of the focus meaning of their sister. Different positions of focus consequently result in different meanings contributed by the particles. This is standardly demonstrated with the examples in (5) that convey the distinct meanings expressed by the sentences in (6), respectively.

(5) a. John only introduced BILL to Sue
b. John only introduced Bill to SUE

(6) a. John introduced Bill and nobody else to Sue
b. John introduced Bill to Sue and to nobody else

If we assume that *only* takes clausal scope in (5), its domain in the two sentences differs as described in (7-b) and (8-b).[1] Since the import of *only* is to state that all the alternatives that are true are entailed by its propositional argument, the meanings of the sentences in (7-a) and (8-a) differ as well. The different meanings of the two sentences are given in (7-c) and (8-c), which correspond to (6-a) and (6-b), respectively.[2]

(7) a. **[only $\mathbf{C_1}$] [John introduced $\mathbf{Bill_F}$ to Sue]**
b. $C_1 \subseteq \{$ that John introduced x to Sue $|$ x is a person $\}$
c. λw. $\forall$q $\in \{$ that John introduced x to Sue $|$ x is a person $\}$:
q(w) = 1 $\rightarrow$ that John introduced Bill to Sue $\subseteq$ q

(8) a. **[only $\mathbf{C_1}$] [John introduced Bill to $\mathbf{Sue_F}$]**
b. $C_1 \subseteq \{$ that John introduced Bill to x $|$ x is a person $\}$
c. λw. $\forall$q $\in \{$ that John introduced Bill to x $|$ x is a person $\}$:
q(w) = 1 $\rightarrow$ that John introduced Bill to Sue $\subseteq$ q

In many cases, as in (7) and (8), there does not seem to be a salient ordering among the alternatives or if there is one, it is not exploited by the respective operators. However, in some cases, an ordering on alternatives is salient and is exploited. For example, *only* may require its propositional argument to be ordered low with respect to the alternatives. This is illustrated in (9) where the alternatives are linearly ordered with respect to the height (or noteworthiness, likelihood) of the predicated rank in the military hierarchy. The scalar inference is the only noticeable contribution that *only* makes to the sentence in (9-a): it is less noteworthy in the context for John to be a lieutenant than for him to be a colonel or a general. We represent this as in (9-d).

(9) a. John is only a LIEUTENANT
b. **[only $\mathbf{C_1}$] [John is a $\mathbf{lieutenant_F}$]**
c. $C_1 \subseteq \{$ that John is a lieutenant, that John is a colonel, that John is a general $\}$
d. $\forall$q $\in C_1$: q $\neq$ that John is a lieutenant $\rightarrow$ q $\lhd_c$ that John is a lieutenant

In contrast to *only*, *even* is always accompanied by a salient noteworthiness or likelihood ordering on alternatives. And the main contribution of *even* is to require the alternatives to be ordered in a particular way with respect to it.

[1]There are different approaches to how this restriction comes about (Rooth 1985, 1992, von Fintel 1994, Beaver & Clark 2008 and others). We remain vague about the exact underlying mechanism and only care about the end result: the domain of a focus-sensitive particle is a subset of the focus meaning of its sister.

[2]For reasons of readability, we adopt the notational convention that instead of writing, say, g($\mathbf{C_1}$) as the meaning of $\mathbf{C_1}$ relative to the assignment function g, we write the non-boldfaced C_1.

1.2 Scalarity

Similarly to *only* and other focus particles, *even* operates on a set of alternatives that is determined by the focus structure of the clause to which it is adjoined. More precisely, its domain of quantification is a subset of the focus meaning of its sister. For example, the sentence in (10-a) has the structure in (10-b) and the set of alternatives over which *even* quantifies is described in (10-c).

(10) a. Even JOHN arrived late
b. **[even C_1] [$John_F$ arrived late]**
c. $C_1 \subseteq \{$ that x arrived late | x is a person $\}$

The main semantic contribution of *even* is that it triggers a presupposition that is epistemic in nature: it identifies the informational value of the meaning of its sister – its prejacent – as greater than the informational values of an appropriate number of alternatives over which it quantifies. To make this characterization operational, two questions need to be answered: (i) What kind of informational value is *even* comparing? (ii) What counts as an appropriate number of alternatives?

Ad (i). There is a rich literature on what is the most appropriate way to characterize the informational value compared by *even* – likelihood, noteworthiness and relevance being the most common candidates (Karttunen & Peters 1979, Kay 1990, Merin 1999, Herburger 2000, van Rooy 2003 and others). For perspicuity, we will treat it as (subjective) likelihood and discuss other possible characterizations where appropriate. The likelihood is conditioned on a relevant information state in the context.[3] Thus, we assume that *even* presupposes that the meaning of its sister is less likely than an appropriate number of alternatives over which *even* quantifies. This ordering relation is subject to an important condition: it is faithful to logical entailments between the alternatives. If an alternative entails another alternative, the informational value of the latter cannot be greater than the informational value of the former, i.e. the latter cannot be less likely than the former.

(11) Scalarity and entailment
If a proposition p entails a proposition q, q cannot be less likely than p

This observation follows from basic probability theory. Specifically, it follows from Kolmogorov's third axiom that states that the probability of a union of mutually exclusive propositions equals the sum of the probabilities of the propositions:[4]

$$\text{if } p_1, p_2, \ldots \text{ are mutually exclusive, } \Pr(p_1 \cup p_2 \cup \ldots) = \textstyle\sum_i \Pr(p_i).$$

Applied to our condition, if a proposition p entails a proposition q, it holds that the sum of the likelihoods of p and $q \setminus p$ equals the likelihood of q. Since the likelihood of $q \setminus p$ is greater

[3] We leave the issues of informativeness of the scalar presupposition as well as its subjectivity aside in the following. They relate to the broader issues of classification of projective meanings (e.g. Potts 2007 and replies) and judge-dependence in epistemic language (Stephenson 2007, Yalcin 2008 and many others).

[4] We treat the terms *probability* (*probable*) and *likelihood* (*likely*) as synonymous.

or equal to zero, it holds that the likelihood of p is at most as great as the likelihood of q.[5] As we will see shortly, this seemingly innocuous principle has wide-ranging consequences in grammar.

Ad (ii). The second question relates to the quantificational strength of the scalar presupposition of *even* – it relates to what number or proportion of alternatives the propositional argument of *even* should be less likely than. Karttunen & Peters (1979) proposed that the propositional argument of *even* needs to be less likely than all of its alternatives that are not identical to it. If we represent the relation of being less likely than with $\lhd$, this gives us the definedness condition in (12): all the alternatives in the domain of *even*, C, are less likely than the propositional argument of *even*, p (given an information state provided by c).

(12) $[\![$ **even** $]\!]^{g,c}$(C, p, w) is defined only if $\forall$q $\in$ C [p $\neq$ q $\rightarrow$ p $\lhd_{c}$ q]

However, many examples have been brought forward that appear to be problematic for this characterization. Two are provided in (13) (Kay 1990:89): for one to make it to the finals is less likely than for one to make it to the semi-finals (13-a) and "having majors, captains, or sergeants making major policy decisions would provide the basis for even more extreme assertions" (13-b) (Kay 1990:90); *even* is acceptable in the two sentences nonetheless.

(13) a. Not only did Mary win her first round match, she even made it to the semi-finals
b. The administration was so bewildered that they even had lieutenant colonels making policy decisions

Faced with data like (13), several maneuvers are possible. First: Karttunen and Peters' proposal could be rescued by assuming that the universal quantification is restricted. For example, the domain of *even* in (13-a) would not contain the proposition that Mary made it to the finals and in (13-b) the propositions that majors were making policy decisions etc. (cf. Lycan 1991). Second: Bennett (1982) and Kay (1990) have proposed that the scalar presupposition of *even* involves existential quantification (14): there is an alternative in the domain of *even*, C, that is less likely than the propositional argument of *even*, p.

(14) $[\![$ **even** $]\!]^{g,c}$(C, p, w) is defined only if $\exists$q $\in$ C [p $\lhd_{c}$ q]

It could be argued that if the presupposition in (12) was too strong, then the presupposition in (14) is too weak. However, the same response to this objection is possible as above: the domain of the quantifier may be appropriately restricted, possibly to a singleton set containing an extremely unlikely proposition.[6] Third: Berckmans (1993) puts forward an ambiguity approach – the scalar presupposition of *even* involves either existential or universal quantification. Fourth: Francescotti (1995) proposes that the quantification involved is over most

[5]Similar considerations apply to other flavors of informational value that have been suggested to feature in the scalar presupposition of *even*: informativeness, noteworthiness etc. An exception is Merin's (1999) notion of relevance. As he explicitly notes, it is not faithful to logical entailments between alternatives: a logically weaker proposition may be more relevant in his system than a logically stronger proposition.

[6]Kay's (1990:66) characterization: "*even* indicates that the sentence [...] in which it occurs expresses, in context, a proposition which is more informative (equivalently 'stronger') than some particular distinct proposition taken to be already present in the context."

of the alternatives. Interestingly, the choice between these alternatives is inconsequential for the purpose of this dissertation. For concreteness, we adopt the weakest, existential version of the scalar presupposition in the following.

1.2.1 Upward-entailingness

The sentence in (10), repeated in (15-a), triggers the scalar presupposition in (15-c). The alternatives over which *even* quantifies in this sentence are logically independent – that John arrived late does not logically entail, say, that Mary arrived late and vice versa. Accordingly, depending on what information state the likelihood is conditioned, various orderings among the alternatives may obtain. For example, taking into consideration only that John is the most punctual person among the relevant individuals, then the existential quantification in (15-c) may be verified by, say, the proposition that Mary arrived late (16-a). On the other hand, taking into consideration that John was stuck in traffic and everyone else experienced no comparable difficulties, there may be no proposition among the alternatives that would verify the existential quantifier and the sentence could be undefined (16-b). In any case, due to the independence of the alternatives in the domain of *even*, the scalar presupposition in (15-c) is consistent with the condition (11) and in an appropriate context it may be true.

(15) a. Even JOHN arrived late
b. **[even C_1] [John$_F$ arrived late]**
c. $\exists$q $\in$ { that x arrived late | x is a person }: that John arrived late $\lhd_c$ q

(16) a. that John arrived late $\lhd_{c_1}$ that Mary arrived late, that Sue arrived late etc.
b. that Mary arrived late, that Sue arrived late etc. $\lhd_{c_2}$ that John arrived late

The condition in (11) also teaches us that in some cases the ordering among the alternatives is more constrained than in others. For example, if we have a set of alternatives of the form given in (17-a), among which an entailment relation obtains (17-b), then any likelihood ordering on them has to satisfy the condition in (17-c).

(17) a. { that John arrived late n-times | n $\in \mathbb{N}_{>0}$ }
b. that John arrived late once $\Leftarrow$ that John arrived late twice $\Leftarrow$ ...
c. ... $\unlhd$ that John arrived late twice $\unlhd$ John arrived late once

This fact and its ilk constrain the distribution of *even*. For instance, the sister of *even* in (18-b) has the alternatives described in (17-a). All of the alternatives entail the propositional argument of *even* and are, according to (17-c), at most as likely as it. The scalar presupposition of *even*, given in (18-c), is thus incorrect and this is responsible for the pragmatic deviance of the sentence.

(18) a. #John arrived late even ONCE
b. **[even C_1] [John arrived late once$_F$]**
c. $\exists$q $\in$ (17-a): that John arrived late once $\lhd_c$ q

1.2.2 Downward-entailingness

However, not all sentences that contain *even* that associates with a weak element, e.g. *once*, in its immediate surface scope – weak *even* – are deviant. For example, when a weak *even* occurs in the scope of a downward-monotone operator like negation, it is acceptable (19). In its base position, *even* is predicted to trigger the same scalar presupposition as in (18-c), which is inconsistent.

(19) John didn't arrive late even ONCE

Different accounts have been developed to deal with this perplexing fact. One of them – the so-called scope theory of *even* (Karttunen & Peters 1979, Lahiri 1998) – proposes that the scalar presupposition is not triggered under negation in (19) but above it. This is achieved by covertly moving *even* above the negation (20-a). The scalar presupposition that *even* triggers in its derived position is given in (20-b).

(20) a. **[even C_1] [not [~~[even C_1]~~ John arrived late once$_F$]**
b. $\exists$q $\in$ { that John didn't arrive late n-times | n $\in \mathbb{N}_{>0}$ }: that John didn't arrive late once $\lhd_c$ q

This scalar presupposition is compatible with the condition in (11). Namely, the alternatives in the domain of *even* stand in an entailment relation described in (21-a) and so the ordering among them must be compatible with (21-b). This is the case in (20-b).

(21) a. ... $\Leftarrow$ that John didn't arrive late twice $\Leftarrow$ that John didn't arrive late once
b. that John didn't arrive late once $\trianglelefteq$ that John didn't arrive late twice $\trianglelefteq$ ...

1.2.3 Non-monotonicity

Another environment in which weak *even* may be licit is in the scope of non-monotonic operators like *exactly n NP*. This is illustrated by the following example:

(22) Exactly four people in the whole world will open that dissertation even ONCE – the author and the committee members

Again, *even* would trigger an incorrect scalar presupposition in its base position in (22). This is computed in (23): the scalar presupposition triggered in the scope of the non-monotone quantifier is in violation of (11).

(23) a. **[exactly four people in the whole world] 4 [$_{XP}$ [even C_1] [t_4 will open that dissertation even once$_F$]]**
b. $[\![$ **XP** $]\!]^{g,c}$ is defined only if $\exists$q $\in$ { that g(**4**) will open that dissertation n-times | n$\in \mathbb{N}_{>0}$ }: that g(**4**) will open that dissertation once $\lhd_c$ q

The scope-theoretic approach to *even* predicts that (22) may have an acceptable meaning if *even* scopes above the non-monotone quantifier. In that case, its scalar presupposition would not be in violation of (11): an intervening non-monotone operator between *even* and its weak associate precludes an entailment relation among the alternatives in the domain of *even*.

What remains to be determined is in what contexts is the triggered scalar presupposition plausible. We discuss these issues in chapter 2.

(24) A prediction of the scope-theoretic approach to *even*
A sentence with a weak *even* is acceptable only if *even* is at surface structure in the scope of a (Strawson) downward-monotone operator or a non-monotone operator, i.e. in the scope of a non-upward-monotone operator

1.2.4 Modal environments

There are occurrences of weak *even* that appear not to be covered by (24): weak *even* may occur in imperatives, under certain modals and under certain attitude predicates (25). In light of traditional approaches to these environments (Hintikka 1962, Kratzer 1981), these facts are puzzling. Namely, there do not seem to be any scope-bearing elements in (25) that are not upward-monotone and so the presupposition triggered by *even* should be deviant, regardless of whether *even* moves or stays in situ (26).

(25) a. Show me even ONE party that cares for the people
b. To pass the class, John needed to prove he attended the lectures even ONCE
c. The band hopes to someday make even ONE video of that quality
d. John is glad that Mary arrived on time even ONCE

(26) A naive prediction
a. #Show me even ONE party that cares for the people
b. #**[IMP [even C_1] [you show me one$_F$ party that cares for the people]]**
c. #**[even C_1] [IMP ~~[even C_1]~~ [you show me one$_F$ party that cares ...]]**

We discuss two competing explanations for why the prediction in (26) may be false. First: The assumption that the imperative operator, certain modals and desire predicates are upward-monotone is not warranted (Heim 1992, Levinson 2003, Villalta 2008 among others). In fact, the data in (25) presents a new argument for the non-monotonicity of the operators involved. Second: Although the imperative operator, modals and attitude predicates are upward-monotone (e.g. von Fintel 1999), there is a rescue mechanism in grammar that if it applies with these operators, it allows the sentences to be compliant with (11) and have plausible entailments. Thus, both approaches to resolving the puzzle in (25) share the assumption that the associate of *even* is not in an upward-entailing environment in those sentences. More to the point, the alternatives over which *even* quantifies in (25) after it scopes above the respective scope-bearing elements do not stand in an entailment relation and so the scalar presupposition it triggers is compliant with (11). We discuss these issues in chapter 3.

1.3 Polarity

There is an assortment of challenges that polarity items like *any* and *ever* pose for linguistic theory. The two most prominent ones have been, on the one hand, finding an adequate description of their distribution and, on the other hand, providing an explanation of this distribution. There have been two main approaches to the first challenge. The first approach claims that NPIs are licensed in the scope of DE operators, i.e. it assumes a semantic licensing condition on NPIs (e.g. Ladusaw 1979). The second approach claims that because NPIs seem to be licensed in a variety of non-DE operators, licensing of NPIs cannot be semantic but must be pragmatic (e.g. Linebarger 1987). Some of the arguments of the latter approach, which is "frustratingly unalgorithmic" (Linebarger 1987:381), have been successfully defused by weakening the DE criterion to a Strawson-DE criterion: NPIs are licensed under operators that allow for downward-entailing inferences on the assumption the presuppositions of the conclusion are fulfilled (von Fintel 1999).

However, there are at least two types of environments that elude even the weakened Strawson-DE condition on NPI licensing – NPIs may be felicitous in the scope of desire predicates and in the scope of non-monotone quantifier phrases like *exactly n NP* (Linebarger 1987, Kadmon & Landman 1993, Rothschild 2006):

(27) a. I'm glad we got ANY tickets
b. Exactly three students did any work at all

We have already indicated that weak *even* may occur in both of these environments. An account of this is provided in chapters 2 and 3 according to which weak *even* is licit in these environments if *even* covertly scopes above the respective scope-bearing elements and the context satisfies particular conditions. Interestingly, the exact same conditions need to be satisfied by the context for NPIs to be felicitous in these environments. This parallelism strongly suggests that we are dealing with closely allied phenomena.

We explain the felicity of NPIs under non-monotone quantifiers and desire predicates by assuming that their distribution may be governed by a covert *even* (cf. Krifka 1995). In the case of *any* and *ever*, this assumption is operationalized by having a covert *even* associate with the domains of *any* and *ever*; the respective NPIs are 'licensed' if and only if the inference triggered by *even* is satisfied in the context. Since the alternatives to the domains of *any* and *ever* are their various sub-domains (Krifka 1995, Chierchia 2006), it holds that the associate of *even* is in these cases weaker than its alternatives. Accordingly, our treatment of weak *even* under non-monotone quantifiers and desire predicates, as propounded in chapters 2 and 3, naturally transfers to NPIs in these environments. A natural explanation is provided for why NPIs are felicitous under non-monotone quantifiers and desire predicates only in particular contexts, as observed by Linebarger (1987) and Kadmon & Landman (1993): the scalar presupposition triggered by covert *even* is satisfied only in those contexts. These issues are discussed at the end of chapters 2 and 3.

1.4 Typology

In addition to *even*, there is a variety of other elements in English and other languages that are commonly classified as scalar particles. There is some variation between these particles, both with respect to their distribution as well as to their semantic contribution in different environments. However, they all share the definitive feature of triggering a scalar presupposition. We tackle the typology of scalar particles in chapters 4 and 5.

1.4.1 Concessive scalarity

A particularly intriguing class of scalar particles is formed by the expressions *aunque sea* and *siquiera* in Spanish (Alonso-Ovalle 2009, Lahiri 2010), *esto ke* in Greek (Giannakidou 2007) and *magari* in Slovenian (Crnič 2011). These expressions are commonly called concessive scalar particles (Giannakidou 2007). They differ from *even* in two important respects: (i) they have a more limited distribution and (ii) they appear to trigger slightly different inferences in environments in which they occur. More to the point, the distribution of these particles is restricted to downward-entailing and appropriate modal environments. In these environments, they seem to contribute distinct meanings: in the former their contribution corresponds to that of *even*, while in the latter it sometimes corresponds to that of *at least*.

We propose that concessive scalar particles are morphologically complex: they consist of a scalar component corresponding to *even* and an existential component corresponding to *at least*. Their distribution is governed by the inferences triggered by these two components – if they are satisfied in the context, the occurrence of the concessive scalar particle is licensed. This may be the case if the scalar component moves at LF above a downward-monotone operator, stranding the existential component in the scope of the operator; this explains the felicity of concessive scalars in downward-entailing environments. In the case where the scalar component moves above a modal operator, we get a licit interpretation only if the stranded existential component gets a free choice interpretation; this explains both the felicity and the distinct import of concessive scalars in modal environments. We discuss the so-called concessive scalar particles in chapter 4.

1.4.2 Scalar particles and competition

At first sight there appear to be many distributional differences between (non-concessive) scalar particles across languages. However, a more careful examination reveals that their distribution varies along only two dimensions. First: Scalar particles can be classified with respect to whether they may associate with weak or strong elements in their immediate surface scope – we call these particles weak and strong scalar particles, respectively. With respect to this criterion, there are three main groups of scalar particles: (i) scalar particles that may be weak or strong (*even* in English, *même* in French, *tudi* in Slovenian), (ii) scalar particles that may only be strong (*sogar* in German, *celo* in Slovenian, *hasta* in Spanish), and (iii) scalar particles that may only be weak (*so much as* in English, *auch nur, einmal* in German). Across languages, the implicational relation in (28) can be observed (cf. Gast & van der Auwera 2011).

(28) <u>Implicational relation for strong scalar particles</u>

There is a scalar particle that is only strong in the language

$\Rightarrow$ There is a scalar particles that is only weak in the language

We propose that scalar particles that are only weak decompose into two operators: one that requires its sister to denote a strong proposition and one that requires its sister to denote a weak proposition(cf. Guerzoni 2003, Lahiri 2010). These complex scalar particles then compete for insertion with scalar particles that are only composed of the former operator.

The competition is regulated by independent principles in grammar – in particular, the principle that requires one to use alternatives with stronger presuppositions if those are satisfied in the context. Thus, if we have to insert a particle that will associate with a weak element in its immediate surface scope, we must insert, say, *auch nur* in German since this particle will lead to stronger presuppositions than if we insert *sogar*. Accordingly, *sogar* may only be adjoined to clauses that denote strong propositions. Finally, there are scalar particles that are ambiguous with respect to which of the two operator combinations they spell out (*even*, *même*).

Second: In some languages, a further type of blocking effect is observed with weak scalar particles: some weak scalar particles occur only in the immediate scope of negation (e.g. *niti* in Slovenian, *einmal* in German), while other weak scalar particles never occur in the immediate scope of negation (e.g. *tudi* in Slovenian, *auch nur* in German). Roughly, the following implicational relation holds for those languages:

(29) Implicational relation for weak scalar particles

There is a scalar particle that may only be weak and that only occurs in the immediate scope of negation in the language ⇒ No other weak scalar particle that may only be weak occurs in the immediate scope of negation in the language

We propose that this variation follows from the Elsewhere Principle. Some weak scalar particles bear an uninterpretable negative feature (e.g. *niti*) but are otherwise semantically indistinguishable from other weak scalar particles (e.g. *tudi*). Accordingly, they may only be used under clausemate negation where their negative feature can be checked. An appropriate Elsewhere Principle dictates that if a weak scalar particle is to be used under negation in the respective languages, it must be the one with the negative feature.

Taking all of this into account, we propose a very sparse account for the variation among (non-concessive) scalar particles. We reduce it to variation in morphology: (i) There is a core ingredient common to all scalar particles – this is the scalar component whose content corresponds to that of *even*. (ii) Some scalar particles in addition spell out a weak scalar component. Finally, (iii) some of these latter particles also spell out a negative feature. All else follows from the competition of the particles. These issues are discussed in chapter 5.

1.5 Additivity

The scalar presupposition is not the only inference that *even* gives rise to – it often induces an additive inference as well. This is illustrated in (30). Considering the discussion of the quantificational strength of the scalar presupposition, it is unsurprising that there has also been some debate with respect to the quantificational strength of the presupposition, as indicated in (30-b): e.g. Karttunen & Peters (1979) have proposed that it is existential, while van Rooy (2003) treats it as (restricted) universal inference.

(30) a. Even JOHN arrived late
  b. Additive inference: Some/all people other than John arrived late

The additive inference is commonly assumed to be a presupposition (or conventional implicature) (Karttunen & Peters 1979 and many others). This is supported by the data in (31): the additive inference cannot be suspended (31-a) ($\rightsquigarrow$ it is not a conversational implicature) and it shares projective behavior of presuppositions (31-b) ($\rightsquigarrow$ it is not part of assertion).

(31) a. #Even JOHN arrived late though, fortunately, no one else did
b. Possibly even JOHN arrived late
$\Rightarrow$ Some/all people other than John arrived late

However, not all occurrences of *even* are accompanied by an additive inference. Two factors play a role in this: (i) whether the alternatives in the domain of *even* are compatible with each other (32) and (ii) whether *even* is weak or not (33), i.e. whether *even* moves or not according to the scope theory. In (32), the alternatives in the domain of *even* are mutually exclusive and the inference that John danced only with someone else at yesterday's party is not generated; the sentence would be inconsistent if it were. In contrast, the alternatives in the domain of *even* in (30) are compatible and an appropriate additive inference is generated (von Stechow 1990, Rullmann 1997).

(32) Yesterday at the party, John even danced only with SUE
Additive inference: ——

In (33-a), we have a configuration where *even* must move above *sorry* at LF; no inference about how often John attended the class (or is sorry that he did) is triggered. For example, the sentence can be used in a context in which John attended the class exactly once. In (33-b), we have a configuration where *even* stays in situ; an additive inference is triggered that John is sorry that he attended the class twice (or more times).

(33) a. John is sorry that he attended the class even ONCE
Additive inference: ——
b. John is even sorry that he attended the class ONCE
Additive inference: that John is sorry that he attended the class twice

We will account for the asymmetries in (30)–(33) by assuming (i) that the additive and the scalar presupposition may be triggered in different positions – i.e. *even* decomposes into a scalar, which may move, and an additive component – and (ii) that the additive presupposition is wired to avoid contradictoriness or triviality (cf. Rullmann 1997).

1.6 Outline of the dissertation

- The first two chapters of the dissertation deal with weak *even* and NPIs occurring in the scope of non-downward-entailing operators:

Chapter 2: Non-monotonicity. We begin the chapter by discussing an approach to weak *even* that assumes that *even* may scope out of its base position at LF (Karttunen & Peters 1979, Lahiri 1998). The mechanics of the approach are illustrated on the occurrences of weak *even* in the scope of downward-entailing operators. A prediction of the approach is that weak *even* may also be acceptable under non-monotone operators. We show that the prediction is borne out: weak *even* is acceptable under non-monotone quantifiers if the sentence and the context of its use satisfy particular properties. The approach is extended to deal with certain poorly understood occurrences of NPIs in these environments.

Chapter 3: Desire. In this chapter we look at occurrences of weak *even* in desire statements, in imperatives and under certain modals. Two strategies are pursued in trying to explain these occurrences and the constraints they impose on the context. First: Desire predicates, imperative operators and certain modals have a non-monotone semantics (cf. Heim 1992, Levinson 2003, Villalta 2008, Lassiter 2011). The occurrence of weak *even* in their scope is correctly predicted to be possible. Second: Desire predicates, imperative operators and modals have an upward-entailing semantics (von Fintel 1999). The occurrence of weak *even* in their scope is thus unexpected. What rescues weak *even* in these environments is a grammatical strengthening mechanism. Both approaches face several challenges. In particular, the first approach faces a difficulty with data that is indicative of desire predicates etc. being upward-entailing operators, while the second approach faces a difficulty in constraining the strengthening mechanism to not overgenerate.

- The fourth and fifth chapter tackle the cross-linguistic differences between scalar particles. We discuss their decomposition and competition for insertion:

Chapter 4: Concessive scalarity. We begin the chapter by describing the distribution and semantic import of expressions that have been characterized as concessive scalar particles (Giannakidou 2007 and others). We account for their distribution by decomposing them into a scalar and an existential component. This decomposition together with independent mechanisms in grammar also allows us to correctly derive their semantic import which at first sight appears to be non-uniform across downward-entailing and modal environments.

Chapter 5: Scalar particles and competition. *Even* belongs to a variegated family of scalar particles. At least five classes of (non-concessive) scalar particles have been distinguished across languages (cf. Gast & van der Auwera 2011). The chapter begins by exemplifying these different classes. Subsequently, we show that this variation can be accounted for by assuming (i) that scalar particles differ with respect to two morphological parameters (whether they have an extra scalar component, a negative feature) and (ii) that they form scales and compete for insertion.

- The final chapter looks at the additive inference that commonly accompanies *even*:

Chapter 6: Additivity. The preceding four chapters focused solely on one component of the meaning of *even* – its scalar presupposition. This chapter looks at its second constitutive component – its additive presupposition. The focus is on the different additive entailments that arise when *even* associates with a weak predicate across an appropriate operator at surface structure and when *even* associates with a weak predicate in its immediate scope at surface structure. The differences in additive entailments are captured by a decomposition of *even* into two elements that may take distinct scopes at LF: a bearer of the scalar presupposition, EVEN, and a bearer of the additive presupposition, ADD.

CHAPTER 2

Non-monotonicity

The scalar particle *even* has a restricted distribution: if it associates with a weak element in its immediate surface scope – weak *even* for short – it must be appropriately embedded. The necessary condition on the appropriateness of the embedded environment is that it is not upward-entailing. That is, the environment either has to be (Strawson) downward-entailing or non-monotone. However, being embedded under a (Strawson) downward-entailing or a non-monotone operator is not yet a sufficient condition for the felicity of weak *even*: it also has to hold that the embedding sentence is less likely in the context than a salient alternative. A similar pattern is evinced also in the distribution of negative polarity items (NPIs).

The primary focus of the chapter is on the distribution of weak *even* and NPIs under non-monotone quantifiers. This distribution clearly discloses the dependence of the respective elements on the properties of the embedding sentences as well as the contexts of their use. We provide a uniform explanation of this sensitivity. The uniformity follows from the assumption that the distribution of NPIs may be governed by a covert *even*. This effectively reduces their licensing requirements to those of weak *even*. And weak *even* is licit under non-monotone quantifiers (and in other environments) if and only if *even* scopes above the non-monotone operator (or other non-upward-entailing operators) and triggers an inference that is satisfied in the context. The aforementioned sensitivity of weak *even* to the properties of the embedding sentences and the contexts of their use emerges from this.

The backdrop to our discussion is presented in section 2 where we look at weak *even* in downward-entailing environments. The felicity of the respective occurrences of weak *even* is explained in scope-theoretic terms: *even* triggers a correct presupposition because it moves out of its base position at LF (Karttunen & Peters 1979, Lahiri 1998). A prediction of the approach is that weak *even* may be acceptable also in the scope of non-monotone quantifiers. Section 3 shows that this prediction is borne out: if the context satisfies particular conditions, weak *even* is licit in the scope of non-monotone quantifiers. Section 4 describes an alternative approach to weak *even* according to which *even* under non-monotone quantifiers may be the spell-out of a different lexical item than in positive sentences. This is the so-called ambiguity approach to *even* (Rooth 1985, Rullmann 1997). It faces two issues: (i) it does not explain the sensitivity of weak *even* to factors external to the minimal clause in which it is located and (ii) it does not explain why weak *even* may occur in non-monotone but not upward-entailing environments. Section 5 extends the analysis of weak *even* to occurrences of NPIs under non-monotone quantifiers. We zoom in on the indefinite NPIs *any* and *ever*. Following Krifka (1995) and Chierchia (2006), we assume that structures containing *any* and *ever* contain an alternative-sensitive operator that associates with their domain; if the operator triggers correct inferences, the NPIs are 'licensed.' We show that if the operator is a covert *even*, the NPIs effectively instance weak *even* configurations and their licensing requirements reduce to those of weak *even*. Section 6 concludes.

2.1 Background

We describe Lahiri's (1998) approach to weak *even* in downward-entailing environments: if *even* triggers an unsatisfiable scalar presupposition in its base position, it may covertly move above a downward-monotone operator where its scalar presupposition may be satisfied (cf. Karttunen & Peters 1979, Heim 1984). The prediction of this approach is that weak *even* may be acceptable in other non-upward-entailing environments as well.

2.1.1 Likelihood and logic

Even triggers the scalar presupposition that the likelihood of its propositional argument is lower than that of a relevant alternative (Bennett 1982, Kay 1990). We assume in the following that this is the only semantic contribution of the particle.

(1) $[\![\textbf{even}]\!]^{g,c}$(C, p, w) is defined only if $\exists$q $\in$ C [p $\lhd_c$ q].
If defined, $[\![\textbf{even}]\!]^{g,c}$(C, p, w) = 1 iff p(w) = 1

For example, the sentence in (2-a) has the structure in (2-b) where *even* takes clausal scope at LF and associates with the focused element *John*. The meaning of the sentence is computed in (2-c): the sentence presupposes that there is an alternative that is more likely than that John arrived late, while its assertive meaning is that John arrived late.

(2) a. Even JOHN arrived late
b. **[even $\mathbf{C_1}$] [$\mathbf{John_F}$ arrived late]**
c. $[\![$ (2-b) $]\!]^{g,c}$(w) is defined only if $\exists$q $\in$ { that x arrived late | x is a relevant individual }: that John arrived late $\lhd_c$ q. If defined, $[\![$ (2-b) $]\!]^{g,c}$(w) = 1 iff John arrived late in w

The scalar presupposition triggered by *even* is subject to the principle in (3), which follows from the axioms of basic probability theory. The principle imposes a hard condition on the distribution of *even*: if *even* is adjoined to a clause whose focus alternatives entail it, it will trigger a scalar presupposition that is in violation of (3) and is thus unsatisfiable.

(3) Scalarity and entailment
If a proposition p entails a proposition q, q cannot be less likely than p

An illustration of the application of the principle is given in (4)–(6). The sentence in (4-a) has the structure in (4-b) where *even* associates with the weak element *once*. The domain of alternatives over which *even* quantifies is described in (4-c).

(4) a. #John arrived late even ONCE
b. **[even C_1] [John arrived late once$_F$]**
c. $C_1 \subseteq$ { that John arrived late n-times | n $\in \mathbb{N}_{>0}$ }

It holds that all the alternatives over which *even* quantifies entail its prejacent (5-a). The principle in (3) then tells us that the likelihood ordering in (5-b) obtains, i.e. it is at least as likely that John arrived late once as that he arrived late twice etc.

(5) Entailment and likelihood relations among alternatives
a. ... $\Rightarrow$ that John arrived late twice $\Rightarrow$ that John arrived late once
b. ... $\trianglelefteq_c$ that John arrived late twice $\trianglelefteq_c$ that John arrived late once

Even in (4-b) triggers the scalar presupposition in (6). This scalar presupposition contradicts the logical fact in (5-b). Namely, it cannot hold that there is an alternative that is more likely than that John arrived late once as well as that John arriving late once is at least as likely as all of its alternatives. That is, since the prejacent of *even* in (4-b) denotes a proposition that is entailed by its alternatives, it cannot be less likely than one of them.[1]

(6) $[\![$ (4-b) $]\!]^{g,c}$ is defined only if $\exists$q $\in C_1$: that John arrived late once $\lhd_c$ q

A puzzle emerges when we look at certain embedded occurrences of *even* — in particular at the occurrences of *even* in the scope of a (Strawson) downward-entailing (DE) operator. These are functions that satisfy the condition in (7), where the cross-categorial entailment ($\Rightarrow$) is defined as in (8) (von Fintel 1999).

(7) Strawson DE functions
A function f of type $\langle\delta,\tau\rangle$ is Strawson downward-entailing iff for all x,y of type δ such that x $\Rightarrow$ y and f(x) is defined: f(y) $\Rightarrow$ f(x)

(8) Cross-categorial entailment
a. For p, q of type t: p $\Rightarrow$ q iff p = 0 or q = 1
b. For f, g of type $\langle\delta,\tau\rangle$: f $\Rightarrow$ g iff for all x of type δ: f(x) $\Rightarrow$ g(x)

A sentence with weak *even* occurring in the scope of a DE operator is in (9-a). If the sentence were to have the structure in (9-b), it would trigger the scalar presupposition in (9-c). As

[1] Notice that as long as the domain of *even* contains more than one alternative, the scalar presupposition triggered by *even* in (4-b) violates (3) also if *even* were to quantify universally (i) (Karttunen & Peters 1979). Namely, since the domain of *even* contains alternatives that are not identical with the prejacent, these are falsely presupposed to be more likely than the prejacent.

(i) $[\![$ **even** $]\!]^{g,c}$(C, p, w) is defined only if $\forall$q $\in$ C [p $\neq$ q $\rightarrow$ p $\lhd_c$ q].
If defined, $[\![$ **even** $]\!]^{g,c}$(C, p, w) = 1 iff p(w) = 1

(ii) $[\![$ (4-b) $]\!]^{g,c}$ is defined only if $\forall$q$\in C_1$: q $\neq$ that J arrived late once $\rightarrow$ that J arrived late once $\lhd_c$ q we have seen in the preceding discussion, this presupposition is in violation of (3) and thus unsatisfiable. (9-a) should accordingly be pragmatically deviant, contrary to fact.

(9) a. John didn't arrive late even ONCE
b. **[not [[even $\mathbf{C_1}$] John arrived late $\mathbf{once_F}$]**
c. $C_1 \subseteq \{$ that John arrived late n-times $\mid n \in \mathbb{N}_{>0} \}$
d. $[\![$ (9-b) $]\!]^{g,c}$ is defined only if $\exists q \in C_1$: that John arrived late once $\lhd_c$ q

2.1.2 Rescue by movement

Karttunen & Peters (1979) have argued that *even* may covertly scope out of its base position (cf. Kay 1990 and others for a similar assumption). Naturally, since the arguments of *even* in its moved position are different from those of *even* in its base position, the scalar presuppositions of *even* in the two positions will differ as well. Lahiri (1998) builds on this insight to explain the asymmetry between positive and negative sentences with weak *even* that we have encountered above: a rescue hatch is available to *even* in negative sentences – it may covertly move above negation. That is, Lahiri assumes that in addition to (9-b), the sentence in (9-a) may also have the LF in (10-a) where there is an intervening entailments-reversing operator between the scoped *even* and its associate *once*. The alternatives over which *even* quantifies in its scoped position are described in (10-b): they are the relevant focus alternatives to the sister of the scoped *even*.

(10) a. **[even $\mathbf{C_1}$] [not ~~[even $\mathbf{C_1}$]~~ [John arrive late $\mathbf{once_F}$]]**
b. $C_1 \subseteq \{$ that John didn't arrive late n-times $\mid n \in \mathbb{N}_{>0} \}$

It holds that the prejacent of *even* in (10) entails all of its alternatives (11-a). According to the condition in (3), a satisfiable likelihood ordering on the alternatives in (10-b) will instance (11-b): the prejacent is at most as likely as all of its alternatives.

(11) Entailment and likelihood relations among alternatives
a. ... $\Leftarrow$ that John didn't arrived late twice $\Leftarrow$ that John didn't arrive late once
b. that John didn't arrive late once $\unlhd_c$ that John didn't arrive late twice $\unlhd_c$ ...

The scalar presupposition of (10-a), given in (12), is thus satisfiable. Since it is natural to assume that not all alternatives are equally likely, it is also true in the actual context. This explains the felicity of weak *even* in negative sentences.[2]

(12) $[\![$ (10-a) $]\!]^{g,c}$(w) is defined only if $\exists q \in C_1$: that John didn't arrive late once $\lhd_c$ q. If defined, $[\![$ (10-a) $]\!]^{g,c}$(w) = 1 iff John didn't arrive late once in w

[2]Notice that the same state of affairs obtains if *even* is defined as a universal quantifier: since all the alternatives are at least as likely as the prejacent, they may very well all be more likely than the prejacent.

(i) $[\![$ (10-a) $]\!]^{g,c}$ is defined only if $\forall q \in C_1$: q $\neq$ that John didn't arrive late once $\rightarrow$ that John didn't arrive late once $\lhd_c$ q. If defined, $[\![$ (10-a) $]\!]^{g,c}$(w) = 1 iff John didn't arrive late once in w

The same reasoning applies to occurrences of *even* in other DE environments, e.g. in the scope of downward-monotone quantifiers and in the antecedent clauses of conditionals. This is illustrated in (13) and (14). If *even* were to stay in situ in (13-a)/(14-a), it would trigger an incorrect scalar presupposition. However, if it moves above the respective downward-monotone operator, its sister (Strawson) entails all of its alternatives (15).[3]

(13) a. Less than three people arrived late even ONCE
b. **[even C_1] [less than three people] 1 [~~[even C_1]~~ t_1 arrived late once$_F$]**
c. $C_1 \subseteq$ { that less than three people arrived late n-times | $n \in \mathbb{N}_{>0}$ }

(14) a. If John arrived late even ONCE, he will be fired
b. **[even C_1] [if [~~[even C_1]~~ John arrived late once$_F$], he will be fired]**
c. $C_1 \subseteq$ { that if John arrived late n-times, he will be fired | $n \in \mathbb{N}_{>0}$ }

(15) Entailment relations among alternatives
a. ... that less than three people arrived late thrice $\Leftarrow$ that less than three people arrived late twice $\Leftarrow$ that less than three people arrived late once
b. ... that if John arrive late thrice he will be fired $\Leftarrow$ that if John arrive late twice he will be fired $\Leftarrow$ that if John arrive late once he will be fired

The scalar presuppositions triggered by *even* in (13-b) and (14-b) are given in (16). They comply with (3) and are correct: since the prejacent of *even* is the logically strongest alternative, it may very well be less likely than one of the other alternatives.

(16) a. $[\![$ (13-b) $]\!]^{g,c}$ is defined only if $\exists q \in$ { that less than three people arrived late n-times | $n \in \mathbb{N}_{>0}$ }: that less than three people arrived late once $\lhd_c$ q
b. $[\![$ (14-b) $]\!]^{g,c}$ is defined only $\exists q \in$ { that if John arrived late n-times, he will be fired | $n \in \mathbb{N}_{>0}$ }: that if John arrived late once he will be fired $\lhd_c$ q

2.1.3 Prediction

The core ingredient of Lahiri's (1998) proposal is that *even* may move to avoid triggering an incorrect presupposition. He has shown that if *even* that associates with a weak element in its immediate surface scope moves above negation or other downward-monotone operators

[3]It is worth pointing out that (14) is problematic for the movement theory of *even*, as has been forcefully argued by Rullmann (1997). Namely, we are required to assume that *even* moves out of an adjunct clause, which is otherwise an island for movement.

> One suspicious feature of the scope theory is that it attempts to solve a semantic problem by assigning wide scope to an element without any independent justification that this sort of exceptional scope assignment is actually possible (Rullmann 1997:48)

A possible way to defuse this issue has been suggested by Lahiri (2006): the scalar presupposition that accompanies sentences with *even* is triggered by an *even*-like operator (EmphAssert in Krifka 1995, E in Chierchia 2006) that is attached at the clausal level to check the relevant feature of *even*; *even* itself is truth-conditionally vacuous, it stays in situ and primarily conditions the insertion of the *even*-like operator. In the following, however, we retain for perspicuity reasons the more common assumption that *even* itself moves and that it can exceptionally move out of islands. We defer a more systematic study of the exceptional scope of scalar particles in English and across languages to another occasion.

at LF (17), the resulting structure can have a consistent and plausible interpretation since downward-monotone operators reverse entailments. That is, the scalar presupposition that *even* triggers in its derived position accords with the condition in (3): its prejacent is not entailed by its alternatives.

(17) $\mathbf{[even\ C]\ [_{\downarrow}\ OP_{DE}\ [_{\uparrow}\ \ldots\ \cancel{[even\ C]}\ one_{F}\ \ldots]}$

However, if *even* associates with a weak predicate in its immediate surface scope, movement of *even* across an operator that reverses entailments is not a necessary but a sufficient condition for compliance with (3). Rather, the necessary condition is that *even* moves across an operator that is not upward-entailing. Besides downward-monotone operators, these include non-monotone operators.

(18) A prediction of the scope-theoretic approach to *even*

A sentence with a weak *even* may be acceptable if *even* is at surface structure in the scope of a (Strawson) downward-monotone operator or a non-monotone operator, i.e. in the scope of a non-upward-monotone operator

Thus, sentences that instance a configuration along the lines of (19) where *even* associates with *one* and moves across a non-monotone operator at LF will have interpretations that are compliant with (3) – the scalar presupposition of scoped *even* is satisfiable. However, a consistent interpretation is not necessarily a plausible interpretation. The following section investigates the conditions under which such presuppositions are plausible.

(19) $\mathbf{[even\ C]\ [_{\not\uparrow\not\downarrow}\ OP_{NM}\ [_{\uparrow}\ \ldots\ \cancel{[even\ C]}\ one_{F}\ \ldots]}$

2.2 Non-monotonicity

We show that weak *even* is acceptable in the scope of non-monotone quantifiers if particular conditions obtain in the context. These conditions are more involved than those imposed by the occurrences of weak *even* under downward-monotone operators.

2.2.1 Consistency

Quantifier phrases of the form *exactly n NP* denote functions that are non-monotone in both their restrictor and their scope. A function is non-monotone iff it is neither upward-monotone nor (Strawson) downward-monotone:

(20) Non-monotone functions

A function f of type $\langle \delta, \tau \rangle$ is non-monotone iff (i) there are x,y of type δ s.t. $x \Rightarrow y$, f(x) is defined and $f(y) \not\Rightarrow f(x)$ and (ii) there are x,y of type δ s.t. $x \Rightarrow y$, f(y) is defined and $f(x) \not\Rightarrow f(y)$

The non-monotonicity of *exactly* QPs is illustrated in (21) and (22). For example, if exactly three people ate kale and another person ate carrots, it is false that exactly four people ate kale but true that exactly four people ate vegetables (21-a). On the other hand, in a situation in which exactly four people ate kale and another person ate carrots, it is true that exactly four people ate kale but false that exactly four people ate vegetables (21-b).

(21) <u>Non-monotonicity of the scope of *exactly* QPs</u>
  a. Exactly 4 people ate vegetables $\not\Rightarrow$ Exactly 4 people ate kale
  b. Exactly 4 people ate kale $\not\Rightarrow$ Exactly 4 people ate vegetables

(22) <u>Non-monotonicity of the restrictor of *exactly* QPs</u>
  a. Exactly 4 people who ate vegetables left $\not\Rightarrow$ Exactly 4 people who ate kale left
  b. Exactly 4 people who ate kale left $\not\Rightarrow$ Exactly 4 people who ate vegetables left

A few examples in which *even* associates with a weak predicate (*open, once, one*) in its immediate scope under a non-monotone quantifier are given in (23). An example with *even* associating with a weak predicate in the restrictor of a non-monotone quantifier is in (24).

(23) a. Exactly four people in the whole world have even OPENED that dissertation
  b. Exactly two congressmen have read the constitution even ONCE – Dennis Kucinich and Ron Paul
  c. Exactly ten percent of American teenagers have read even ONE book

(24) Exactly two people who even OPENED that dissertation were present at the defense

The scalar presupposition triggered by *even* in these sentences is satisfiable if *even* scopes above the non-monotone quantifiers. We illustrate this for (23-a): the sentence has the structure in (25-b) and *even* quantifies over the alternatives in (25-c).

(25) a. Exactly four people in the whole world have even OPENED that dissertation
  b. **[even C_1] [$_{\not\uparrow\not\downarrow}$ [exactly four people] 1 [$_{\uparrow}$ ~~[even C_1]~~ t_1 have opened$_F$ that dissertation]]**
  c. $C_1 \subseteq$ {that exactly 4 people x that dissertation | x is open, read or understand}

It holds that the alternatives in (25-c) are mutually logically independent (26-a). In particular, none of the alternatives except the prejacent entail the prejacent (26-b).

(26) a. $\forall$p, q $\in C_1$: p $\neq$ q $\rightarrow$ p $\cap$ q $\notin$ {p, q, $\emptyset$}
  b. $\forall$p $\in C_1$: p $\subseteq$ that exactly four people opened the dissertation
  $\rightarrow$ p = that exactly four people opened the dissertation

The scalar presupposition triggered by *even* in (25-b) is thus satisfiable, i.e. it is compliant with the condition in (3): propositions that are mutually logically independent may in principle stand in any kind of likelihood relation to each other.

(27) $[\![$ (25-b) $]\!]^{g,c}$(w) is defined only if $\exists$q $\in C_1$: that exactly four people in the whole world opened that dissertation $\lhd_c$ q. If defined, $[\![$ (25-b) $]\!]^{g,c}$(w) = 1 iff exactly four people in the whole world opened that dissertation in w

However, satisfiability does not imply plausibility. This can be seen if we slightly modify the examples in (23). Two types of modifications of the quantifier phrase are made in (28): in one case the domain of the quantifier phrase is narrowed (28-a), while in the other cases a higher numeral is used in the quantifier phrase (28-bc). The sentences are pragmatically deviant. Notice that if the associate of *even* in (28) is replaced by a strong element, the sentences become acceptable (29).

(28) a. #Exactly four of the five people attending the seminar have even OPENED that dissertation before the first session
b. #Exactly four hundred congressmen have read the constitution even ONCE
c. #Exactly fifty percent of American teenagers have read even ONE book

(29) a. Exactly four people of the five people attending the seminar have even UNDERSTOOD that dissertation
b. Exactly four hundred congressmen have read the constitution even SEVEN times

A slightly different type of modification is made in (30). It concerns the content of the main predicate: they are modified in such a way that their extension naturally consists of few individuals that satisfy the description in the quantifier phrase. Again, if the weak associates are replaced by strong associates, the acceptability of the sentences improves (31).

(30) a. #Exactly four people in the whole world have even OPENED that dissertation that is practically impossible to obtain
b. #Exactly ten percent of congressmen were involved in even ONE sex scandal

(31) a. Exactly four people in the whole world have even UNDERSTOOD that dissertation that is practically impossible to obtain
b. Exactly ten percent of congressmen were involved in even SEVEN sex scandals

2.2.2 Plausibility

The goal of the rest of this section is to explain the contrast observed between (23), (28) and (30), and to pinpoint the conditions that the sentences and the contexts of their use need to satisfy for the scalar presupposition triggered by weak *even* to be correct.

The correctness of the scalar presupposition depends on (i) what probability distributions on the number of individuals that are both in the domain of the non-monotone quantifier and in the main predicate are compatible with the context and on (ii) what probability distributions on the number of individuals that are both in the domain of the non-monotone quantifier and in the respective alternative to the main predicate are compatible with the context. If we make an innocuous assumption that these distributions are approximately normal and have comparable variances,[4] which we do in the following, we may say that the correctness of the scalar presupposition depends, roughly, on how many individuals in the domain of the non-monotone quantifier are expected to be in the denotation of the main predicate and its alternatives. For example, if the sentence is the one given in (32), its felicity depends primarily on how many people in the world are expected to open and, say, read that dissertation.

[4] This assumption may in fact be weakened. Since we remain largely informal in the following, we leave a thorough specification of this condition to another occasion.

(32) Exactly four people in the whole world have even OPENED that dissertation

This expectation together with the innocuous assumptions about probability distributions translates into the likelihoods of the prejacent and its alternatives. More to the point, a proper understanding of the likelihood of the respective alternatives over which *even* quantifies is achieved by comparing each alternative to appropriate propositions with which it spans the logical space (this is where the different probability distributions enter the picture). For example, (a) the likelihood that exactly four people in the world opened that dissertation depends on (b) the likelihood that more than four people in the world opened that dissertation and (c) the likelihood that less than four people in the world opened that dissertation. If either (b) or (c) is very high, then (a) will be low. This follows from the fact that (a), (b) and (c) are likelihoods of mutually exclusive propositions that span the logical space; if one of the likelihoods is high, the other two likelihoods are low according to Kolmogorov's third axiom. Thus, if the expectation is that, say, fifty people opened that dissertation (and the discrete probability distribution is approximately normal), the likelihood that more than four people opened it is high (b), the likelihood that less than four people opened it is ignorable (c), and (a) is appropriately low.

We begin by explaining the correctness of the scalar presupposition triggered by *even* in (32), repeated in (33-a). That is, we begin by describing the contexts in which it is less likely that exactly four people in the whole world opened that dissertation than that exactly four people in the whole world read that dissertation. Subsequently, we show why an analogous explanation does not go through with the deviant examples in (28) and (30).

(33) a. Exactly four people in the whole world have even OPENED that dissertation
b. $\exists$q $\in$ {that exactly 4 people x that dissertation | x is open, read or understand}:
that exactly 4 people opened that dissertation $\lhd_c$ q

Plausible presuppositions

The reason behind why the relation described in (33-b) is correct in the actual context is threefold:[5] (i) there is an expectation that more than four people in the world will open that dissertation, (ii) this expectation is significantly greater than the expectation that more than four people in the world will read that dissertation (not only because the latter proposition entails the former), and (iii) it is not expected that less than four people will open or read the dissertation, i.e. the difference in expectation that less than four people will open that dissertation and that less than four people will read that dissertation is negligible. This is graphically represented in Figure 2-1: it is expected that, say, around thirty-five people opened that dissertation, that around twenty people read that dissertation, and that around ten people understood that dissertation.

These factors, together with our innocuous assumptions about the probability distributions, conspire to allow the likelihood that exactly four people in the world opened that dissertation to be lower than the likelihood that exactly four people in the world read that

[5]For brevity, we will assume in the following that the existential statement in (33-b) is verified by the proposition that exactly four people read that dissertation.

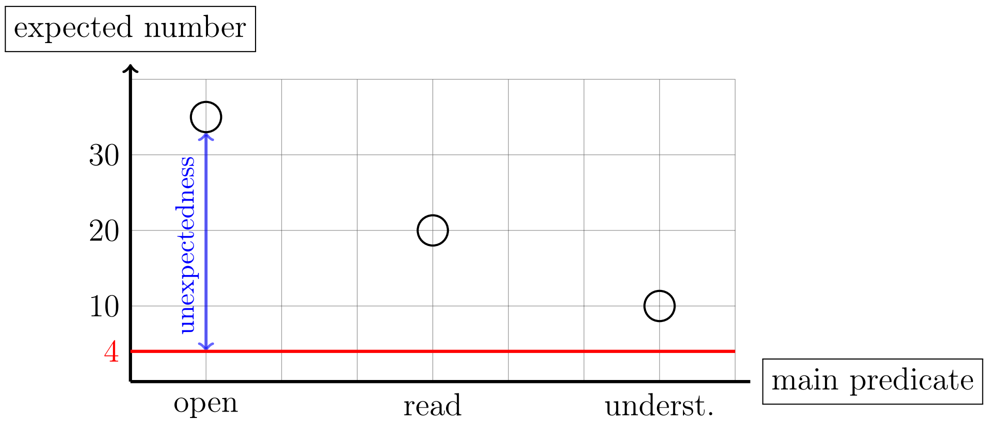

Figure 2-1: Expected number of people x-ing that dissertation. Indication of the unexpectedness of exactly four people in the whole world having opened that dissertation.

dissertation – i.e. it is more unexpected that only exactly four people opened that dissertation than that only exactly four people read or understood that dissertation (cf. (i) the distance in Figure 2-1 between the expected number of people that VP-ed and the value that exactly four people VP-ed, where VP is open, read or understand and (ii) the assumption that the probability distributions of that exactly n people VP-ed are approximately normal for all VPs with comparable variances).

More formally, the likelihoods of the relevant alternatives are determined as in (34) and (35). These formulas are corollaries of Kolmogorov's third axiom and the fact that the respective propositions partition the logical space (that more than four, exactly four and less than four people VP-ed). To verify the scalar presupposition in (33-b), we need to show that (34) is lower than (35) in the actual context.

(34) the likelihood that exactly 4 people in the world opened that dissertation
= 1 – the likelihood that more than 4 people in the world opened that diss.
– the likelihood that less than 4 people in the world opened that diss.

(35) the likelihood that exactly 4 people in the world read that dissertation
= 1 – the likelihood that more than 4 people in the world read that diss.
– the likelihood that less than 4 people in the world read that diss.

The comparison between (34) and (35) can be represented as in the table in Figure 2-2: the prejacent and the relevant alternative are situated with respect to propositions with which they span the logical space.[6] (34) corresponds to β, while (35) corresponds to β'. And (34) is lower than (35) iff the relation described in (36) obtains.

[6]If the random variables X and Y are defined as in (i), Figure 2-2 effectively represents the probability distributions of X and Y. The presupposition is satisfied if $\Pr(X = 4) = \Pr(\{w \mid X(w)=4\}) < \Pr(Y = 4)$.

(i) a. X = λw. the n that exactly n people in the world opened that dissertation
b. Y = λw. the n that exactly n people in the world read that dissertation

Proposition	Pr
no one – open	α
...	
exactly three – open	
exactly four – open	β
exactly five – open	γ
...	

Proposition	Pr
no one – read	α'
...	
exactly three – read	
exactly four – read	β'
exactly five – read	γ'
...	

Figure 2-2: Likelihoods (β,β') of two alternatives

(36) Restatement of the scalar presupposition (33-b)
$\beta = 1 - \alpha - \gamma < \beta\text{'} = 1 - \alpha\text{'} - \gamma\text{'}$. Equivalently: $\alpha\text{'} - \alpha < \gamma - \gamma\text{'}$

The scalar presupposition in (33-b) is felicitous if γ is considerably higher that γ' in the preceding table (more people are expected to open than to read the dissertation), while the difference between α and α' is small (it is relatively unlikely that less than four people in the world opened or read that dissertation). As we have indicated in Figure 2-1, this easily obtains in the actual contexts and the presupposition in (33-b) is thus not only compatible with (3) but also correct (the quantification is verified by the proposition that exactly four people read that dissertation). This means that the occurrence of weak *even* in (33-a) is acceptable in the respective context.

If the context were such that it would be expected that only few people have read that dissertation, the scalar presupposition in (33-b) would be false and weak *even* would not be acceptable. An example of such a context is one where *that dissertation* refers to a dissertation in a field where dissertations do not serve a purpose other than satisfying an antiquated degree requirement. This is arguably the case in biosciences where dissertations tend to be commented compendia of previously published papers that are quickly superseded by newer papers. In this case, the expectation is that fewer than four people will open that dissertation and that at most the main supervisor will read and understand it, as indicated in Figure 2-3. Accordingly, in such a context, due to an approximately normal probability distribution, it is more unexpected that exactly four people read (and understood) that dissertation than that exactly four people opened that dissertation. And this transfers to the respective likelihoods: it is more likely that exactly four people opened that dissertation than that exactly four people read that dissertation. The scalar presupposition triggered in (33-b) is false in such a context and weak *even* is unacceptable:

(37) #Exactly four people in the world even OPENED that (biosciences) dissertation

In the cases where the associate of *even* is a numeral, the same reasoning applies. For example, the sentence in (38-a) has the structure in (38-b) and triggers the scalar presupposition in (38-d). In the following we assume for brevity that the verifier of the scalar presupposition is the proposition that exactly two congressmen read the constitution twice.

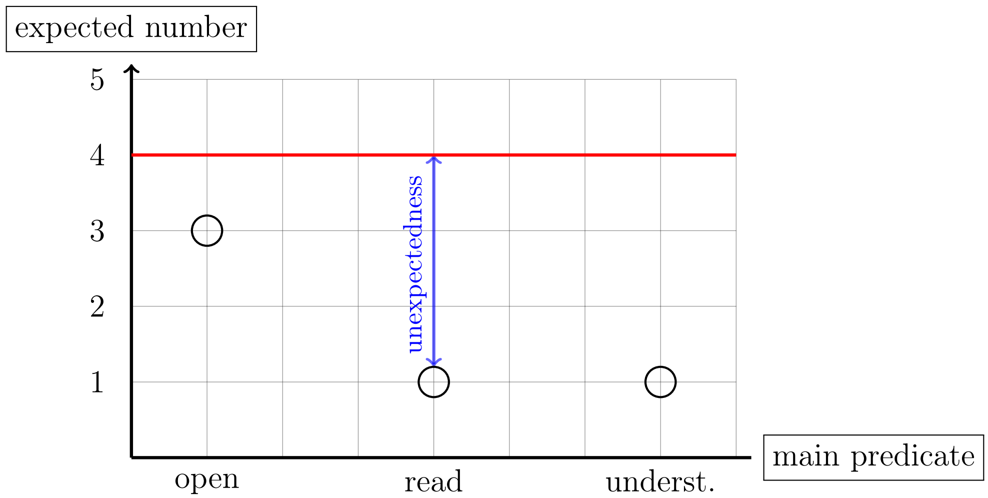

Figure 2-3: Expected number of people x-ing that (biosciences) dissertation. Indication of the unexpectedness of exactly four people in the whole world having read that dissertation.

(38) a. Exactly two congressmen have read the constitution even ONCE
b. **[even $\mathbf{C_1}$] [exactly 2 congressmen read the constitution $\mathbf{once_F}$]**
c. $C_1 \subseteq$ { that exactly 2 congressmen read the constitution n times | $n \in \mathbb{N}_{>0}$ }
d. $\exists q \in C_1$: that exactly 2 congressmen read the constitution once $\lhd_c$ q

The scalar presupposition is plausible in the actual context. Namely, in the actual context the expectation is that many congressmen read the constitution once (say, around two hundred) but that few of these congressmen read the constitution more than once (say, around fifty congressmen read it thrice), as indicated in Figure 2-4. Accordingly, on some natural assumptions about probability distributions, it is more unexpected that only exactly two congressmen read the constitution once than that exactly two congressmen read the constitution twice or more often.

These expectations suffice for the plausibility of (38-c): (i) the likelihood that exactly two congressmen have read the constitution once is low because of the high likelihood that more than two congressmen have read it once; (ii) the likelihood that exactly two congressmen have read the constitution twice is higher because it is not as likely that more than two congressmen have read it twice as that more than two congressmen have read it once. This is schematized in (39): (39-c) follows from Kolmogorov's third axiom and the fact that the respective propositions partition the logical space. Thus, the existential presupposition described in (38-c) is not only consistent but also correct in the actual context. This means that the occurrence of weak *even* in (38-a) is felicitous. As before, if the expectations in the context were different, the scalar presupposition might be false and weak *even* unacceptable.[7]

[7] At this point, it is worth looking at the prediction for (38-a) by the approach that adopts a universal scalar presupposition (Karttunen & Peters 1979). The unrestricted universal scalar presupposition of *even* in (38-a) is given in (i). It is trivially false: since it is practically impossible that exactly two congressmen have read the constitution, say, a thousand times, it cannot be the case that it is least likely that exactly

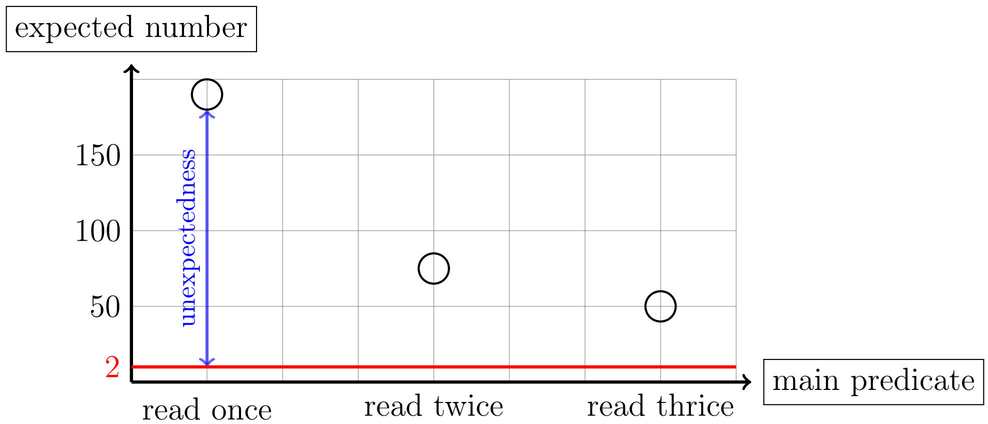

Figure 2-4: Expected number of congressmen reading the constitution x times. Indication of the unexpectedness of exactly two congressmen reading the constitution once.

(39) a. Pr (more than 2 – once) >> Pr (more than 2 – twice)
b. Pr (less than 2 – once) ≈ Pr (less than 2 – twice) ≈ 0
c. ⇒ $\boxed{\text{Pr (exactly 2 – one) < Pr (exactly 2 – twice)}}$

The generalization underlying the distribution of weak *even* under non-monotone quantifiers furnished by the above discussion is in (40): if the context is such that the main predicate and its stronger alternatives are expected to obtain of relatively many individuals in the domain of the non-monotone quantifier, then it is, on some natural assumptions about the probability distributions, less likely that the weak main predicate obtains of relatively few individuals than that some stronger alternative obtains of relatively few individuals.

(40) Generalization about low numbers (proportions)
If P and P' are alternative predicates with P' ⇒ P and P is very likely to obtain of relatively many individuals, then it holds that it is less likely that P will obtain of a relatively low number of individuals than that P' will obtain of a relatively low number of individuals

two congressmen read the constitution once.

(i) ∀q ∈ {that exactly two congressmen have read the constitution n times | n ∈ $\mathbb{N}_{>0}$}:
that exactly two congressmen have read the constitution once $\lhd_c$ q

Accordingly, as was accentuated in the introductory chapter, an appropriate restriction of the domain of quantification of *even* is required – e.g. to propositions that describe congressmen reading the constitution a reasonable number of times (ii). This restricted presupposition is satisfied in the actual context and weak *even* is predicted to be acceptable.

(ii) ∀q ∈ {that exactly two congressmen have read the constitution n times | 0<n<5}:
that exactly two congressmen have read the constitution once $\lhd_c$ q

Implausible scalar presuppositions: QP variants

We have already described some special contexts in which sentences containing weak *even* under non-monotone quantifiers are unacceptable (cf. dissertations in biosciences example). We now turn to two classes of sentences with weak *even* under a non-monotone quantifier that are unacceptable in most natural contexts, including the actual context. We begin by looking at the variants of (23) in which we have tinkered with the quantifier phrase. The first example is the sentence in (41-a): if *even* stays in situ, it triggers an unsatisfiable presupposition; if *even* scopes above the non-monotone quantifier, as in (41-b), it triggers the scalar presupposition in (41-c). This presupposition is satisfiable – it complies with (3).

(41)
a. #Exactly four of the five people attending the seminar have even OPENED that dissertation before the first session
b. **[even $\mathbf{C_1}$] [$_{\not\uparrow\not\downarrow}$ [exactly four people] 1 [$_\uparrow$ ~~[even $\mathbf{C_1}$]~~ $\mathbf{t_1}$ have opened$_\mathbf{F}$ that dissertation]]**
c. $\exists$q $\in$ {that exactly 4 people of the 5 people x that dissertation before the first session | x is open, read or understand}: that exactly 4 people of the 5 people opened that dissertation before the first session $\lhd_c$ q

However, the presupposition is incorrect. Namely, the expectation in the actual context is that few people will open the assigned readings prior to the first session of the seminar. For example, if the seminar consists of five participants, the expectation in the actual context is that perhaps three students open the assigned readings, two of these students read them, and one student understands them, as indicated in Figure 2-5. In accordance to this, it is more unexpected for exactly four of the five students to read or understand that dissertation than for exactly four of the five students to open that dissertation (cf. the distance between the expected number of people that VP-ed and the value that exactly four people VP-ed, where VP is open, read or understand in Figure 2-5 and the assumption of the probability distribution being approximately normal). In terms of likelihood: since it is more likely that less than four people read or understood that dissertation than that less than four people opened that dissertation (42-b) and it is unlikely that more than four students read it, it follows from Kolmogorov's third axiom that it is less likely that exactly four of the five students read or understood that dissertation than that exactly four of the five people opened that dissertation (42-c). The scalar presupposition in (41-c) is thus false in the actual context, which explains the pragmatic deviance of the sentence with weak *even* in (41-a).

(42)
a. $\text{Pr (more than 4 – open)} \approx \text{Pr (more than 4 – read)} \approx 0$
b. $\text{Pr (less than 4 – open)} \leq \text{Pr (less than 4 – read)}$
c. $\Rightarrow \boxed{\text{Pr (exactly 4 – open)} \geq \text{Pr (exactly 4 – read)}}$

The explanation of the pragmatic deviance of (28-b) proceeds similarly: the sentence has the structure in (43-b) and triggers the scalar presupposition in (43-c). The sentence is pragmatically deviant because the likelihood of the prejacent of scoped *even* is greater than the likelihood of the proposition that exactly four hundred congressmen have read the constitution twice or more times. We explicate this in the following.

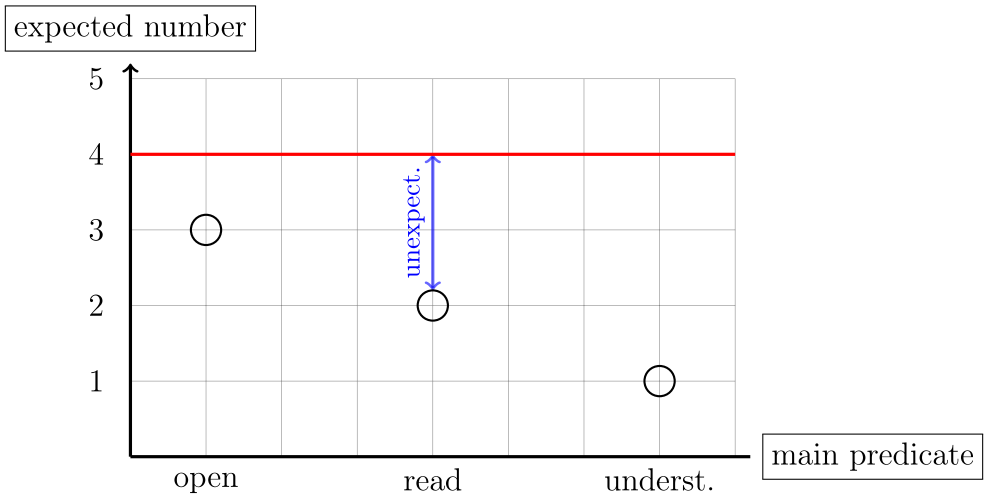

Figure 2-5: Expected number of people attending having x that dissertation. Indication of the unexpectedness of exactly four people in the seminar having read that dissertation.

(43) a. #Exactly four hundred congressmen have read the constitution even ONCE
b. **[even C_1] [$_{\not\uparrow\not\downarrow}$ exactly 400 congressmen read the constitution once$_F$]**
c. $\exists$q $\in$ { that exactly 400 congressmen have read the constitution n times | n $\in$ $\mathbb{N}_{>0}$ }: that exactly 400 congressmen have read the constitution once $\lhd_c$ q

The expectation in the actual context is that many congressmen read the constitution at least once (say, close to four hundred) and that much fewer congressmen read the constitution more than once (say, around two hundred read it twice and, optimistically, around one hundred read it thrice etc), as indicated in Figure 2-6.

It thus holds that although (i) it is likely that less than four hundred congressmen read the constitution once, (ii) it is much more likely that less than four hundred congressmen have read the constitution twice (or more often) (44-b). It follows that the likelihood that exactly four hundred congressmen read the constitution once is at least as great as that exactly four hundred congressmen read it twice (or more often) (44-c). This means that the scalar presupposition in (43-c) is false in the actual context, resulting in the pragmatic deviance of the sentence.

(44) a. Pr (more than 400 – once) $\approx$ Pr (more than 400 – twice) $\approx$ 0
b. Pr (less than 400 – once) << Pr (less than 400 – twice)
c. $\Rightarrow$ $\boxed{\text{Pr (exactly 400 – once) } \geq \text{ Pr (exactly 400 – twice)}}$

The generalization underlying the infelicity of weak *even* in above examples is compiled in (45): if the context is such that the stronger alternatives to the main predicate are expected to obtain of relatively few individuals in the domain of the non-monotone quantifier, then it is more likely that the weak main predicate obtains of relatively many individuals than that some stronger alternative obtains of relatively many individuals.

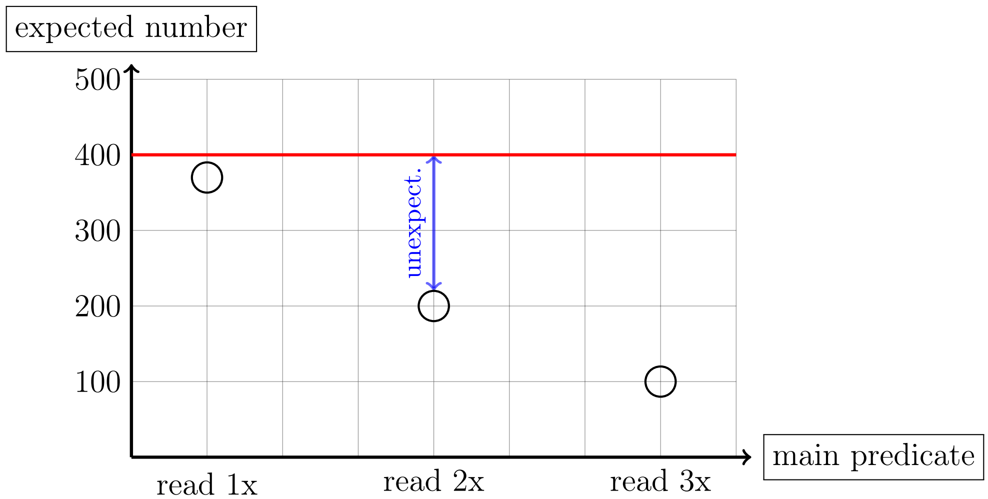

Figure 2-6: Expected number of congressmen having read the constitution x times. Indication of the unexpectedness of exactly 400 congressmen having read the constitution twice.

(45) Generalization about high numbers (proportions)
If P and P' are alternative predicates with P' ⇒ P and P' is very likely to obtain of relatively few individuals, then it is less likely that P' will obtain of a relatively high number of individuals than that P will obtain of a relatively high number of individuals

Implausible scalar presuppositions: VP variants

We now switch to the variants of (23) in which the main predicate and its alternatives are unlikely to obtain of many individuals (30). A pertinent example is in (46): the structure of the sentence in (46-a) is given in (46-b) and its satisfiable scalar presupposition is given in (46-c) – since the alternatives in the domain of *even* are mutually logically independent, any likelihood ordering may obtain on them.

(46) a. #Exactly ten percent of congressmen were involved in even ONE sex scandal
b. **[even C_1] [$_{\not\uparrow\not\downarrow}$ exactly 10% of congressmen were involved in one$_F$ sex scandal]**
c. ∃q ∈ { that exactly 10% of congressmen were involved in n sex scandals | n ∈ $\mathbb{N}_{>0}$ }: that exactly 10% of congressmen were involved in one sex scandal $\lhd_c$ q

Similar to our discussion of dissertations in biosciences, it is expected that the main predicate obtains of only few individuals in the domain of the non-monotone quantifiers (say, around five percent of congressmen) and that the stronger alternatives to the main predicate obtain of even fewer individuals, as indicated in Figure 2-7. It is thus more unexpected that exactly 10% of congressmen were involved in, say, two sex scandals than that exactly 10% of congressmen were involved in one sex scandal. This transfers to likelihoods of the respective propositions: it is more likely that exactly 10% of congressmen were involved in one sex scandal than that exactly 10% of congressmen were involved in two or more sex scandals. Thus, the scalar presupposition in (46-c) is incorrect, which explains the infelicity of (46-a).

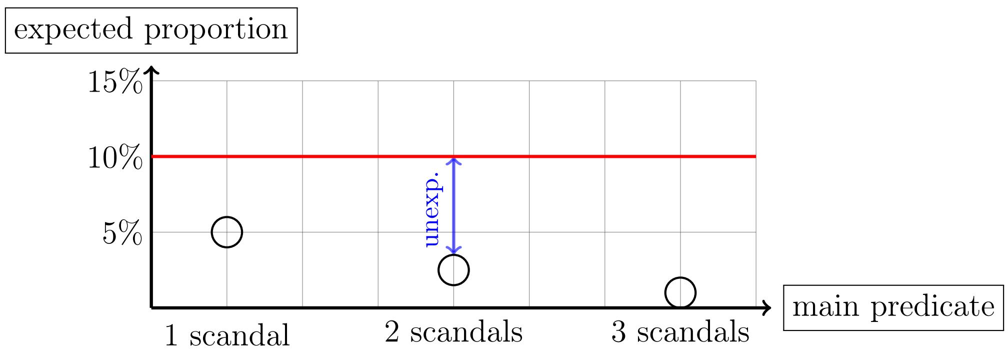

Figure 2-7: Expected percentage of congressmen involved in x sex scandals. Indication of the unexpectedness of exactly 10% of congressmen being involved in two sex scandals.

The generalization underlying the infelicity of weak *even* in the above example is an extreme case of (40): if the context is such that the main predicate and its stronger alternatives are expected to obtain of very few or perhaps no individuals in the domain of the non-monotone quantifier (and the respective probability distributions are approximately normal), then it is more likely that the weak main predicate obtains of relatively few individuals than that some stronger alternative obtains of relatively few individuals.

(47) <u>Generalization about hard alternatives</u>
If P and P' are alternative predicates with P' ⇒ P and P' is very unlikely to obtain of any number of individuals, then it is less likely that P' will obtain of a relatively low number of individuals than that P will obtain of a relatively low number of individuals

2.2.3 Summary

If *even* associates with a weak predicate in the scope of a non-monotone operator, it triggers a consistent scalar presupposition if it covertly scopes above the non-monotone operator (48). Namely, in that case, the alternatives over which *even* quantifies are mutually logically independent and in principle any likelihood ordering may hold on them, including the one presupposed by *even*.

(48) $\textbf{[even C] [}_{\not\uparrow\not\downarrow}\ \textbf{OP}_{\textbf{NM}}\ \textbf{[}_{\uparrow}\ \ldots\ \cancel{\textbf{[even C]}}\ \textbf{one}_{\textbf{F}}\ \ldots\textbf{]}$

The scalar presupposition that *even* triggers in its scoped position is not necessarily correct. That is, particular conditions need to obtain in the context for the sentence with weak *even* under a non-monotone quantifier to be licit. These conditions relate to the expectations about how many individuals in the domain of the non-monotone quantifier are in the denotation of the main predicate and its alternatives (and the respective probability distributions). We have derived three generalizations concerning these conditions.

The first generalization underlies the fact that weak *even* may occur in the scope of a non-monotone quantifier that contains a low numeral or proportion. The predicate P in (49) corresponds to the meaning of the VP containing the weak associate of *even* – e.g. *open that dissertation* in (50)– while P' is its relevant focus alternative – e.g. *read that dissertation*. If it is expected that many people opened that dissertation and that sufficiently fewer people read that dissertation, the scalar presupposition in (50) is correct: it is less likely that only exactly four people opened that dissertation than that exactly four people read that dissertation.

(40) Generalization about low numbers (proportions)

If P and P' are alternative predicates with P' $\Rightarrow$ P and P is very likely to obtain of relatively many individuals, then it holds that it is less likely that P will obtain of a relatively low number of individuals than that P' will obtain of a relatively low number of individuals

(49) Exactly four people in the whole world have even OPENED that dissertation

The second generalization is the obverse of the first generalization and underlies the fact that weak *even* may not occur in the scope of a non-monotone quantifier that contains a high numeral or proportion.

(45) Generalization about high numbers (proportions)

If P and P' are alternative predicates with P' $\Rightarrow$ P and P' is very likely to obtain of relatively few individuals, then it is less likely that P' will obtain of a relatively high number of individuals than that P will obtain of a relatively high number of individuals

For example, since it is expected that fewer than four hundred congressmen read the constitution once or more times, it is more likely that exactly four hundred congressmen read the constitution once than that exactly four hundred congressmen read the constitution, say, twice. This explains the infelicity of weak *even* in (50-b).

(50) a. Exactly two congressmen have read the constitution even ONCE
b. #Exactly four hundred congressmen have read the constitution even ONCE

The third generalization, which is an extreme case of the first generalization, underlies the fact that weak *even* may not occur in the scope of a non-monotone quantifier that contains a low numeral or proportion if the main predicate and its alternatives are expected to obtain of only few or no individuals in the domain of the non-monotone quantifier.

(51) Generalization about hard alternatives

If P and P' are alternative predicates with P' ⇒ P and P' is very unlikely to obtain of any number of individuals, then it is less likely that P' will obtain of a relatively low number of individuals than that P will obtain of a relatively low number of individuals

For example, since it is expected that only very few congressmen were involved in a sex scandal, it is more likely that exactly ten percent of congressmen (= a relatively low proportion) were involved in one sex scandal than that exactly ten percent of congressmen were involved in more than one sex scandal. This explains the infelicity of weak *even* in (52-b).

(52) a. Exactly ten percent of congressmen read even ONE book
b. #Exactly ten percent of congressmen were involved in even ONE sex scandal

2.3 Ambiguity

We have assumed above that sentences with weak *even* are acceptable only if *even* moves above an appropriate operator at LF. An alternative to this approach has been developed by Rooth (1985): in certain environments, *even* may be assigned a meaning that is the reverse of the meaning of *even* in positive sentences.

2.3.1 Downward-entailingness

A different resolution of the contrast in (53) is possible if Rooth's (1985) ambiguity approach to *even* is adopted.[8] According to this approach, *even* comes in two varieties, given in (54). The first lexical item is identical to the one proposed by Karttunen & Peters (1979) and has an unrestricted distribution (54-a), while the second item triggers the reverse presupposition and has the distribution of a negative polarity item (54-b).

(53) a. #John arrived late even ONCE
b. John didn't arrive late even ONCE

(54) a. $[\![\textbf{even}]\!]^{g,c}$(C, p, w) is defined only if $\forall q \in C\ [\ p \neq q \rightarrow p \lhd_c q]$.
If defined, $[\![\textbf{even}]\!]^{g,c}$(C, p, w) = 1 iff p(w) = 1
b. $[\![\textbf{even}_{\textbf{NPI}}]\!]^{g,c}$(C, p, w) is defined only if $\forall q \in C\ [\ p \neq q \rightarrow q \lhd_c p]$.
If defined, $[\![\textbf{even}_{\textbf{NPI}}]\!]^{g,c}$(C, p, w) = 1 iff p(w) = 1

Nothing changes with respect to occurrences of weak *even* in positive episodic sentences. For example, the sentence in (53-a) is deviant since only a plain *even* may occur in it, which triggers an incorrect scalar presupposition (55-a); negative polarity *even* is not licensed in a positive sentences (55-b).

[8] Parallel to our discussion in the introductory chapter, an existential variant of the scalar presupposition is possible on this approach as well. Since we reject the approach on other grounds, we stick to Rooth's original formulation. We continue to ignore the additive presupposition as before.

(55) a. #**[even C_1] [John arrived late once$_F$]**
b. ***[even$_{NPI}$ C_1] [John arrived late once$_F$]**

This changes in negative sentences. As in positive sentences, *even* in (53-b) may either be the plain *even* or *even$_{NPI}$*. However, the structure with *even$_{NPI}$* is licit since *even$_{NPI}$* occurs under negation and negation licenses NPIs (56). Furthermore, the scalar presupposition triggered by *even$_{NPI}$* in (56) is consistent and plausible (57): the logically weakest alternative – that John arrived late once – may be likelier than all of its alternatives.

(56) **[not [[even$_{NPI}$ C_1] [John arrived late once$_F$]]]**

(57) $[\![$ (57-b) $]\!]^{g,c}$(w) is defined only if for n>1, that John arrived late n-times $\lhd_c$ that John arrived late once. If defined, $[\![$ (57-a) $]\!]^{g,c}$(w) = 1 iff John didn't arrive late once in w

The ambiguity approach is subject to two objections. The first objection is conceptual in nature: there is nothing in the meaning of *even$_{NPI}$* that could shed light on why it occurs only in negative polarity environments. In the same spirit, it is not clear why *even$_{NPI}$* should have a restricted distribution rather than the plain *even*. The second objection is empirical in nature and is based on observations by Heim (1984) and Schwarz (2000): the felicity of *even* with a weak associate can be shown to be sensitive to content that is external to the minimal clause in which *even* is generated. This is demonstrated in (58): (58-a) is licit, while (58-b) is pragmatically deviant. The only difference between the sentences is in the scope of the quantifier. That is, there is no difference between the two sentences with respect to the minimal clause in which *even$_{NPI}$* is base-generated and the licenser of the NPI. Since the respective environment is downward-entailing, the ambiguity theory predicts there to be no difference in the felicity of the two sentences.

(58) a. Every student who read even ONE paper will pass the exam
b. #Every student who read even ONE paper will fail the exam

(59) a. **[[every student] [1 $\boxed{\textbf{[[even}_{\textbf{NPI}}\ \textbf{C}_2\textbf{] t}_1\ \textbf{read one}_{\textbf{F}}\ \textbf{paper]}}$] will pass]**
b. #**[[every student] [1 $\boxed{\textbf{[[even}_{\textbf{NPI}}\ \textbf{C}_2\textbf{] t}_1\ \textbf{read one}_{\textbf{F}}\ \textbf{paper]}}$] will fail]**

The scope theory of Karttunen & Peters (1979) that Lahiri adopts is in a better position to explain the contrast in (58). Namely, in its scoped position, the arguments of *even* differ in the two sentences and, accordingly, the scalar presuppositions triggered by it.

(60) a. **[even C_1] [every student who read one$_F$ paper will pass]**
b. #**[even C_1] [every student who read one$_F$ paper will fail]**

The scalar presuppositions of (60) are given in (61). Although *even* has in the two structures in (60) different arguments, its prejacent is in both cases entailed by all the alternatives in its domain. So, the prejacent of *even* is in both structures in (60) at most as likely as the alternatives and the scalar presupposition is in principle satisfiable. This means that the pragmatic deviance of (60-a) is not due to *even* triggering a presupposition that violates (3); it is rather due to the falsity of the presupposition in natural contexts.

(61) a. $\exists q \in \{$that every student who read n papers passed the exam $\mid n \in \mathbb{N}_{>0}\}$:
that every student who read one paper passed the exam $\lhd_c$ q

b. $\exists q \in \{$that every student who read n papers failed the exam $\mid n \in \mathbb{N}_{>0}\}$:
that every student who read one paper failed the exam $\lhd_c$ q

Namely, it naturally holds that if someone read many papers, it is more unlikely that they will fail than if they read fewer papers. Accordingly, the unexpectedness of every student who read (at least) one paper failing the exam hails primarily from the unexpectedness of every student who read more than one paper failing. It thus arguably holds that the alternatives in the domain of *even* in (61-b) are not noticeably more likely than the prejacent. This is the reason for the falsity of the presupposition and the pragmatic deviance of the sentence (cf. Schwarz 2000:8 for further discussion). Crucially, such a treatment is not available to ambiguity theory: since *even* stays in situ in both sentences in (58), it has the same arguments in both sentences and thus triggers the same presupposition in both sentences.

2.3.2 Non-monotonicity

The above issues for the ambiguity approach to *even* also emerge when it comes to occurrences of weak *even* in the scope of non-monotone quantifiers. The first issue is that it is not obvious that the negative polarity $even_{NPI}$ should be licensed in the scope of a non-monotone quantifier, i.e. in an environment that is not (Strawson) downward-entailing. However, as we will see in the next section, NPIs are sometimes licensed in non-monotone environments, so $even_{NPI}$ might fall into that class of NPIs. Be that as it may, it remains a mystery as to why $even_{NPI}$ should be licensed in this environment but not in upward-entailing environments. The second issue is that, as in the case of downward-entailing quantifiers, the felicity of weak *even* in the scope of a non-monotone quantifier depends on the content external to the minimal clause in which *even* is base-generated as well as on contextual factors. This is illustrated in (62) and (63).

(62) a. Exactly two congressmen have read the constitution even ONCE
b. #Exactly four hundred congressmen have read the constitution even ONCE

(63) a. Exactly ten percent of American teenagers read even ONE book
b. #Exactly ten percent of congressmen were involved in even ONE sex scandal

We have derived this contrast in acceptability in the scope-theoretic approach to *even* by showing that the scalar presuppositions of scoped *even* in (62-b) and (63-b) are false in the actual context, while the scalar presuppositions of (62-a) and (63-a) are correct.

This is not an available option for the ambiguity theory. Namely, the theory assigns the infelicitous sentences the structures in (64). The scalar presuppositions triggered by $even_{NPI}$, given in (65), are correct in both structures and $even_{NPI}$ is embedded in both structures under a QP expressing the same proportion. Based on this, it is not clear how an ambiguity theory could account for the observed contrast between the two sentences.

(64) a. **[exactly 10% of American teens] 1 [[$\mathbf{even_{NPI}}$ $\mathbf{C_0}$] $\mathbf{t_1}$ read $\mathbf{one_F}$ book]**
b. **[exactly 10% of congr.] 1 [[$\mathbf{even_{NPI}}$ $\mathbf{C_0}$] $\mathbf{t_1}$ be involved in $\mathbf{one_F}$ scandal]**

(65) a. $\exists$q $\in$ { that g(**1**) read n books | n $\in \mathbb{N}_{>0}$ }: that g(**1**) read one book $\lhd_c$ q
b. $\exists$q $\in$ { that g(**1**) was involved in n sex scandals | n $\in \mathbb{N}_{>0}$ }: that g(**1**) was involved in one sex scandal $\lhd_c$ q

2.4 Negative polarity items

Negative polarity items like *any* and *ever* may occur under non-monotone quantifiers. Their acceptability is context-dependent in the same way as the acceptability of weak *even* in this environment. We propose that this is due to their distribution being governed by the inferences triggered by a covert *even* that associates with them.

2.4.1 Licensing of negative polarity items

Downward-entailingness

Negative polarity items (NPIs) are expressions that have a restricted distribution. A major goal of linguistic theory is to appropriately describe this distribution, i.e. to answer the question under what operators are NPIs licensed. This is the so-called licensor question (Ladusaw 1996:326). A prominent answer to this question defined the licensors of NPIs in syntactic/semantic terms (66) (Fauconnier 1975, Ladusaw 1979): an occurrence of an NPI is licit only if it is in the scope of an appropriate DE operator (66).[9]

(66) <u>NPI licensing condition</u> (version 1 of 3)
An NPI is only grammatical if it is in the scope of a DE operator

This condition was subsequently expanded to account for two types of data. First: The distribution of some NPIs is restricted to only a subset of DE environments:

(67) a. John didn't come home in weeks
b. #If John comes home in weeks, you can be happy

This is captured by having different NPIs be subject to different NPI licensing conditions, all of which can be defined in semantic terms (Zwarts 1998). For example, the NPI *in weeks* must occur in the scope of an anti-additive operator,[10] while the NPIs *any* and *ever* may occur under any DE operator:

(68) <u>NPI licensing condition</u> (version 2 of 3)
NPIs are only grammatical if they are in the scope of a DE operator. Some NPIs (*in weeks*) may further occur only in the scope of an anti-additive operator

[9]Another pertinent question in this respect is Ladusaw's (1996:326) licensing relation question – in what relation must the NPI stand to its licensor. It pertains to issues related to intervention effects. We leave these issues aside in the following (cf. Chierchia 2006, Guerzoni 2006 for a recent discussion).

[10]A function f of type $\langle \delta, \tau \rangle$ is anti-additive iff for all x,y of type δ: f(x $\vee$ y) $\Leftrightarrow$ f(x) $\wedge$ f(y).

Second: *Any* and *ever* are licensed in the scope of *only* (69). This is problematic for (68) since *only* does not denote a DE function, as indicated in (70-a). However, it does denote a Strawson DE function, as indicated in (70-b).

(69) Only John saw anyone

(70) a. Only John ate vegetables $\not\Rightarrow$ Only John ate kale
b. Only John ate vegetables & John ate kale $\Rightarrow$ Only John ate kale

In light of the data in (69), the licensing condition in (68) was weakened to the condition in (71) (von Fintel 1999). Since (71) is properly weaker than (68), it subsumes licensing of *any* and *ever* under DE operators as well their licensing in the scope of expressions like *only, sorry* and in antecedent clauses of conditionals.

(71) NPI licensing condition (version 3 of 3)
NPIs are only grammatical if they are in the scope of a Strawson DE operator. Some NPIs (*in weeks*) may further occur only in the scope of an anti-additive operator

Non-monotonicity

There are prominent occurrences of *any* and *ever* that are in violation of even the weakened licensing condition in (71). In particular, NPIs may occur under non-monotone quantifiers:

(72) Exactly four people in the whole world have ever read that dissertation: Bill, Mary, Tom, and Ed (Linebarger 1987:373)

(73) a. Exactly three people with any money showed up (Rothschild 2006)
b. Exactly three people did any work at all

It holds that *exactly n NP* is not a Strawson DE operator. An occurrence of any kind of NPI in its scope is thus unexpected on (71). Linebarger (1987) took the occurrence of NPIs under non-monotone quantifiers as suggestive of the fact that the NPI licensing condition should be syntactic/pragmatic in nature: direct licensing of NPIs occurs if they are in the immediate scope of negation (cf. Baker 1970); in the absence of negation, NPIs are licensed by an allusion to a sentence with negation (Negative Implicature). Negative Implicature of (72) that is responsible for licensing of *ever* is given in (74) where *ever* is in the immediate scope of negation (Linebarger 1987:373).

(74) Everyone who is not Bill, Mary, Ed, or Tom has not ever read that dissertation

Linebarger also observed that "NPI acceptability [under *exactly* QPs] decreases with the magnitude (context determining what counts as large) of the number expression modified by *exactly*." This is illustrated in (75). She proposed to derive this from the Negative Implicature: "it is pragmatically strange to bank on an implicature in [(74)] from a large QP, and hence contextually large numbers do not license NPIs."

(75) #Exactly 456 people have ever read that book all the way through (Nishiguchi 2004:5)

The main problem of such an approach to NPI licensing is that it is "frustratingly unalgorithmic" (Linebarger 1987:381, though see Linebarger 1991:166). As such, it is not clear that it brings one closer to resolving the licensor question. In contrast, Ladusaw's approach is "impressively algorithmic" (Linebarger 1987:361) but fails to account for the felicity of NPIs under non-monotone quantifiers. Now, there have been proposals to further weaken the NPI licensing condition in (71) to include non-monotonic NPI licensers (e.g. Progovac 1994:279; Rothschild 2006). However, taking into consideration Linebarger's discussion of examples like (75) such a strategy is inadequate: it fails to capture an important characteristic of NPIs under non-monotone quantifiers – their context-dependence.

2.4.2 Another classification of polarity items

We have noted above that not all NPIs exhibit the same distributional pattern, e.g. some NPIs may occur under any DE operator, while others occur only under anti-additive operators. Furthermore, it is known at least since Borkin (1971) that even NPIs that do not differ in their distribution sometimes induce distinct pragmatic effects in sentences in which they are used. Two prominent differences relate to their behavior in questions and their context-dependence. On the basis of these two criteria, two classes of NPIs can be distinguished: regular NPIs and so-called *even*-NPIs (Heim 1984, Krifka 1995, Chierchia 2010).

Bias in questions

Borkin (1971) has observed that NPIs like *any* and *ever* may be used in questions irrespective of the speaker's expectations about the possible answers to the question (76-a). On the other hand, minimizer NPIs like *a red cent* may be used in questions only in contexts in which the speaker expects a negative answer – the questions have a negative bias (76-b). Furthermore, the negative bias that we observe with minimizers appears to come about also in questions containing stressed *any* and *ever* (76-c).

(76) a. Did Mary contribute any money? ($\rightsquigarrow$ no bias)
b. Did Mary contribute even a red cent? ($\rightsquigarrow$ negatively biased)
c. Did Mary contribute ANY money AT ALL? ($\rightsquigarrow$ negatively biased)

Guerzoni (2004) derived the contrast in (76-ab) from the absence of *even* in (76-a) and its presence in (76-b). Namely, under the assumption that questions denote sets of answers and that *even* may scope out of its base position, Guerzoni shows that the sentence in (76-b) only has one LF that denotes a set containing a defined answer – and the defined answer is negative. This is illustrated in (77)–(79). The sentence in (77-a) has two possible structures that differ in the scope of *even* with respect to the trace of *whether*.

(77) a. Did Mary contribute even a red cent?
b. **[whether [$\mathbf{1_{(st)(st)}}$ [$\mathbf{t_{1_{(st)(st)}}}$ [even $\mathbf{C_2}$] [Mary contributed a red cent]]]]**
c. **[whether [1 [[even $\mathbf{C_2}$] [$\mathbf{t_1}$ ~~[even $\mathbf{C_2}$]~~ [Mary contributed a red cent]]]]**

If we simplify Guerzoni's semantics and assume that the meaning of *whether* is the one in (78), we derive the meanings for the two structures in (79) and (81), respectively.

(78) $[\![$ **whether** $]\!]^{g,c} = \lambda f_{((st)(st))(st)}.\ \{f(\lambda p.p),\ f(\lambda p.\neg p)\}$

The LF in (77-b) denotes a set containing two propositions, both of which trigger an incorrect scalar presupposition (80): the prejacent – that Mary contributed a minimal amount of money (a red cent) – is entailed by all the alternatives – the propositions that Mary contributed a greater amount of money – and so (80) is in violation of the condition in (3).

(79) $[\![\text{ (79-a) }]\!]^{g,c} = [\![\textbf{ whether }]\!]^{g,c}\big(\lambda f.f([\![\textbf{ [even C}_2\textbf{] M contributed a red cent }]\!]^{g,c})\big)$
$= \big\{[\![\textbf{ [even C}_1\textbf{] Mary contributed a red cent }]\!]^{g,c},$
$\neg[\![\textbf{ [even C}_1\textbf{] Mary contributed a red cent }]\!]^{g,c}\big\}$

(80) $\exists q \in \{\text{that M contributed n cents} \mid n \in \mathbb{N}\}$: that Mary contributed a red cent $\lhd_c$ q

The LF in (77-c) denotes the set described in (81). The first answer in (81) imposes the same requirement on the context as the propositions in (79) – it is thus undefined in any context. The second answer in (81) triggers the presupposition in (82). This presupposition may be correct: the proposition that Mary didn't contribute a minimal amount (a red cent) entails all the alternatives and may be less likely than them.

(81) $[\![\text{ (81-b) }]\!]^{g,c} = [\![\textbf{ whether }]\!]^{g,c}\big(\lambda f.[\![\textbf{ even C}_1]\!]^{g,c}(f([\![\textbf{ M contributed a red cent }]\!]^{g,c}))\big)$
$= \big\{[\![\textbf{ [even C}_1\textbf{] Mary contributed a red cent }]\!]^{g,c},$
$[\![\textbf{ even C}_1]\!]^{g,c}(\neg[\![\textbf{ Mary contributed a red cent }]\!]^{g,c})\big\}$

(82) $\exists q \in \{\text{that Mary didn't contribute n cents} \mid n \in \mathbb{N}\}$:
that Mary didn't contribute a red cent $\lhd_c$ q

The non-presuppositional meaning of the second answer is that Mary did not contribute a minimal (or greater) amount of money. Thus, the only LF of the sentence in (77-a) that denotes a set with a proposition that is consistent with (3) is (77-c): its denotation is a set that contains an undefined positive answer and a defined negative answer. This derives the bias of the question. Finally, if we were to assume that the question in (76-c) contains a covert *even* that associates with the NPI, Guerzoni's approach could be utilized to explain its bias as well (see section 2.4.3).

Context dependence

The same expressions that trigger bias in questions exhibit also greater context-dependency. This has been observed by Heim (1984) and Schwarz (2000). For example, there is a contrast in acceptability of the sentences in (83): the sentence (83-a) is acceptable, while (83-b) is marked. However, the only difference between (83-a) and (83-b) is in the content of the scope of the universal quantifier. That is, there is no difference between the sentences with respect to the minimal clause in which the NPI is generated nor with respect to the licensor of the NPI. This means that the NPI in (83) is sensitive to content external to the minimal clause in which it is located.

(83) a. Everyone that lifted a finger to help was rewarded
b. #Everyone that lifted a finger to help was wearing blue jeans

If the sentences are modified to contain the unstressed NPI *ever* instead of *lift a finger*, the difference in acceptability disappears (Heim 1984). This is illustrated in (84). That is, the felicity of the NPI in (84) does not depend on the content external to the clause in which it is located.

(84) a. Everyone that has ever helped was rewarded
b. Everyone that has ever helped was wearing blue jeans

The asymmetry between (83) and (84) can be explained if we assume that (83) but not (84) contains a covert *even*, which we represent with EVEN, that takes matrix scope and is responsible for the restricted distribution of the respective NPI. The licensing requirement of unstressed *ever* is that it is in the scope of a DE operator, which is satisfied in (84). The licensing of *lift a finger* is more involved: the NPI denotes a weak predicate and has EVEN associating with it. If *even* stays in situ, it triggers an incorrect scalar presupposition. If it scopes out of its base position, we obtain the structures in (85-a) and (86-a), respectively. The scalar presupposition triggered by *even* is satisfiable in both (85) and (86). However, there is a difference between the two with respect to their correctness.

First: It holds that the likelihood of being rewarded plausibly depends on whether one has helped, and it is indeed less likely to already be rewarded if one has helped a little than if one has helped a lot. Thus, the scalar presupposition of (83-a), given in (85-b), is correct.

(85) a. **[EVEN C_1] [everyone that [lifted a finger]$_F$ to help was rewarded]**
b. ∃q {that everyone that has done x work to help was rewarded | x is an amount}: that everyone that has lifted a finger to help was rewarded $\lhd_c$ q

Second: (83-b) is different. Since it holds that the weak associate of EVEN is in a DE environment, it holds according to (3) that the prejacent of the scoped *even* in (86) is at most as likely as its alternatives. However, since in the actual context the likelihood of wearing blue jeans does not depend on whether one helped, it is difficult to evaluate whether the prejacent and its alternatives have noticeably different likelihoods, i.e. whether the prejacent is noticeably less likely than some alternative. This is responsible for the pragmatic deviance of the sentence (cf. Schwarz 2000:8 for further discussion).

(86) a. **[even C_1] [everyone that [lifted a finger]$_F$ to help was wearing blue j.]**
b. #∃q {that everyone that has done x work was wearing blue jeans | x is an amount}: that everyone that has lifted a finger to help was wearing blue jeans $\lhd_c$ q

Similar to what we have observed with negative bias, stressed NPIs *any* and *ever* appear to pattern like minimizer NPIs and unlike unstressed *any* and *ever*: they are sensitive to the content external to the minimal clause in which they are located. This is illustrated in (87). If we were to assume that the sentences in (87) contain a covert *even*, the contrast could be explained along the lines of (85) and (86).

(87) a. Everyone that did ANYTHING AT ALL to help was rewarded
b. #Everyone that did ANYTHING AT ALL to help was wearing blue jeans

Summary: two classes of NPIs

We have described two criteria that distinguish two types of NPIs – minimizer NPIs and stressed *any* and *ever*, on the one hand, and other NPIs, on the other hand. Following Schmerling (1971), Heim (1984) has argued that minimizers come with a possibly covert *even*. Krifka (1995) assumes that something similar holds for stressed NPIs: their licensing involves an *even*-like operator EmphAssert. In both cases, the NPIs are argued to be licit – 'licensed' – if the scalar presupposition triggered by the accompanying *even* (EmphAssert) is true in the context. We have shown that this assumption explains the negative bias that minimizers and stressed NPIs give rise to and their context-dependency.[11]

2.4.3 Domain alternatives and exhaustification

We propose that the distribution of minimizers and stressed NPIs is governed by a covert *even*, while the distribution of unstressed *any* and *ever* may be governed by a covert *even*. Following Krifka (1995) and Chierchia (2006), we operationalize this by assuming that *any* and *ever* have a focused domain and that an appropriate alternative-sensitive operator is required to associate with it. If the operator is a covert *even*, *any* and *ever* are acceptable if and only if *even* triggers a presupposition that is satisfied in the context.

Domain alternatives

In the preceding subsections we discussed the description of the distribution of NPIs according to which they are restricted to occur in the scope of Strawson DE operators. Krifka (1995) and Chierchia (2006) attempt to provide an explanation of this restriction. They propose that the meaning of *any* and *ever* is that of regular nominal and adverbial indefinites. However, *any* and *ever* in addition obligatorily introduce alternative quantifiers that differ from *any* and *ever* only with respect to their domain of quantification. In line with the introductory chapter, we can represent the introduction of alternatives as being induced by grammaticalized focus on the domain of quantification of *any* and *ever* (cf. Krifka 1995:219; Chierchia 2010). The meaning of *any book* is given in (88). It is a plain existential quantifier:

(88) $[\![\ \textbf{[any } \mathbf{D_F}\textbf{] book}\ ]\!]^{g,c} = \lambda P_{(s,et)}.\ \lambda w_s.\ \exists x\ [\ D(x) \wedge \text{book}(x) \wedge P(x,w)\ ]$

The alternatives to the focused domain of *any* are its various sub-domains, as given in (89-a). For example, if the domain consists of three objects (say, a, b and c), its alternatives are the sets given in (89-b).

(89) a. $F(\mathbf{D_F}) = \{\ D' \mid D' \subseteq D\ \}$
b. $F(\mathbf{D_F}) = \{\ D' \mid D' \subseteq \{a,b,c\}\ \} = \{\{a,b,c\}, \{b,c\}, \{a,c\}, \{a,b\}, \{a\}, \{b\}, \{c\}\}$

The alternatives to *any book* are given in (90): they are existential quantifiers that differ from *any book* solely with respect to their domain of quantification. The property of this characterization of NPIs and their alternatives that is crucial for our purposes is that all

[11] Licensing of NPIs by *even* is not a peculiarity of English but is rather found across languages. In some cases the *even/also* component is morphologically transparent. Two such examples are Hindi NPIs *ek bhii* and *koii bhii* (Lahiri 1998) and Serbian/Croatian *i*-wh and *ni*-wh NPIs (Progovac 1994 for description).

the alternatives to the focused domain of *any* entail the domain and, accordingly, all the alternatives to the NPI entail the NPI (cf. (8) for definition of cross-categorial entailment). This follows from the facts (i) that the alternatives to the domain are its subsets and (ii) that existential quantifiers are upward-entailing.

(90) F(**[any $\mathbf{D_F}$] book**) = { λP. λw. ∃x [D'(x) ∧ book(x) ∧ P(x,w)] | D' ⊆ D }

The alternatives introduced by an NPI must be exhaustified. This means that there has to be an appropriate alternative-sensitive operator in the structure that associates with the focused domain of the NPI. The NPIs are consequently 'licensed' if the inferences triggered by the respective operator are licit. This presents a slight reconceptualization of NPI licensing: instead of treating the embedding operators or embedded environments as NPI licensors, the respective alternative-sensitive operators could be said to perform that role if they trigger licit inferences (cf. Chierchia 2010).

Exhaustification with EVEN

One operator that may associate with the focused domains of *any* and *ever* is a covert *even* operator (EmphAssert in Krifka 1995, E in Chierchia 2006).[12] We represent it with EVEN and assign it the same meaning that we assign to *even* (91). In a structure where EVEN associates with the domain of an NPI, the NPI is 'licensed' if the scalar presupposition triggered by EVEN is licit in the context.

(91) $[\![$ **EVEN** $]\!]^{g,c}$(C, p, w) is defined only if ∃q ∈ C [p $\lhd_c$ q].
If defined, $[\![$ **EVEN** $]\!]^{g,c}$(C, p, w) = 1 iff p(w) = 1

Since the domain of an NPI is entailed by all of its alternatives – its alternatives are the various subsets of the domain – it holds that if EVEN associates with it, it may trigger a licit scalar presupposition only if there is a non-upward-entailing operator intervening between it and the NPI.

Upward-entailing environments

If there is no intervening non-upward-entailing operator between EVEN and the NPI, EVEN triggers an unsatisfiable scalar presupposition. This is illustrated in (92) and (93) where we assume for concreteness that there are three books in the domain of *any*: Syntactic Structures (SS), Lectures on Government and Binding (LGB) and The Logical Structure of Linguistic Theory (LSLT). The domain of *any* is focused and its focus alternatives are its various subsets, e.g. the singleton set containing LSLT, the set containing LGB and LSLT etc. EVEN associates with it (92-b). Accordingly, the alternatives over which *even* quantifies are the propositions of the form that John read a book from D' where D' is a set containing one or more of the three above-mentioned books (92-c).

[12] The other operator is a covert *only* operator (ScalAssert in Krifka 1995, O in Chierchia 2006). We leave licensing by a covert *only* aside in this dissertation (cf. Chierchia 2010 for a comprehensive study of it).

(92) a. #John read any book

b. $\boxed{\textsc{even}\ \mathbf{C_0}}$ **[John read [any** $\boxed{\mathbf{D_F}}$ **] book]**

c. $C_0 \subseteq$ F(**John read [any $\mathbf{D_F}$] book**) =

$\{\lambda w.\exists x[\text{book}(x) \wedge D'(x) \wedge \text{read}(\text{John},x,w)] \mid D' \subseteq \{\text{SS, LGB, LSLT}\}\}$ =

{that John read SS or LGB or LSLT, that John read SS or LGB, that John read LGB or LSLT, ..., that John read LGB, that John read LSLT}

The meaning of (92-b) is computed in (93): the sentence presupposes that there is an alternative in the domain of EVEN that is more likely than the prejacent; the non-presuppositional meaning of the sentence is that John read a book in the set containing SS, LGB and LSLT.

(93) $[\![$ (93-b) $]\!]^{g,c}$(w) is defined only if $\exists q \in C_0$: that John read SS, LGB or LSLT $\lhd_c$ q.
If defined, $[\![$ (93-b) $]\!]^{g,c}$(w) = 1 iff John read SS or LGB or LSLT in w

The scalar presupposition in (93) is incompatible with the principle (3). Namely, it holds that the prejacent of EVEN in (92-b) is entailed by all the alternatives in the domain of EVEN and is thus at least as likely as them (94). This contradicts the scalar presupposition in (93). Since the scalar presupposition is incorrect, the sentence is deviant.

(94) a. $\forall q \in$ {that John read SS or LGB or LSLT, that John read SS or LGB, ..., that John read LSLT }: q $\Rightarrow$ that John read SS or LGB or LSLT

b. $\forall q \in$ {that John read SS or LGB or LSLT, that John read SS or LGB, ..., that John read LSLT }: q $\unlhd_c$ that John read SS or LGB or LSLT

Downward-entailing environments

If *any book* is in the scope of a DE operator and EVEN associates with its domain, the NPI may be licensed. This is illustrated in (95-a): EVEN that associates with the domain of *any* takes scope above the negation (95-b). Its domain of quantification is described in (95-c).

(95) a. John didn't read any book

b. **[EVEN $\mathbf{C_0}$] [not [John read [any $\mathbf{D_F}$] book]]**

c. $C_0 \subseteq$ F(**not [John read [any $\mathbf{D_F}$] book]**) =

$\{\lambda w.\neg\exists x[\text{book}(x) \wedge D'(x) \wedge \text{read}(\text{John},x,w)] \mid D' \subseteq \{\text{SS, LSLT, LGB}\}\}$ =

{that John didn't read SS or LGB or LSLT, that John didn't read SS or LGB, ..., that John didn't read LGB, that John didn't read LSLT}

The prejacent of EVEN in (95) entails all the alternatives in the domain of EVEN and it is thus at most as likely as them (96).

(96) a. $\forall q \in$ {that John didn't read SS, LGB or LSLT, that John didn't read SS or LGB, ...}: that John didn't read SS or LGB or LSLT $\Rightarrow$ q

b. $\forall q \in$ {that John didn't read SS, LGB or LSLT, that John didn't read SS or LGB, ...}: that John didn't read SS or LGB or LSLT $\unlhd_c$ q

The meaning of (95-b) is computed in (97). The scalar presupposition triggered by EVEN is in light of (96) arguably correct: there may very well be an alternative in the domain of EVEN that is more likely than the prejacent.

(97) $[\![$ (95-b) $]\!]^{g,c}$(w) is defined only if $\exists$q $\in$ C_0: that John didn't read SS, LGB or LSLT $\lhd_c$ q. If defined, $[\![$ (95-b) $]\!]^{g,c}$(w) = 1 iff John didn't read SS, LGB or LSLT in w

The correctness of the scalar presupposition triggered by EVEN in (95-b) is all that is needed for the NPI to be acceptable in the respective sentence, i.e. for it to be 'licensed.' This explains the felicity of (95-a).

Questions and obligatory exhaustification with EVEN

In the preceding section, we have observed a difference in pragmatics between unstressed and stressed NPIs *any* and *ever*: unstressed NPIs did not trigger bias in questions and were not sensitive to content external to the minimal clause in which they were generated, while stressed NPIs did trigger bias in questions and were sensitive to content external to the minimal clause in which they were generated. This difference is explained if we assume that unstressed NPIs are optionally licensed by EVEN, while stressed NPIs are obligatorily licensed by EVEN. In case an NPI is licensed by EVEN it triggers bias in questions and exhibits context-dependence. For example, the bias of the question in (98-a) falls out from the fact that the only LF of (98-a) that denotes a set with a defined answer is (98-c) and the answer that is defined is negative (99): EVEN in the positive answer triggers a presupposition that is in violation of (3), as we have seen in (93). No such bias obtains with unstressed *anything* since in that case the sentence does not have to be parsed with EVEN. Finally, the fact that there is a parse of the question in which the interrogative clause denotes a set with a defined answer suffices for the stressed NPI to be licensed.

(98) a. Did Mary contribute ANYTHING AT ALL?
b. **[whether [$1_{(st)(st)}$ [$t_{1_{(st)(st)}}$ [EVEN C_2] Mary contribute [any D_F] thing]]]**
c. **[whether [$1_{(st)(st)}$ [EVEN C_2] [$t_{1_{(st)(st)}}$ Mary contribute [any D_F] thing]]]**

(99) $[\![$ (98-c) $]\!]^{g,c} = \{[\![$ **[EVEN C_1] Mary contribute [any D_F] thing** $]\!]^{g,c}$, $[\![$ **EVEN C_1**$]\!]^{g,c}(\neg[\![$ **Mary contribute [any D_F] thing** $]\!]^{g,c})\}$

Prediction: non-monotone environments

In the cases where EVEN associates with the domain of an NPI, the licensing requirements of the NPI effectively reduce to the licensing requirements of weak *even*. Namely, EVEN that associates with the domain of *any* or *ever* associates with a weak predicate. The prediction is then that, similarly to weak *even*, NPIs may be acceptable in the scope of non-monotone operators.

(100) Prediction
An NPI may be acceptable if it is in the scope of a (Strawson) downward-monotone operator or a non-monotone operator

2.4.4 Derivation: NPIs under non-monotone quantifiers

If *any* and *ever* are licensed by EVEN, they should be able to occur under non-monotone quantifiers and they should exhibit the same context-dependence that we observe with occurrences of weak *even* under non-monotone quantifiers: the scalar presupposition triggered by EVEN is satisfied only in particular contexts. As we have discussed above, this is what indeed obtains: the felicity of *any* and *ever* in the scope of non-monotone quantifiers is conditional on the expectations in the context.

(101) a. Exactly four people in the whole world have ever read that dissertation
b. #Exactly four hundred people in our school have ever read that dissertation

Low numeral or proportion in the QP

We begin by looking at two felicitous occurrences of NPIs in the scope of non-monotone quantifiers (102). The discussion parallels the one of weak *even* in section 2.2.

(102) a. Exactly three students read any book at all
b. Exactly four people in the whole world have ever read that dissertation

We propose that the NPIs in (102) are licensed by EVEN, i.e. the alternative-sensitive operator that associates with the focused domain of *any* and *ever* in (102) is EVEN. The sentence in (102-a) may have either structure in (103). The structure in (103-a) has an illicit interpretation: its scalar presupposition is given in (104) and it violates the principle in (3). Namely, all the alternatives in the domain of EVEN in (103-a) entail the prejacent of EVEN.

(103) a. **[exactly three students 8 [[EVEN C_1] t_8 read [any D_F] book at all]]**
b. **[EVEN C_1] [exactly three students read [any D_F] books at all**

(104) $[\![$ (104-a) $]\!]^{g,c}$ is defined only if $\exists$q $\in$ { that g(**1**) read a book in D' | D' $\subseteq$ D }: that g(1) read a book in D $\lhd_c$ q

The scalar presupposition of EVEN in (103-b) incurs no such violation since EVEN scopes above a non-monotone operator. The alternatives over which EVEN quantifies in such a configuration are described in (105-b) – they are mutually logically independent and in principle any likelihood ordering may obtain on them.

(105) a. **[EVEN C_1] [exactly three students read [any D_F] books at all**
b. $C_1 \subseteq$ { that exactly three students read a book in D' | D' $\subseteq$ D }

The meaning of the structure in (105-a) is computed in (106). For concreteness, we assume that the only books in the domain of *any* are Syntactic Structures, Lectures on Government and Binding, and The Logical Structure of Linguistic Theory. The sentence presupposes that there is an alternative in the domain of EVEN that is more likely than its prejacent; its assertive meaning is that exactly three students read a book.

(106) $[\![$ (106-a) $]\!]^{g,c}$(w) is defined only if $\exists$q $\in$ {that exactly 3 students read a book in D' | D' $\subseteq$ {SS, LGB, LSLT}}: that exactly 3 students read SS, LGB or LSLT $\lhd_c$ q.
If defined, $[\![$ (106-a) $]\!]^{g,c}$(w) = 1 iff exactly 3 students read SS, LGB or LSLT in w

As we have already indicated above, the scalar presupposition in (106) does not violate the principle in (3). Moreover, it is satisfied in contexts in which (i) it is very likely that more than three students read SS or LGB or LSLT and (ii) it is less likely that more than three students read, say, LGB or LSLT. An example of such a context is one where it is expected that around thirty students in the department read SS and that, say, at least three but not more than ten students read LGB or LSLT, as depicted in Figure 2-8.

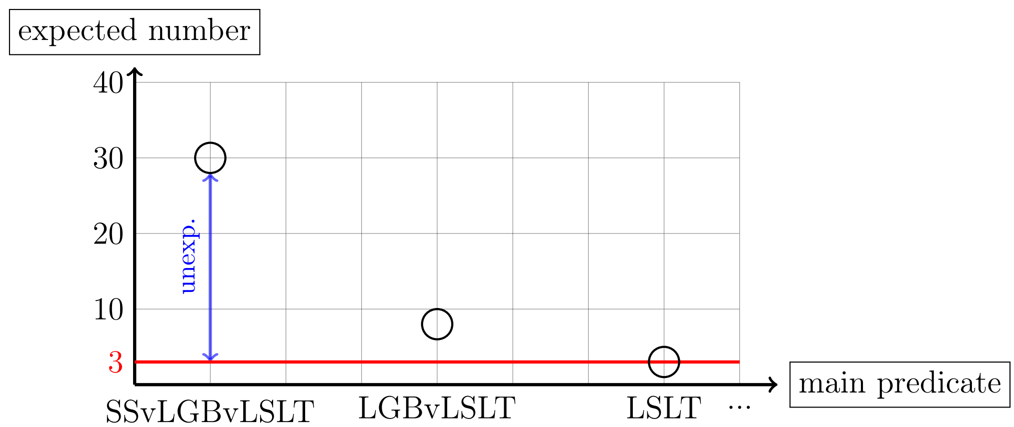

Figure 2-8: Expected number of students reading books in x. Indication of the unexpectedness of exactly three students reading SS∨LGB∨LSLT.

In such a context, it is less likely that only exactly three students read one of the three books than, say, that exactly three students read one of the two more difficult books (107). This means that the scalar presupposition in (106) is verified by the proposition that exactly three students read LGB or LSLT. Furthermore, the described context corresponds to the actual context, which explains the perceived felicity of (102-a).

(107) a. Pr(more than 3 – SS v LGB v LSLT) >> Pr(more than 3 – LGB v LSLT)
b. Pr(less than 3 – SS v LGB v LSLT) ≈ Pr(less than 3 – LGB v LSLT) ≈ 0
c. $\Rightarrow$ $\boxed{\text{Pr(exactly 3 – SS v LGB v LSLT) < Pr(exactly 3 – LGB v LSLT)}}$

Although the sentence in (102-a) is licit in the actual context, there are natural contexts in which the scalar presupposition of (102-a) would not be satisfied. For example, if the sentence is about students in the first grade of elementary school, it is pragmatically deviant. Namely, the expectation in such a scenario is that no student read any book at all. It then holds that it is at least as likely that exactly three students read a book from a big set of books than that exactly three students read a book from a subset of that big set of books. This shows that the acceptability of the NPI does not depend solely on the size of the numeral in the QP but always also on the relevant expectations in the context.

(108) a. Exactly three students (in the department) read any book at all
b. #Exactly three students (in the first grade) read any book at all

The reasoning that we have just illustrated for *any* NPIs applies also in the case of the adverbial NPI *ever* in (102-b). The sentence in (109-a) has the structure in (109-b) where EVEN takes scope above the non-monotone quantifier and associates with the focused domain of *ever*.

(109) a. Exactly four people in the whole world have ever read that dissertation
b. **[EVEN C_1] [exactly 4 people have [ever D_F] read that dissertation]**

We assign the NPI *ever* the simplistic existential meaning in (110): its first argument is a domain that contains moments (or time intervals), D, while its second argument is a function from times to propositions, P. The semantic import of *ever* is to existentially close the time argument of its second argument.

(110) $[\![$ **ever** $\mathbf{D_F}]\!]^{g,c} = \lambda P_{(i,st)}.\lambda w_s.\ \exists t\ [\ D(t) \wedge P(t,w)\ ]$

The alternatives to the focused domain of *ever* are its various subdomains. The alternatives of a clause containing *ever* are sketched in (111): they are the propositions that there is a time t at which John has accomplished reading the dissertation where t is in a particular subset of D.

(111) F(**[ever $\mathbf{D_F}$] John read that dissertation**)] =
$\{\ \lambda w.\ \exists t\ [\ D'(t) \wedge [\![\ \textbf{read}\ ]\!]^{g,c}(\text{John,Diss,t,w})\ ]\ |\ D' \subseteq D\ \}$ =
$\{$ that John read that dissertation sometime in D' $|\ D' \subseteq D\ \}$

The sentence (102-b) has the structure in (112-a): *ever* is embedded under a non-monotone quantifier, while EVEN takes scope above the quantifier and associates with the domain of *ever*. The alternatives over which EVEN quantifies are given in (112-b).

(112) a. **[EVEN C_1] [exactly 4 people 1 [[ever D_F] t_1 read that dissertation]]**
b. $C_1 \subseteq \{$that exactly 4 people read that dissertation sometime in D' $|\ D' \subseteq D\}$

The structure in (112-a) has the meaning in (113). The scalar presupposition triggered by EVEN is satisfiable since all the alternatives in its domain are mutually logically independent and in principle any likelihood ordering may obtain on them.

(113) $[\![$ (113-b) $]\!]^{g,c}$(w) is defined only if $\exists q \in C_1$: that exactly 4 people in the whole world read that dissertation sometime in D $\lhd_c$ q. If defined, $[\![$ (113-b) $]\!]^{g,c}$(w) = 1 iff exactly 4 people in the whole world read that dissertation sometime in D in w

The presupposition is satisfied in contexts in which it is expected (i) that many people read that dissertation sometime in the longest period D and (ii) that fewer people read that dissertation sometime in a shorter period of time D'. For example, it is satisfied in a context in which it is expected (i) that, say, around thirty people read that dissertation sometime or other in D and (ii) that around ten people read that dissertation sometime in the shorter period D' after the dissertation has been submitted, as depicted in 2-9.
In such a context it holds that it is less likely that only exactly four people read that dissertation sometime in the long period D than that exactly four people read that dissertation sometime in the shorter period D' (114). Thus, the scalar presupposition is verified by the

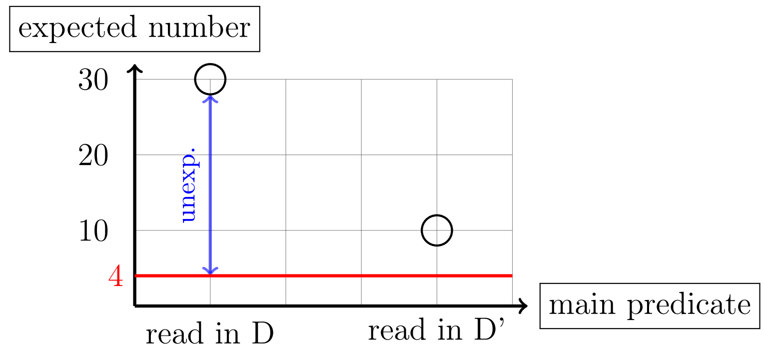

Figure 2-9: Expected number of people reading that dissertation sometime in x. Indication of the unexpectedness of exactly four people reading that dissertation in D.

alternative that exactly four people read that dissertation sometime in the shorter period D'. This setup corresponds to the actual context where there is an expectation that (linguistics) dissertations are read by many. This explains the felicity of (102-b).[13]

(114) a. Pr(more than 4 – long period D) >> Pr(more than 4 – short period D')

b. Pr(less than 4 – long period D) ≈ Pr(less than 4 – short period D') ≈ 0

c. ⇒ $\boxed{\text{Pr(exactly 4 – long period D)} < \text{Pr (exactly 4 – short period D')}}$

We have shown that if an NPI is licensed by EVEN, it instances a weak *even* configuration. Consequently, it is subject to the licensing requirements of weak *even* – the scalar presupposition triggered by the scalar particle that associates with the weak domain of the NPI must be satisfied in the context. Accordingly, the distribution of NPIs under non-monotone quantifiers is partly governed by the principle in (40), repeated below, where P corresponds to the meaning of the VP containing *any* or *ever* and P' corresponds to a relevant focus alternative.

(40) Generalization about low numbers (proportions)

If P and P' are alternative predicates with P' ⇒ P and P is very likely to obtain of relatively many individuals, then it holds that it is less likely that P will obtain of a relatively low number of individuals than that P' will obtain of a relatively low number of individuals

[13]If EVEN were to involve universal quantification instead of an existential one, the scalar presupposition triggered by EVEN would be felicitous if the domain of EVEN were appropriately restricted. If no restriction would obtain, i.e. if the domain of EVEN were identical with the focus alternatives of the sister of EVEN, a false presupposition would be triggered. Namely, the domain of EVEN would contain alternatives where *ever* would quantify over single moments (or very short intervals). The likelihood that exactly four people read that dissertation at some particular moment (or in some particular very short interval) would be minimal.

High numeral in the QP

Any and *ever* are acceptable in the scope of non-monotone quantifiers with (relatively) low numerals if EVEN associates with their focused domain and triggers a scalar presupposition that is satisfied in the context. *Any* and *ever* tend to be illicit in the scope of non-monotone quantifiers with (relatively) high numerals:

(115) a. #Exactly thirty-three senators read any book by Chomsky
b. #Exactly four hundred people in our school have ever read that dissertation

The reason for the deviance of the sentences in (115) lies in the scalar presupposition that the sentences trigger. The sentence in (115-a) may have the structure in (116-a); EVEN associates with the domain of *any* and in accordance quantifies over the alternatives in (116-b) where we assume for concreteness that the only relevant books by Chomsky are Manufacturing Consent, Hegemony or Survival and Syntactic Structures.

(116) a. **[EVEN C_1] [exactly 33 senators read [any D_F] book by Chomsky]**
b. $C_1 \subseteq$ {that exactly 33 senators read a book in D' | D' $\subseteq$ {MC,HS,SS}}

The meaning of the structure in (116-a) is computed in (117). Its presupposition is that there is an alternative in the domain of EVEN that is more likely than the prejacent of EVEN. As before, the presupposition does not violate the condition in (3) since the alternatives are mutually logically independent and in principle any likelihood ordering may obtain on them. However, the fact that the scalar presupposition triggered by EVEN is satisfiable is not sufficient for the NPI to be licensed – the presupposition has to be satisfied.

(117) $[\![$ (117-b) $]\!]^{g,c}$(w) is defined only if $\exists$q $\in C_1$: that exactly 33 senators read MC, HS or SS $\lhd_c$ q. If defined, $[\![$ (117-b) $]\!]^{g,c}$(w) = 1 iff exactly 33 senators read MC, HS or SS in w

The expectation in the actual context is that much fewer than thirty-three senators read Manufacturing Consent or Hegemony or Survival (say, around ten senators) and that almost no one read Syntactic Structures, as depicted in Figure 2-10.
In such a context, it is then at least as likely that exactly thirty-three senators read a book among MC, HS or SS as that exactly thirty-three senators read a book from a proper subset of the set containing MC, HS or SS (118-c). This follows from (i) the fact that it is at least as likely that less than thirty-three senators read a book from a proper subset of the set containing MC, HS or SS as that less than thirty-three students read MC, HS or SS (118-b) and (ii) the fact that the likelihood that more than thirty-three students read a book by Chomsky is practically zero (118-a). The scalar presupposition in (117) is thus not satisfied in the described scenario. Consequently, the sentence is marked and the NPI is not 'licensed.'

(118) a. Pr(more than 33 – MC$\vee$HS$\vee$SS) $\approx$ Pr(more than 33 – MC$\vee$SS) $\approx$ 0
b. Pr(less than 33 – MC$\vee$HS$\vee$SS) $\geq$ Pr(less than 33 – MC$\vee$SS)
c. $\Rightarrow$ $\boxed{\text{Pr(exactly 33 – MC}\vee\text{HS}\vee\text{SS)} \geq \text{Pr(exactly 33 – MC}\vee\text{SS)}}$

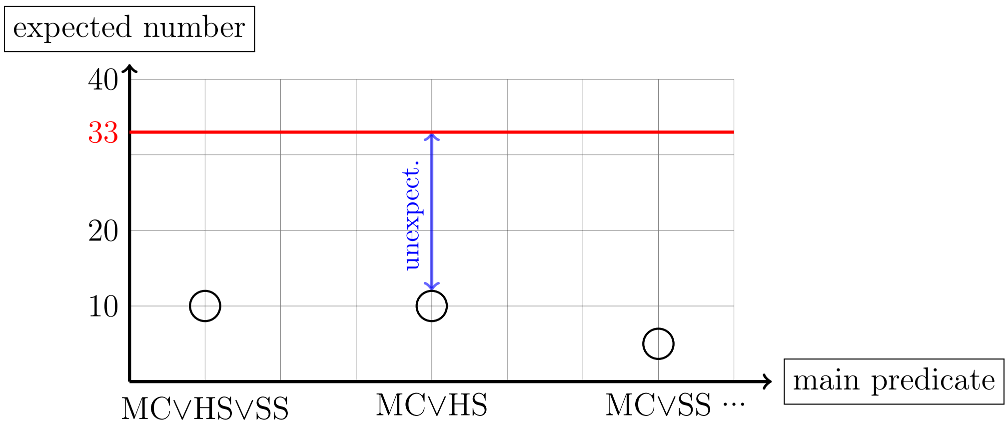

Figure 2-10: Expected number of senators reading a book by Chomsky in x. Indication of the unexpectedness of exactly thirty-three senators reading MC∨HS.

If the expectations in the context were appropriately different, the felicity of the sentence would improve. For example, if the domain of *any* were not restricted to books by Chomsky but would contain all the books, the scalar presupposition triggered by EVEN would be licit. Namely, the expectation is that everyone of the hundred senators read some book or other; it is then more unexpected (less likely) that only exactly thirty-three senators read a book from a big set of books than that exactly thirty-three senators read a book from some subset of the big set of books.

(119) a. Exactly thirty-three senators read any book at all
b. #Exactly thirty-three senators read any book by Chomsky

Analogous reasoning applies to examples with *ever*. The infelicitous sentence in (120-a) has the structure in (120-b). The alternatives over which EVEN quantifies are given in (120-c): they are mutually logically independent and any likelihood ordering may obtain on them.

(120) a. #Exactly 400 people in the whole world have ever read that dissertation
b. **[even C_1] [exactly 400 people [ever D]$_F$ read that dissertation]**
c. $C_1 \subseteq$ {that exactly 400 people read that dissertation sometime in D' | D'⊆D}

(121) $[\![$ (121-b) $]\!]^{g,c}$(w) is defined only if $\exists$q $\in C_1$: that exactly 400 people in the whole world read that dissertation sometime in D $\lhd_c$ q. If defined, $[\![$ (121-b) $]\!]^{g,c}$(w) = 1 iff exactly 400 people in the whole world read that dissertation sometime in D in w

The expectation is that a lot fewer than four hundred people have read that dissertation sometime in the long period D (say, around thirty) and that, trivially, at most that many have read it sometime in some shorter period of time, as depicted in Figure 2-11. It is thus at least as likely that exactly four hundred people have read that dissertation sometime in the long period D as that exactly four hundred people have read that dissertation sometime in some shorter period. The scalar presupposition in (121) is thus false in the actual context. This explains the pragmatic deviance of the sentence in (120-a).

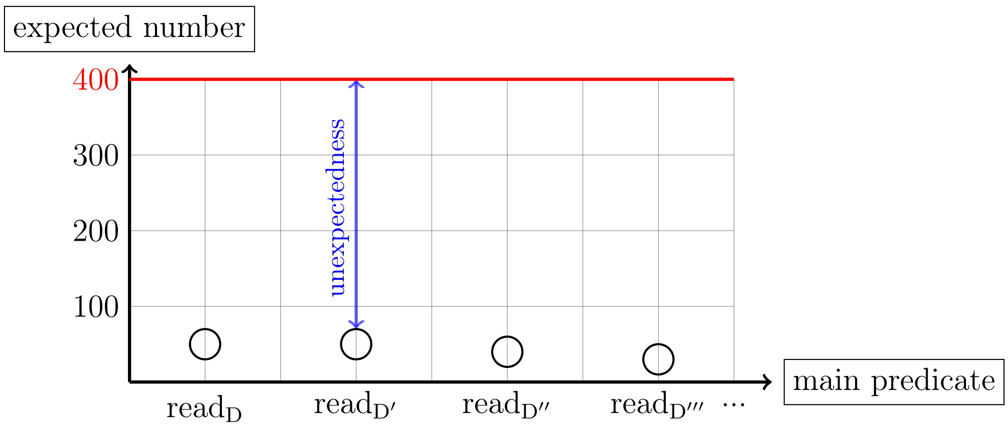

Figure 2-11: Expected number of people reading that dissertation in x. Indication of the unexpectedness of exactly 400 people reading that dissertation in D'.

These last two examples illustrate the second generalization underlying the restricted distribution of NPIs and weak *even* under non-monotone quantifiers (45). It is repeated below where P corresponds to the meaning of the VP containing *any* or *ever* and P' corresponds to a relevant focus alternative.

(45) Generalization about high numbers (proportions)
If P and P' are alternative predicates with P' $\Rightarrow$ P and P' is very likely to obtain of relatively few individuals, then it is less likely that P' will obtain of a relatively high number of individuals than that P will obtain of a relatively high number of individuals

2.4.5 Summary and consequences

The felicitous occurrences of NPIs in the scope of non-monotone quantifiers and their context-dependence are puzzling for the semantic characterization of NPI licensing in (68): non-monotone quantifiers are not Strawson DE, much less anti-additive operators.

(71) NPI licensing condition
NPIs are only grammatical if they are in the scope of a Strawson DE operator. Some NPIs (*in weeks*) may further occur only in the scope of an anti-additive operator

This lead Linebarger to adopt a different characterization of the NPI licensing condition – one that relies on the pragmatic notion of Negative Implicature. Instead of pursuing this path, which results in a "frustratingly unalgorithmic" treatment of NPIs, we have suggested that NPIs under non-monotone quantifiers are licensed by EVEN. More precisely, we have followed Krifka (1995) and Chierchia (2006, 2010) in assuming that expressions like *any* and *ever* induce domain alternatives that need to be utilized by an appropriate alternative-sensitive operator. One such operator is EVEN. If EVEN associates with the domains of *any* and *ever*, their licensing requirements effectively reduce to those of weak *even*. Accordingly, we obtain the prediction in (100), which parallels (18).

(100) Prediction

An NPI may be acceptable if it is in the scope of a (Strawson) downward-monotone operator or a non-monotone operator

If *any* and *ever* occur in the scope of non-monotone quantifiers, EVEN that associates with their domains and scopes above the non-monotone quantifiers triggers a satisfiable scalar presupposition. The presupposition is satisfied in contexts in which appropriate expectations obtain: (i) the meaning of the VP with the NPI obtains of a higher number/proportion of individuals than what is expressed in the non-monotone quantifier and (ii) the relevant alternatives to the VP with the NPI obtain of a significantly lower number of individuals than the meaning of the VP with the NPI. We have shown that the necessary condition for this is that the numeral or proportion in the non-monotone quantifier is appropriately low.

2.5 Conclusion

The scalar presupposition triggered by *even* is subject to the condition in (3). That is, if *even* triggers a presupposition that its prejacent is less likely than an alternative that entails the prejacent, the sentence will be unacceptable.

(3) Scalarity and entailment

If a proposition p entails a proposition q, q cannot be less likely than p

Lahiri (1998) discusses occurrences of *even* that associate with a weak predicate in their immediate surface scope and are embedded under a DE operator. If the scalar presupposition of *even* would be computed in its surface position in those cases, it would be in violation of (3). He shows that if *even* moves above the DE operator at LF, its scalar presupposition may be correct (cf. Karttunen & Peters 1979, Heim 1984).

(122) $\textbf{[even C] [}_{\downarrow}\ \textbf{OP}_{\textbf{DE}}\ \textbf{[}_{\uparrow}\ \textbf{...}\ \cancel{\textbf{[even C]}}\ \textbf{one}_{\textbf{F}}\ \textbf{...]}$

DE environments are not the only environments in which weak *even* is predicted to be able to occur. Rather, the prediction is that it should be able to occur under any operator that is not upward-entailing. Namely, movement of *even* above a non-upward-entailing operator suffices for it to trigger a scalar presupposition consistent with (3).

(18) Prediction

A weak *even* may be acceptable if it is in the scope of a (Strawson) downward-monotone operator or a non-monotone operator

(123) $\textbf{[even C] [}_{\not\uparrow\not\downarrow}\ \textbf{OP}_{\textbf{NM}}\ \textbf{[}_{\uparrow}\ \textbf{...}\ \cancel{\textbf{[even C]}}\ \textbf{one}_{\textbf{F}}\ \textbf{...]}$

We have shown that this prediction is borne out. However, although the scalar presupposition triggered by scoped *even* is consistent with (3) if there is an intervening non-monotone operator between it and its weak associate, it is not satisfied in every context. We have delineated the conditions that are necessary for this scalar presupposition to be satisfied. Three generalizations were shown to follow from these conditions: (i) the numeral (proportion) in the non-monotone quantifier phrase must be relatively low, (ii) the main predicate must be expected to obtain of sufficiently more individuals in the domain of the quantifier than its alternatives and (iii) the main predicate must be expected to obtain of more individuals in the domain of the quantifier than what is described by the numeral in the quantifier phrase.

Subsequently, we have extended the proposal to a "recalcitrant arena of NPI licensing:"[14] NPIs under non-monotone quantifiers. We have argued that the NPIs that felicitously occur under non-monotone quantifiers are licensed by EVEN. We have operationalized this idea in the framework of Krifka and Chierchia where indefinite NPIs are, roughly, treated as having focused domains with which an appropriate alternative-sensitive operator must associate. If the operator is EVEN, NPIs may be acceptable if they are in the scope of a non-upward-entailing operator. This treatment allowed us to account for Linebarger's (1987) observation about the context-dependence of these NPIs, which mirrors what we find with weak *even*.

[14]von Fintel (1999:98) has used this turn of phrase to refer to licensing of NPIs under operators that are Strawson DE but not strictly DE.

CHAPTER 3

Desire

Weak *even* is acceptable only if it is in a non-upward-entailing environment – in upward-entailing environments it gives rise to contradictory scalar entailments. Desire predicates and the imperative operator have commonly been treated as upward-entailing (von Fintel 1999, Schwager 2005). Accordingly, acceptable occurrences of weak *even* in their scope that we describe in this chapter are unexpected. We pursue two strategies to deal with this puzzle. First strategy: Instead of assuming that desire predicates and the imperative operator are upward-entailing, they should be treated as non-monotone operators (cf. Heim 1992, Levinson 2003 and others for desire predicates). If *even* that associates with a weak element scopes above them, it triggers a scalar presupposition that can be satisfied in appropriate contexts. Second strategy: Although the assumption that desire predicates and the imperative operator are upward-entailing is correct, there is a strengthening mechanism that can apply in grammar and rescue the occurrences of weak *even* in their scope. Both strategies face certain challenges: the first strategy has issues with the apparent monotonicity of desire predicates, while the second strategy has issues with constraining the strengthening mechanism so that it does not rescue weak *even* in other otherwise upward-entailing environments.

Section 1 introduces the puzzle: weak *even* may occur in desire statements, in imperatives and certain other modal environments. Section 2 accounts for these occurrences of weak *even* by adopting a non-monotonic semantics of desire predicates and the imperative operator. The main challenge for this approach is that the respective operators do not appear to exhibit non-monotonic behavior independently, which is discussed in greater detail in the appendix. Section 3 presents an alternative account of the data according to which weak *even* is licit in these environments because a covert strengthening operator is inserted above the desire predicates and the imperative operator and *even* may scope above it. Section 4 extends the analysis to account for occurrences of certain NPIs in these environments – NPIs that are licensed by a covert *even*. Section 5 concludes.

3.1 The puzzle

Weak *even* may occur in the scope of non-negated desire predicates, in imperatives, and under certain modals. Furthermore, weak *even* does not occur under other attitude predicates, including *believe*, *intend* and *command*, and it is marked under (performative) deontic modals.

3.1.1 *Even* in desire statements and imperatives

Non-factive desire predicates

Weak *even* may occur in the scope of non-factive desire predicates *hope*, *would like* and their synonyms. A few naturally occurring examples of this kind are given in (1) and (2).

(1) Weak *even* under *hope*

a. I hope to someday make even ONE video of that quality
b. The group hopes to encourage "even ONE person among the tens of thousands of poor souls ensnared in this self-destructive lifestyle"
c. Melissa Rose Bernardo is a freelance writer in New York City who hopes someday to acquire even ONE-FOURTH of Stacy Morrison's optimism
d. After the numerous failed attempts to have another baby, Eric and Jamie hoped to see even ONE OR TWO healthy embryos
e. I aspire to having even ONE-TENTH the talent for lyrics writing that these three have[1]

(2) Weak *even* under *would like*

a. And I would like you to identify even ONE website that says "We only host infringing material - legitimate content is not welcome!"
b. In fact, I would like to find even ONE person who hasn't had at least one papercut this year. People without hands do not count
c. Jeremy Lindman would like to protect even just one kid from a stranger and he feels it is worth an ordinance[2]

Similar examples can also be found with the non-factive desire predicate *want*, though their acceptability is at least for some of our consultants degraded.

(3) Weak *even* under *want*

a. I want to see even ONE of you nay sayers create a scenario, a route, a locomotive, some rolling stock, some buildings
b. I want to change even ONE person's comprehension of a person with a neurological problem

[1] http://vimeo.com/8918647, http://www.myspace.com/thombarker, http://www.afamichigan.org/..., http://www.lemondrop.com/..., http://www.sgn.org/... (all the cited links can be activated in the electronic version of the dissertation and have been shortened for space reasons)

[2] http://www.techdirt.com/articles/20100925/..., http://www.murdershewrites.com/..., http://ci.northbranch.mn.us/MinutesAgendas/...

c. Everyone wants to prevent even "ONE bad incident" as BellaQuest points out
d. We all wanted to find even ONE little thing that would make us feel like he really cared[3]

Another conspicuous instance of a non-factive desire predicate that licenses weak *even* in its scope is *wish*. A desire statement with *wish* entails that the proposition denoted by the sentential complement of *wish* is taken by the attitude holder not to have obtained.

(4) Weak *even* under *wish*
a. I wish I wrote even ONE riff featured on ANY Death album
b. This Haley chick wishes she could sing even ONE note close to Janis
c. Star babies wished that even ONE of them had brought a raincoat instead of a bookshelf[4]

Besides weak *even*, also certain NPIs are felicitous in the just described environments. For example, we find stressed NPIs, so-called superlative quantifiers like *the slightest NP* and *the faintest NP* (Fauconnier 1975) as well as some minimizers like *give a damn* in the scope of the above-mentioned desire predicates.

(5) Some instances of NPIs under *would like, hope*
a. And I also hope that ANYONE is still reading this thread
b. She [...] hopes to make the slightest difference in their lives
c. I would sure like my fellow citizens to give a damn[5]

(6) Some instances of NPIs under *wish*
a. I wish I had the faintest idea how to identify Australian crows
b. She wishes that she were the slightest bit charming
c. I wish they would lift a finger to make it work better
d. My son is a sweet, kind, funny, smart, well adjusted kid, but he really wishes his father gave a damn about him
e. There are millions of poor people out there who wish they had so much as a cup of rice to feed their family of ten
f. He wished ANYONE AT ALL would look at him with that same love and sweetness[6]

Further examples of non-factive predicates that have the same priority flavor as desire predicates include the semi-modal verbs *need (to)* and *ought (to)* (cf. Portner 2009 for classification of modals). Two examples of *need (to)* licensing weak *even* and NPIs are in (7), while some naturally occurring examples of weak *even* and NPIs under *ought (to)* are in (8).

[3] http://forums.steampowered.com/..., http://www.braingrace.com/..., http://www.people.com/..., http://www.ctmirror.org/...
[4] http://www.johnsoncitypress.com/..., http://www.youtube.com/..., http://www.youtube.com/..., http://thecoachellareview.com/...
[5] http://en.forums.wordpress.com/..., http://www.srph.tamhsc.edu/..., http://reston.patch.com/...
[6] http://www.fanfiction.net/..., http://www.flickr.com/..., http://www.fanfiction.net/..., http://www.pcgamer.com/..., http://www.pankmagazine.com/..., http://thepassionatecook.typepad.com/...

(7) Weak *even* and NPIs under *need*

a. If you're going to convict him, you'll need hard evidence that there's ANYTHING illegal in what he did (Linebarger 1987:374)

b. If you want to pass my class, you'll need hard evidence that you attended my lectures even ONCE

(8) Weak *even* and NPIs under *ought*

a. While you quoted several proponents of forced drugging, you ought to have quoted even ONE of the many organized groups of psychiatric survivors

b. If the article wants to claim that for Strauss "natural right" is a "myth," then its author really ought to give even ONE single textual reference to support his claim

c. Those willing to simply say cut $4,400,000,000 perhaps ought to have at least the faintest idea what that means in terms of impact on state and local government services[7]

Factive desire predicates

It is well-known at least since Kadmon & Landman (1993) that weak *even* as well as some NPIs may occur in the scope of factive desire predicates like *glad*. Two representative examples are given in (9).[8]

(9) Weak *even* and NPIs under *glad*

a. John is glad that he read even ONE paper on this topic

b. I am glad that ANYBODY likes me AT ALL

Furthermore, weak *even* and NPIs are licensed also in the scope of factive evaluative predicates like *good, great*, *fantastic*, and *interesting*:

(10) Weak *even* under other evaluative predicates

It's good/great/fantastic/interesting that John solved even ONE exercise

Rhetorical imperatives

The final class of modal environments in which weak *even* may occur are imperatives. The felicity of weak *even* in imperatives is illustrated in (11), while in (12) we have imperatives that contain two types of NPIs – stressed NPIs and minimizers.

[7] http://www.ovimagazine.com/..., http://gabriellacoleman.org/..., http://bearingdrift.com/...

[8] However, it has been pointed out by Linebarger (1991:173) and Van der Wouden (1997:162) that at least some minimizers are illicit in the scope of *glad*:

(i) a. *I'm glad that she contributed a red cent to the ACLU

b. *I'm glad that he budged an inch

(11) <u>Weak *even* in imperatives</u>

a. Show me even ONE party that cares for the people
b. Break even ONE record that I can't
c. Give me even just ONE reason not to hurt you

(12) <u>Some NPIs in imperatives</u>

a. Find me a politician that EVER cared for us AT ALL
b. Show me a party that would so much as lift a finger to help the poor

These imperatives may be given natural paraphrases with the embedding predicates *challenge, defy* and *dare* (13). Interestingly, if we make the paraphrases non-performative by changing the the patient and the tense of the clause, weak *even* remains licensed (14).

(13) a. I challenge you to show me even ONE party that cares for the people
b. I dare you to score even ONE goal against my team

(14) John challenged Steve to show him even ONE party that cares for the people

Another batch of imperatives with weak *even* is given in (15). They have a slightly different flavor than the imperatives above and cannot be paraphrased with *challenge* or *dare* but rather with *plead* or *urge*.

(15) a. If you can't come, PLEASE donate even ONE DOLLAR
b. I've gone hungry for few days; please give me even one nut!
c. Choose even just one thing in your life and [...] make better choices about it[9]

(16) I had fantastic, beyond expected, luck with them last year and I urge you to plant even ONE of these tubers[10]

3.1.2 Extra inference about probability

An important feature of desire statements containing weak *even* has been glossed over in the preceding discussion: they are accompanied by a distinct bias. This has been famously discussed under the heading of "settle for less" by Kadmon & Landman (1993). The basic characteristic of these contexts is brought out in their discussion of (17), reflected in the quote below:

(17) I'm glad we even got THESE tickets!

> (1) What I really want is better tickets. (2) We didn't get better tickets. (3) We got these tickets, which I wouldn't normally be glad about. (4) I settle for less, and I'm glad about what I have. (Kadmon & Landman 1993:385)

A comparable state of affairs obtains also with occurrences of weak *even* under non-factive desire predicates and in imperatives. The condition that the sentences in (18), repeated from above, impose on the context is characterized in (19). We call the condition low probability bias.

[9] http://iam.bmezine.com/..., http://purpleslinky.com/..., http://blog.foodservicewarehouse.com/...
[10] http://www.cherrymenlove.com/gardening$_f$lowers/...

(18) a. Show me even ONE party that cares for the people
b. I would like to find even ONE person who hasn't had at least one paper-cut this year

(19) Low probability bias
A context satisfies the low probability bias with respect to a set of alternatives and an individual if none of the alternatives is expected to come true by the individual

If we apply (19) to the example in (18-b), the relevant set of alternatives in the context consists of the propositions that I find n people, for $n > 0$, which corresponds to the focus meaning of the sentential complement of *would like* without *even*. The sentence is felicitous only in contexts in which none of the alternatives has – according to me, the attitude holder – a non-negligible probability. If this condition is not satisfied in the context, the sentence sounds odd.

As we will argue more extensively in section 3.4.2, (19) also correctly subsumes the relevant aspect of the "settle for less" context accompanying (17) – the context must be such that the attitude holder takes it to have been unlikely that any alternative to the embedded clause would obtain. Contrary to Kadmon and Landman's claims, weak *even* and NPIs may occur under *glad* even if an alternative that entails the sentential complement of *glad* is true in the context – it only has to hold that it was unlikely according to the attitude holder that it would obtain. This is evidenced by (20), a naturally occurring example.

(20) Just be glad that the Eastern networks could even FIND Elko, let alone have a camera there to record the speech[11]

Before continuing, we should discuss a class of data that at first sight appears problematic for the characterization in (19). For example, in none of the examples in (21) does it seem to hold that it is particularly unexpected for the respective alternatives to obtain. That is, the sentences in (21) appear not to trigger the low probability bias: e.g. it is very likely that Tyson will inspire a lot of kids and due to his self-confidence he probably believes in it too (21-a); in the same vein, the speaker in (21-b) may be convinced that he is an influential person and that his articles help many people.

(21) a. Tyson, who said he hopes to inspire even ONE kid to turn his life around, has given similar speeches around the world
b. I'm so glad my article helped even ONE person - makes it worth it
c. It would make me sooooo happy inside that I helped just even ONE person... let alone millions of other migraine suffers out there[12]

The same considerations hold also for the imperative sentences in (22), repeated from above. For example, the first imperative may be addressed to a known philanthropist from whom one may expect a high donation.

[11] http://www.wayiplay.com/...
[12] http://www.lvrj.com/..., http://www.pickthebrain.com/..., http://www.naturalcalm.ca/...

(22) a. If you can't come, PLEASE donate even ONE DOLLAR
b. Choose even just ONE thing in your life and decide to make better choices about it

We suggest that the sentences in (21) and (22) do not in fact counterexemplify the low probability bias – the only difference between these and the previous cases is that bias in (21) and (22) comes with a flavor of polite pretense. For example, it arguably holds that although Tyson may in fact be certain that he will inspire many kids, the quote in (21-a) presents him as being excessively humble and falsely modest – i.e. the low probability bias is satisfied under pretense, so to speak. The same reasoning can be extended to imperatives in (22). This allows us to stick to (19) as a uniform characterization of all the above data.

3.1.3 Beliefs, intentions and commands

Weak *even* is not licit in all modal environments. For example, it is unacceptable in the scope of doxastic predicates, *intend* and certain directive predicates like *command* and *order*.

Beliefs

There is an intriguing contrast between, on the one hand, imperatives, bouletic attitude predicates and certain priority modals and, on the other hand, doxastic attitude predicates and modals with respect to their ability to license weak *even* in their scope – only the former can do it. This is evidenced by (23), which contains transforms of three desire statement from above into belief and doxastic modal statements.

(23) a. #I believe to have found even ONE person without a paper-cut
b. #I know that ANYBODY likes me
c. #She might be the slightest bit charming

Intentions and commands

We have already suggested in our discussion above that at least some speakers find weak *even* unacceptable in the scope of the desire predicate *want*. The predicate *intend* is even more resilient to licensing of weak *even*. This is illustrated by the minimal pair in (24): weak *even* is acceptable under *would like*, but unacceptable under *intend*.

(24) a. I would like to find even ONE party that cares for the people
b. #I intend to find even ONE party that cares for the people

Furthermore, there is also some variation in the domain of directive predicates with respect to licensing of weak *even*. Unlike under *challenge* and *urge*, weak *even* is unacceptable in the scope of directive predicates *command* and *order* .

(25) a. I challenge you to find even ONE party that cares for the people
b. #I command you to find even ONE party that cares for the people

Finally, weak *even* is also unacceptable in the scope of modal auxiliaries *must, can* and *may*, even on their (performative) deontic interpretation (26).

(26) a. Find me even ONE party that cares for the people
b. #You must find me even ONE party that cares for the people

The above contrasts are puzzling considering that all the respective embedding expressions in (24)–(26) fall into the same broad family of bouletic, deontic and teleological predicates and modals. The pattern is summarized in the following table:

(27) Priority expressions that do not license weak *even*
a. want (for some speakers), intend, plan
b. command, order, demand, require
c. must, can, may

3.1.4 A brief statement of the puzzle

According to the standard characterizations of desire predicates, modals and imperatives, they are upward-monotone modal operators (Hintikka 1962, von Fintel 1999, Schwager 2005 and others). Accordingly, if weak *even* occurs in their scope, it should trigger an inconsistent scalar presupposition. This is exemplified in (28): the sentence (28-a) has one of the structures in (28-bc) – *even* either stay in situ or scopes above *hope* – and should thus trigger one of the scalar presuppositions in (29).

(28) a. I hope to make even ONE video of that quality
b. **I hope [[even C_1] PRO to make one$_F$ video of that quality]]**
c. **[even C_1] [I hope [PRO to make one$_F$ video of that quality]]**

(29) a. $[\![$ **even** $]\!]^{g,c}$(C, $[\![$ **I make one video of that quality** $]\!]^{g,c}$, w) is defined only if $\exists$q $\in$ {that I make n videos of that quality | n $\in \mathbb{N}_{>0}$}: that I make one video of that quality $\lhd_c$ q
b. $[\![$ **even** $]\!]^{g,c}$(C, $[\![$ **I hope [PRO to make one$_F$ video of that quality]** $]\!]^{g,c}$, w) is defined only if $\exists$q $\in$ {that I hope to make n videos of that quality | n $\in \mathbb{N}_{>0}$}: that I hope to make one video of that quality $\lhd_c$ q

Both presuppositions in (29) run afoul of the axiom that the scalar presupposition of *even* is faithful to implication, which is repeated in (30) from previous chapters.

(30) Scalarity and entailment
If a proposition p entails a proposition q, q cannot be less likely than p

Namely, since it holds that the proposition that I make one video is entailed by all of the alternatives, e.g. by the proposition that I make two videos, it is at least as likely as all of them (31). This is incompatible with the presupposition in (29-a) that there is an alternative that is more likely than that I make one video.

(31) ... $\unlhd_c$ that I make three videos of that quality $\unlhd_c$ that I make two videos of that quality $\unlhd_c$ that I make one video of that quality

And since it holds that the proposition that I hope to make one video is entailed by all of the alternatives, e.g. by the proposition that I hope to make two videos, it is at least as likely as all of them as well (32). This is incompatible with the presupposition in (29-b) that there is an alternative that is more likely than that I hope to make one video.

(32) ... $\trianglelefteq_c$ that I would like to make two videos of that quality $\trianglelefteq_c$ that I would like to make one video of that quality

3.2 Non-monotonic desire

This section presents an account of the above data and puzzles in a framework that treats desire predicates and imperatives as non-monotone operators (cf. Heim 1992, Levinson 2003, Villalta 2008, Lassiter 2011 for desire predicates).

3.2.1 Overview of the proposal

Several approaches to desire predicates treat them as non-monotone instead of upward-monotone operators (Heim 1992, Levinson 2003, Villalta 2008, Lassiter 2011 among others). The licit occurrences of weak *even* in the scope of these operators are thus correctly predicted to be possible by these approaches. For example, *even* in its derived position in (33-b) triggers the scalar presupposition in (33-d). This presupposition is compatible with (30). Namely, the domain of *even*, given in (33-c), contains only mutually independent propositions and so the likelihood relation described in (33-d) may obtain on them. The felicity of weak *even* under desire predicates and in imperatives is on this approach subsumed by the prediction discussed in the introductory chapter, repeated in (34): weak *even* may be acceptable in non-monotone environments.

(33)
a. I hope to make even ONE video of that quality
b. **[even C_1] [$_{\not\uparrow\!\not\downarrow}$ I 7 hope [~~[even C_1]~~ PRO_7 to make one_F video ...]]**
c. $C_1 \subseteq$ { that I hope to make n videos of that quality | n $\in \mathbb{N}_{>0}$ }
d. $\exists q \in C_1$: that I hope to make one video of that quality $\lhd_c$ q

(34) <u>A prediction of the scope-theoretic approach to *even*</u>

A sentence with a weak *even* may be acceptable if *even* is at surface structure in the scope of a (Strawson) downward-monotone operator or a non-monotone operator, i.e. in the scope of a non-upward-monotone operator

Besides showing that the scalar presupposition of scoped *even* is consistent, a satisfactory account of weak *even* needs to resolve four additional questions:

(i) In what contexts is the scalar presupposition triggered by scoped *even* correct?
(ii) What is responsible for the bias that accompanies the occurrences of weak *even* in desire statements?
(iii) What rules out weak *even* in epistemic statements?
(iv) What rules out weak *even* under *intend* and *command*?

Ad (i). The scalar presupposition in (34-d) is plausible in contexts in which it holds that if there are preferences that distinguish making a certain number of videos from making another number of videos, they will be such that making the greater number of videos is better than making the lower number of videos. In such a context it holds that if I hope to make one video of that quality and I have preferences that distinguish between making one video of that quality and, say, making two videos of that quality and, finally, I take it to be possible that I make two videos of that quality, then I hope to make two videos of that quality. Furthermore, the reverse does not hold in such a context: if I hope to make two videos of that quality and I have preferences that distinguish between making one and making two videos of that quality, it is not necessarily the case that I hope to make one video of that quality – e.g. I may be indifferent between making one and not making one video of that quality. This one-way conditional relation between the two alternatives necessitates the proposition that I hope to make one video of that quality to be more unexpected (less likely) in the context than, say, the proposition that I hope to make two videos of that quality.

Ad (ii). The extra inference that accompanies weak *even* in desire statements and in imperatives is derived by pragmatic reasoning about the beliefs of the attitude holder. In a context in which the scalar presupposition of *even* is satisfied, it holds that there are alternatives that the attitude holder prefers to his described desire. Since desires are linked to the pursuits of the attitude holder, having a weaker desire will result in pursuit of outcomes that correspond to the weaker desire and that have a lower utility for the attitude holder than the outcomes corresponding to a stronger desire. This is legitimate only if their expected value is not lower than the expected value of the outcomes one would pursue if he had a stronger desire. This is the case only if the likelihood of the latter is sufficiently low.

Ad (iii). The infelicity of weak *even* in the scope of doxastic predicates follows from the fact that they have a different semantics than desire predicates. In particular, they have the standard modal semantics, according to which they are upward-monotone operators (e.g. Hintikka 1962). The scalar presupposition of weak *even* triggered in such sentences is incorrect, regardless of whether *even* stays in situ or scopes above the doxastic predicate.

Ad (iv). *Intend* and *command* have a non-monotone semantics and so the scalar presupposition triggered by weak *even* in these sentences is compatible with the condition on scalarity in (30) if *even* scopes above the predicates. However, being compatible with (30) is not a sufficient condition for the felicity of weak *even* – the scalar presupposition triggered by *even* has to be plausible in the respective context. We show that this is not the case with *intend* and *command*. Roughly, this is due to the fact that intentions and commands are stable and under control of the attitude holder in a way that is different from desires.

3.2.2 A negation-related semantics of desire

There is a variety of approaches that treat desire predicates as having a non-monotone semantics. Many of these are derivative on Heim's (1992) negation-related approach (e.g. Levinson 2003, Villalta 2008, Lassiter 2011), which we adopt for concreteness.

Beliefs and preferences

Heim (1992) proposes that to want p is to believe that p is desirable (good), though she does not explicitly discuss this paraphrase.[13] The belief component of the meaning of *want* is identical to Hintikka's treatment of *believe* whose core ingredient is the doxastic accessibility function that is relativized to an attitude holder and a world (35).

(35) Dox(i,w) = {w' | w' is compatible with what i believes in w}

The second ingredient of the meaning of *want* involves the notion of desirability (goodness), which is defined with the help of the comparative notion of preference.[14] A preference relation basically relates possible worlds (e.g. von Wright 1963, Rescher 1967). And because different individuals may have different preferences in different situations, the relation is parametrized to individuals and situations/worlds. We symbolize the preference relation with $\succeq_{i,w}$ in prefix notation where i, w stand for the individual and the world parameter, respectively. Furthermore, we assume that the relation $\succeq$ is a complete partial order, i.e. the relation is reflexive, transitive, anti-symmetric and complete. Strict preference $\succ$ is defined in the standard way: p $\succ_{i,w}$ q iff p $\succeq_{i,w}$ q and $\neg$(q $\succeq_{i,w}$ p).

Now, the basic preference relation between worlds can be lifted to propositional relata, i.e. to a relation between sets of worlds. There are different ways in which this extension may be defined. Heim (1992) employs the so-called all-all preference relation between propositions that requires all the worlds in the 'better' proposition to be preferred over all the worlds in the 'worse' proposition.[15]

Definition 1 (All-all preference)**.** *For any individual i, any world w, any preference relation $\succeq_{i,w}$ among worlds, and any propositions p, q: p $\succ_{i,w}$ q $\equiv_{df}$ $\forall$w',w"(p(w') = 1 $\wedge$ q(w") = 1 $\rightarrow$ w' $\succ_{i,w}$ w").*

[13]In lieu of this, Heim (1992:193) builds on the intuition expressed by Stalnaker: "wanting something is preferring it to certain relevant alternatives, the relevant alternatives being those possibilities that the agent believes will be realized if he does not get what he wants." This intuition is not far from our paraphrase, as we will see, since p is desirable only if it is preferred over its alternatives, say, $\neg$p.

[14]Similar notions have been entertained in moral and economic theory where goodness and desirability are standardly given negation-related characterizations (see Brogan 1919, von Wright 1963, Bricker 1980 among others). For example, Moore (1993:25) provides the following description of what is right:

> to assert that a certain line of conduct is, at a given time, absolutely right or obligatory, is obviously to assert that more good or less evil will exist in the world, if it is adopted, than if anything else be done instead.

[15]Such a characterization of preference has also been entertained by von Wright (1963:31):

> [A]ny given total state of the world, which contains p but not q, is preferred to a total state of the world, which differs from the first in that it contains q but not p, but otherwise is identical with it.

Desire as *ceteris paribus* preference

We can now combine the belief and the preference components. Heim proposes that the relata in the meaning of desire statements are sets of belief worlds of the attitude holder nearest to the respective anchor belief world. This is captured by employing a class selection function SIM that assigns to each world w and a proposition p the subset of p containing only the worlds that are maximally similar to w (Lewis 1973).

Definition 2. *For any set of worlds W, any proposition* $p \subseteq W$, $w \in W$ *and comparative similarity relation* $\leq$: $\textsc{sim}(\leq,w,p) \equiv_{df} \lambda w'.\ p(w') = 1 \wedge \forall w''(p(w'') = 1 \rightarrow w' \leq_w w'')$.[16]

A non-dynamic rendition of Heim's definition of *want* is given in (36): that an agent wants p means that the agent believes that p is desirable, all else being equal,[17] i.e. the agent believes that it would be better if he were in one of p worlds than if he were in one of ¬p worlds, all else being equal.

(36) If defined, $[\![\textbf{want}]\!]^{g,c}(\succeq, \text{p, i, w}) = 1$ iff $\forall$w' $\in$ DOX(i, w):
$$\textsc{sim}(\text{w', Dox(i, w)}\cap\text{p}) \succ_{\text{i,w}} \textsc{sim}(\text{w', Dox(i, w)}\setminus\text{p})$$

Besides guaranteeing the correct presupposition projection, the reason why the argument of SIM in (36) is a subset of the belief state of the agent is to guarantee that what is compared involves worlds compatible with the beliefs of the agent and not worlds outside her doxastic pool. The semantics of other desire predicates is built up in a parallel fashion, though some modifications might be needed. For example, the sentential complement of *wish* is taken not to be believed by the holder of the desire. This requires us to tweak one of the relata of the preference relation: one is comparing p worlds that are in the minimally revised belief state of the agent that otherwise believes ¬p. The revision is required since none of the worlds in the agent's belief state are p worlds and so the first relatum in (37) would be empty.

(37) If defined, $[\![\textbf{wish}]\!]^{g,c}(\succeq, \text{p, i, w}) = 1$ iff $\forall$w' $\in$ DOX(i, w):
$$\textsc{sim}(\text{w', rev(Dox(i, w))} \cap \text{p}) \succ_{\text{i,w}} \text{w'}$$

The need for a revision operator in the characterization of the semantics of *wish* reflects two deeper requirements that desire predicates impose on the context: the propositional argument of *want* must be compatible with the beliefs of the attitude holder and it may not be entailed by them. In Heim's semantics in (36) and (37), these are naturally conditioned by a general principle of non-vacuity: if DOX(i, w) were a subset of p, SIM(w', DOX(i, w)∖p) in (36) would be empty and the truth-conditions would be vacuous (trivial proposition); if DOX(i, w) and p were mutually exclusive, SIM(w', DOX(i, w)∩p) would be empty and the truth-conditions would again be vacuous (Heim 1992:198).

(38) $[\![\textbf{want}]\!]^{g,c}$(p,i,w) is defined only if DOX(i,w) $\cap$ p $\neq \emptyset$ and DOX(i,w) $\cap$ p $\neq$ DOX(i,w).
If defined, $[\![\textbf{want}]\!]^{g,c}(\text{p,i,w}) = 1$ iff $\forall$w' $\in$ DOX(i,w): SIM(w',DOX(i,w)∩p)
$$\succ_{\text{i,w}} \textsc{sim}(\text{w',Dox(i,w)}\setminus\text{p})$$

[16] That is, SIM($\leq$,w,p) is the set of worlds w' in p such that no other world in p is more similar to w with respect to $\leq$ than w'. We leave the similarity relation argument out of most of the subsequent representations.

[17] This paraphrase is correct to the extent that we assume that the preference relation $\succ$ does not vary across the doxastic alternatives of the attitude holder, i.e. ∀i∀w∀w'∈DOX(i,w) [$\succ_{\text{i,w}} = \succ_{\text{i,w'}}$].

An analogous meaning can also be assigned to the imperative operator. There are two differences between it and desire predicates: first, the imperative operator does not quantify over the beliefs of an attitude holder but over the worlds in the context set; second, the imperative operator triggers additional presuppositions that are responsible for its performativity. For brevity, we write these presuppositions simply as an authority requirement (cf. Schwager 2005 for a more thorough discussion of performativity).

(39) $[\![$ **IMP** $]\!]^{g,c}$(p,w) is defined only if (i) cs(c) $\cap$ p $\neq \emptyset$ and cs(c) $\cap$ p $\neq$ cs and (ii) the speaker sp(c) is an authority in c. If defined, $[\![$ **IMP** $]\!]^{g,c}$(p,w) = 1 iff
$\forall$w' $\in$ cs(c): $\textsc{sim}$(w', cs(c)$\cap$p) $\succ_{\text{sp(c),w}}$ $\textsc{sim}$(w', cs(c)$\setminus$p)

Desire predicates are non-monotonic

The semantics described above is non-monotonic. For example, it predicts the non-inferences in (40) and (41). We focus on (40) in the following since it is the more relevant non-inference pattern for our purposes – it shows non-upward-entailingness of desire predicates.

(40) a. I hope to make two videos of that quality
b. $\not\Rightarrow$ I hope to make one video of that quality

(41) a. I hope to make one video of that quality
b. $\not\Rightarrow$ I hope to make two videos of that quality

The two sentences in (40) have the assertive meanings in (42).

(42) a. If defined, $[\![$ **I hope to make 2 videos** $]\!]^{g,c}$ = 1 iff $\forall$w' $\in$ $\textsc{Dox}$(i,w):
$\textsc{sim}$(w', Dox(i,w)$\cap[\![$ **I make 2 videos** $]\!]^{g,c}$)
$\succ_{\text{i,w}}$ $\textsc{sim}$(w', Dox(i,w)$\cap[\![$ **I make 0 or !1 videos** $]\!]^{g,c}$)
b. If defined, $[\![$ **I hope to make 1 video** $]\!]^{g,c}$ = 1 iff $\forall$w' $\in$ $\textsc{Dox}$(i,w):
$\textsc{sim}$(w', Dox(i,w)$\cap[\![$ **I make 1 video** $]\!]^{g,c}$)
$\succ_{\text{i,w}}$ $\textsc{sim}$(w', Dox(i,w)$\cap[\![$ **I make 0 videos** $]\!]^{g,c}$)

Assume that it holds that (i) I prefer making two videos of that quality to making no or exactly one video of that quality and that (ii) it is not the case that I prefer making exactly one video of that quality to making no videos of that quality. Clearly, (42-a) is true in the described scenario due to (i). (42-b) is false due to (ii): it holds that the nearest belief worlds in which I make exactly one video of that quality and the nearest belief worlds in which I make (at least) one video of that quality to the anchor worlds in which I make exactly one video of that quality coincide. And since we know due to (ii) that they are not all preferred to the nearest belief worlds in which I make no videos of that quality, it is false that all the nearest belief worlds in which I make (at least) one video are preferred to those in which I make no videos, i.e. it is not the case that I want to make one video.

3.2.3 Consistency and plausibility of the scalar presuppositon

The scalar presupposition triggered by weak *even* in the scope of desire predicates and the imperative operator is consistent if *even* scopes above the respective operators. It is plausible in contexts in which it holds that the relevant stronger alternatives are better than the relevant weaker alternatives (if there are preferences that distinguish between them).

Consistency

The sentence in (43-a) has the LF in (43-b): *even* scopes above the desire predicate. The scalar presupposition that it triggers in its derived position is given in (43-d).

(43) a. I hope to make even ONE video of that quality
b. **[even C_1] [$_{\uparrow\downarrow}$ I 7 hope [~~[even C_1]~~ PRO_7 to make one_F video ...]]**
c. $C_1 \subseteq$ { that I hope to make n videos of that quality | n $\in \mathbb{N}_{>0}$ }
d. $\exists$q $\in C_1$: that I hope to make one video of that quality $\lhd_c$ q

Since it holds that none of the alternatives in the domain of scoped *even* entails the prejacent of *even* (44), the scalar presupposition is consistent, i.e. it is compatible with (30). This conforms with the prediction discussed in the preceding chapters: weak *even* may be acceptable in the scope of a non-upward-entailing operator (45).

(44) for all n $\in \mathbb{N}_{>1}$: that I hope to make n videos of that quality $\not\Rightarrow$ that I hope to make one video of that quality

(45) <u>A prediction of the scope-theoretic approach to *even*</u>
A sentence with a weak *even* may be acceptable if *even* is at surface structure in the scope of a (Strawson) downward-monotone operator or a non-monotone operator, i.e. in the scope of a non-upward-monotone operator

Notice that the prediction in (45) describes a necessary but not a sufficient condition for the felicity of weak *even*. Since the scalar presupposition described in (43-d) is not trivial, it is expected to be satisfied only in particular contexts.

Plausibility: Non-factive desire predicates

In the following we determine the contexts in which the presupposition in (43-d) is plausible. We do this by checking what has to hold in a context for a particular counterfactual conditional relation to obtain between the prejacent of *even* and the alternatives. We then argue that if such a relation obtains among the alternatives, their likelihoods comply with the condition described in (43-d).

Since desire predicates are non-monotone operators, no entailment obtains among the propositions in the domain of *even* in (43). However, there are two salient types of contexts in which a particular kind of conditional relation does obtain among them: (i) contexts in which if there are preferences that distinguish making a certain number of videos of that quality and making another number of videos of that quality, then these prerences are such that making the greater number of videos is better than making the lower number of videos; and (ii) contexts in which if there are preferences that distinguish making a certain number of videos and making another number of videos of that quality, then these preferences are such that making the lower number of videos is better than making the greater number of videos.[18] In the type of contexts in (i), the implication obtains that if the prejacent of *even* in (43) is true – that I hope to make one video of that quality – and there are preferences that distinguish between making one video of that quality and, say, making two videos of that quality, then it holds that if I take it to be possible that I make two videos of that quality, then I hope to make two videos of that quality. In the type of contexts in (ii), the reverse implication obtains: if it is true that, say, I hope to make two videos of that quality and there are preferences that distinguish between making two videos of that quality and making one video of that quality, then I hope to make one video of that quality.

The first type of context is the intuitively more natural one. In the context it holds that if there are relevant preferences between, say, making two videos of that quality and making one video of that quality, then these preferences are such that the former is better than the latter. According to a natural understanding of preferences, this means that it holds that I prefer making two videos of that quality to making <u>exactly</u> one video of that quality. The prejacent together with the assumption about my preferences Strawson entail the alternative that I would like to make two videos of that quality:

(46) a. I hope to make one video of that quality
b. There are preferences that distinguish between making one video and making two videos of that quality & they are such that making two videos of that quality is better than making exactly one video of that quality
c. $\Rightarrow_{s}$ I hope to make two videos of that quality

The relation in (46) is roughly paraphrased by the conditional in (47): the antecedent contains the prejacent and the presupposition of the respective alternative, while the consequent contains the alternative.[19] If either the prejacent or the presupposition of the alternative is false in the context, the conditional is counterfactual. In any case, it is evaluated as true in the context at hand. Furthermore, since we are assuming that *hope* denotes a non-monotone function, the conditional in (48) is false in the described context: one cannot conclude from hoping that a better alternative obtains that one is hoping that worse alternative obtains.

(47) If I hope to make one video of that quality and I take it to be possible that I will make two videos of that quality, then I hope to make two videos of that quality ✓

(48) If I hope to make two videos of that quality and take it to be possible that I make exactly one video of that quality, then I hope to make one video of that quality #

Together the two conditionals suffice to establish the plausibility of the scalar presupposition in (43-d) in the respective context: they are indicative of a scale on which the prejacent of

[18] The conditionalization in (i) and (ii) to there being distinguishing preferences is necessary. Namely, in the contexts in which making more videos of that quality is preferred to making less videos of that quality simpliciter, it trivially holds that all the alternatives in the domain of *even* that are defined are true. This would make the utterance of (43) redundant. On the other hand, in the contexts in which making less videos of that quality is preferred to making more videos of that quality it trivially holds that all the alternatives in the domain of *even* are false or undefined (Irene Heim p.c.).

[19] We leave out the distinguishability condition in the following for brevity and assume that, say, making two videos is such that the preferences of the attitude holder in the context distinguish it from making (exactly) one video.

even in (43) is less likely than at least one alternative. Namely, the proposition that I hope to make one video of that quality together with the assumption that the relevant alternative is defined contextually entails that the relevant alternative is true – say, that I hope to make two videos of that quality; the opposite is not the case. Consequently, if the likelihood function accompanying *even* is conditioned on such a context, it will assign the proposition that I hope to make one video a lower likelihood than the proposition that I hope to make two videos.

If the context is such that if there are preferences distinguishing between, say, making two videos of that quality and making one video of that quality, then these preferences are such that the latter is better than the former (e.g. I abhor fame or the quality of the videos is bad), the reverse inference pattern from the one in (46) obtains and accordingly reverse conditional relations. These are described in (49) and (50). The scalar presupposition in (43-d) is not satisfied in such a context.

(49) If I hope to make one video of that quality and I take it to be possible that I will make two videos of that quality, then I hope to make two videos of that quality #

(50) If I hope to make two videos of that quality and take it to be possible that I make (exactly) one video of that quality, then I hope to make one video of that quality ✓

Finally, there are (i) contexts in which people are taken to be indifferent between making more and making less videos of that quality and (ii) contexts in which it is open what people's preferences are. In both types of contexts, no contextual inferences along the lines of (49) and (50) hold. In both cases, there is nothing in the content of the sentence or the context of its use that scalar reasoning could latch on that would support the predicted scalar presupposition. Thus, it is perceived as deviant or an appropriate preference relation is accommodated – that if there are relevant preferences, stronger alternatives are preferred to weaker alternatives:

(51) John hopes to catch even ONE wug
$\rightsquigarrow$ John prefers catching two wugs to catching exactly one wug

Plausibility: Factive desire predicates and imperatives

As suggested by Kadmon & Landman (1993), weak *even* is licit in the scope of factive desire predicates like *glad* in the first type of contexts described above – that is, contexts in which the attitude holder prefers pragmatically stronger to pragmatically weaker alternatives. Kadmon & Landman (1993) have characterized the contexts in which this and other conditions hold as "settle for less" contexts. Their full description is given in the subsequent quote where (1) is the pertinent component of the characterization for our discussion.

(52) a. A: Couldn't you get any tickets better than this!?
b. I'm glad we even got THESE tickets!

> (1) What I really want is better tickets. (2) We didn't get better tickets. (3) We got these tickets, which I wouldn't normally be glad about. (4) I settle for less, and I'm glad about what I have. (Kadmon & Landman 1993:385)

We predict that weak *even* under factive desire predicates is felicitous in such "settle for less" contexts:[20] the scalar particle *even* scopes above the non-monotone operator *glad* and triggers in its derived position a consistent scalar presupposition (53-d).

(53)
a. I am glad we even got THESE tickets
b. **[even C_1] [$_{\not\uparrow\not\downarrow}$ I am glad [~~[even C_1]~~ we got these$_F$ tickets]]**
c. $C_1 \subseteq$ { that I am glad that we got tickets x | x is a salient group of tickets }
d. $\exists q \in C_1$: that I am glad that we got these tickets $\lhd_c$ q

The scalar presupposition is satisfied since "what I really want is better tickets," i.e. the context is such that I prefer to get tickets that are higher on a salient scale than these tickets. In such a context, the conditional in (54) holds. Accordingly, the scalar presupposition is verified by the proposition that I desire for us to get those better tickets (that I am glad we got those better tickets).

(54) If I am glad that I got these tickets, then if I would get tickets that are higher on the salient scale, I would be glad that I got those tickets

The imperatives are subject to the same reasoning: *even* scopes at LF above the non-monotone operator IMP, which has a comparable meaning to other desire predicates but triggers additional presuppositions. In its derived position *even* triggers a consistent scalar presupposition sketched in (55-d) where we represent the meaning of the imperative with $want_{IMP}$. The scalar presupposition is satisfied in a context in which the speaker prefers the hearer performing a harder task to the hearer performing an easier task. In such a context the conditional in (56) is true; this is indicative of there being an alternative that is more likely than the prejacent – that I want you to show me two political parties that care for the people.

(55)
a. Show me even ONE political party that cares for the people
b. **[even C_1] [$_{\not\uparrow\not\downarrow}$ IMP [~~[even C_1]~~ you show me one$_F$ party that cares]]**
c. $C_1 \subseteq$ { that I want$_{\text{IMP}}$ you to show me n parties that care | $n \in \mathbb{N}_{>0}$ }
d. $\exists q \in C_1$: that I want$_{\text{IMP}}$ you to show me n parties that care $\lhd_c$ q

(56) If I want$_{\text{IMP}}$ you to show me one party that cares, I take it to be possible that you show me two parties, and I am an authority, then I want you to show me two parties

3.2.4 Extra inference about probability

Desire statements containing weak *even* occur in contexts that are biased. The bias they exhibit is described in (19), repeated below. For example, any context in which (57-a) is used satisfies the condition in (57-b): the attitude holder takes it to be unlikely that the alternatives to the sentential complement of *hope* will obtain.

[20] The characterization "settle for less" simply stands for being glad about a proposition obtaining that is presupposed to be less preferred than its alternatives.

(19) Low probability bias

A context satisfies the low probability bias wrt a set of alternatives and an individual if the individual takes the alternatives to be unlikely to obtain

(57) a. John hopes to make even ONE video of that quality
b. John believes it is unlikely that he will make one video of that quality

Low probability bias emerges from the interaction of the scalar presupposition triggered by *even*, which is satisfied in contexts in which stronger alternatives to the sentential complement of the desire predicate are better than the proposition denoted by the sentential complement, and the link between one's desires and one's actions. We sketch the reasoning on the basis of (57): Having a desire to make a certain number of videos of that quality is linked to how the attitude holder chooses to act. Different acts result in different outcomes and the attitude holder's choice is guided by optimizing her chances of being happy with the outcomes. Now, having the desire to make one and the desire to make, say, two videos of that quality is linked to the pursuit of outcomes corresponding to making one and to making two videos of that quality, respectively. In a context in which (57-a) is felicitous, the latter outcomes are more desirable to the attitude holder than the former (or at least as desirable). The pursuit of the former is thus legitimate only if the attitude holder takes the latter to be sufficiently less likely to obtain. Namely, only in this case is he optimizing her chances of being happy.

3.2.5 Beliefs, intentions and commands

We have seen that in addition to DE and appropriate non-monotone environments, weak *even* may trigger a consistent and plausible presupposition in imperatives and under certain attitude predicates. However, there are also attitude predicates under which weak *even* may not occur. We will discuss three salient classes of such predicates. The first class of predicates that do not license weak *even* contains doxastic attitude predicates like *believe* and *know*:

(58) Doxastic and epistemic attitude predicates

a. #Mary believes John found even ONE party that cares for the people
b. #John knows that Mary got even ONE cent for every case that the police have messed up

The second class is formed by the attitude predicates like *intend* and *plan*:

(59) #Mary intends to find even ONE party that cares for the people

The third class involves directive predicates like *command* and *order* (60). However, directive predicates do not form a uniform class with respect to their ability to license weak *even*. Namely, as we have seen, the predicates *challenge, dare* and *urge* do allow for felicitous occurrences of weak *even* in their scope (61).

(60) Directive attitude predicates (class 1)

\# Mary ordered/commanded John to find even ONE party that cares for the people

(61) Directive attitude predicates (class 2)

a. Mary challenged John to find even ONE party that cares for the people

b. I urge you to plant even ONE seed of this tuber

We discuss the (in)felicity of weak *even* in the scope of the predicates described in (58)-(61) in turn. We put forward that in (58) *even* triggers an inconsistent presupposition, while in all other cases except (61) it triggers an implausible presupposition.

Beliefs

Weak *even* is illicit in the scope of doxastic and epistemic predicates (62). This is expected on the approach to attitude predicates entertained in this section: desire but not doxastic/epistemic attitude predicates have a preference-based negation-related semantics. The semantics of doxastic/epistemic attitude predicates is upward-entailing (cf. Hintikka 1962).

(62) #I believe/know that John made even ONE video of that quality

The sentence in (62) has the two possible structures in (63). In both structures, *even* triggers an inconsistent scalar presupposition – a scalar presupposition that is in violation of (30), repeated below.

(63) a. **[I believe [[even $\mathbf{C_1}$] John made $\mathbf{one_F}$ video of that quality]]**

b. **[even $\mathbf{C_1}$] [I believe John made $\mathbf{one_F}$ video of that quality]**

(30) Scalarity and entailment

If a proposition p entails a proposition q, q cannot be less likely than p

The inconsistency of the scalar presupposition of (62-a) is familiar from the examples of weak *even* in unembedded environments: since the prejacent of *even* is entailed by all of its alternatives (64-c), there cannot be an alternative that is less likely than it.

(64) Scalar presupposition of (63-a)

a. $C_1 \subseteq$ { that John made n videos of that quality | $n \in \mathbb{N}_{>0}$}

b. $\exists q \in C_1$: that John made one video of that quality $\lhd_c$ q

c. for all $n \in \mathbb{N}_{>1}$: that John made one video of that quality $\Leftarrow$ that John made n videos of that quality

A similar state of affairs obtains if *even* scopes above the attitude predicate: since the predicate is upward-monotone, the prejacent of scoped *even* in (63-b) is logically weakest among its alternatives, as described in (65-c), and thus cannot be less likely than any of them. Since *even* triggers illicit presuppositions in both parses of (62), the sentence does not have a felicitous interpretation and weak *even* is not licensed.

(65) Scalar presupposition of (63-b)

a. $C_1 \subseteq$ { that I believe that John made n videos of that quality | $n \in \mathbb{N}_{>0}$}

b. $\exists q \in C_1$: that I believe that John made one video of that quality $\lhd_c$ q

c. for all $n \in \mathbb{N}_{>1}$: $\lambda w.\ \forall w' \in Dox(I,w)$: John made one video of that quality in w' $\Leftarrow$ $\lambda w.\ \forall w' \in Dox(I,w)$: John made n videos of that quality in w'

The same reasoning applies to occurrences of weak *even* in the scope of doxastic/epistemic modal auxiliaries like *must* and *might*. Unlike desire predicates, these operators have an upward-monotone semantics similar to *believe* and thus scoping *even* above them cannot rescue the occurrence of weak *even*.

(66) a. #John must/might have made even ONE video of that quality
b. #**[even $\mathbf{C_1}$] [must/might [John made one$_\mathbf{F}$ video of that quality]]**

However, as we have noted in the introductory section, weak *even* is also infelicitous under (performative) deontic modal auxiliaries. There are two ways of explaining this: first, it is possible that it is only priority attitude predicate that have a non-monotone semantics and that modal auxiliaries of all flavors denote upward-entailing functions (Kratzer 1991); second, the infelicity of weak *even* under deontic modals might be subsumed by whatever explains their non-occurrence under predicates like *intend* and *command*.

(67) a. #You must/may make even ONE video of that quality
b. #**[even $\mathbf{C_1}$] [must/may$_\mathbf{perf}$ [you make one$_\mathbf{F}$ video of that quality]]**

Intentions and commands

Weak *even* may not occur under the attitude predicate *intend*, even though the predicate arguably falls into the same class of attitude predicates as *would like* and *glad*.[21]

(68) a. #I intend to make even ONE video of that quality
b. #**[even $\mathbf{C_1}$] [$_{\not\uparrow\not\downarrow}$ I 7 intend [~~[even $\mathbf{C_1}$]~~ PRO$_\mathbf{7}$ to make one$_\mathbf{F}$ video ...]]**
c. $C_1 \subseteq$ { that I intend to make n videos of that quality | $n \in \mathbb{N}_{>0}$}
d. $\exists q \in C_1$: that I intend to make one video of that quality $\lhd_c$ q

As it was accentuated above, movement of *even* that associates with a weak predicate across a non-monotone operator is only a necessary condition for it to trigger an acceptable presupposition – it is not a sufficient condition. Namely, the presupposition that it triggers in its derived position may still be false in the given context, causing the sentence to be pragmatically deviant. We argue that this is the case in (68).

Desire and intention are distinct concepts (Bratman 1987 and others). For example, it is possible to have desires without having corresponding intentions to realize them and vice versa. Another difference is that the latter involve more freedom of choice – in fact, "intention stems from choice" (Holton 2009:58).[22] Although intentions may be influenced by desires

[21] Although it has to be noted that there is a assortment of philosophical proposals that argue that intention is a species of belief (or even belief *simpliciter*) (Grice 1971, Harman 1976, Velleman 2007, Setiya 2007 and others). The main reason why we assume that the meaning of *intend* parallels that of *want* rather than that of *believe* is that presupposition projection in its scope behaves like presupposition projection under *want*.

[22] There is also a difference between desire predicates and *intend* with respect to gradability – only the former are gradable.

(i) a. I hope to visit France more than I hope to visit Spain
b. #I intend to visit France more than I intend to visit Spain

and beliefs of the agent, they are not determined by them – an agent may choose to perform an action prior to making a judgment about what the best action is and she may even choose an action that is not best according to her beliefs and desires. We put forward that this property of intention is the main reason for the infelicity of the scalar presupposition in (68-d).

We have seen that the scalar presupposition of weak *even* under desire predicates was satisfied in contexts in which the attitude holder was taken to prefer stronger alternatives to weaker alternatives. In such contexts, conditionals along the lines of (47) are true, which is indicative of there being a likelihood scale according to which the desire statement in the antecedent is ranked higher than the desire statement in the consequent of the conditional.

(47) If I hope to make one video of that quality and I take it to be possible that I will make two videos of that quality, then I hope to make two videos of that quality

The same reasoning does not hold for *intend*. This is suggested by the perceived falseness of the conditional in (69) in natural contexts, incl. in contexts in which it is taken for granted that I prefer to make two videos of that quality to making exactly one video of that quality.

(69) If I intend to make one video of that quality and take it to be possible that I make two videos of that quality, then I intend to make two videos of that quality #

As gestured above, this is arguably due to the choice component of intention: if I choose to perform a certain action (= intend to perform an action), nothing warrants that I would choose to perform a certain alternative action (= intend to perform an alternative action) if conditions were appropriately different (with respect to this see also the discussion of stability of intention in Bratman 1987). Accordingly, there is nothing in the content of the sentences and the context on what we can latch our evaluation that would support the plausibility of the predicted scalar presupposition.

Commands and challenges

Weak *even* is unacceptable under directive predicates *command* and *order* but it is acceptable under *challenge, dare* and *defy*. We assume that all of these predicates have a non-monotone semantics similar to desire predicates.

(70) a. #John commanded/ordered Peter to make even ONE video of that quality
b. John challenged/dared Peter to make even ONE video of that quality

We propose that the reason that underlies the infelicity of weak *even* under *intend* also underlies its infelicity under *command, order*: after *even* scopes out of its base position, as sketched in (71-b), it triggers a consistent but implausible scalar presupposition (71-d).

(71) a. #John commanded Peter to make even ONE video of that quality
b. **[even C_1] [$_{\not\Updownarrow}$ John commanded Peter to make one$_F$ video ...]**
c. $C_1 \subseteq$ {that John commanded Peter to make n videos of that quality | $n \in \mathbb{N}_{>0}$}
d. $\exists q \in C_1$: that John commanded Peter to make one video of that quality $\lhd_c$ q

Similar to cases with *intend*, no non-trivial conditional relation can be established between the prejacent in (71) – that John commanded Peter to make one video of that quality – and its alternatives. This holds even for contexts in which John prefers Peter making two videos of that quality to making exactly one video of that quality.

(72) If John commanded Peter to make one video of that quality and he took it to be possible that Peter would make two videos of that quality, then he commanded Peter to make two videos of that quality #

Challenge, dare and *defy* exhibit a different behavior in appropriate contexts. Again, *even* scopes above the respective operators at LF (73-b) where it triggers a consistent presupposition (73-d). Now, the meaning of *challenge* has a constitutive characteristic that *command* lacks: the challenged task is supposed to be hard. It then naturally holds that more difficult tasks qualify as more reasonable challenges. This is what the evaluation of the scalar presupposition in (73) can latch on – it is less likely that someone is challenged to do the easiest task rather than a harder task. Analogous reasoning applies to *urge*.

(73) a. John challenged Peter to make even ONE video of that quality
b. **[even $\mathbf{C_1}$] [$_{\not\uparrow\not\downarrow}$ John challenged Peter to make one$_{\mathbf{F}}$ video ...]**
c. $\mathrm{C}_1 \subseteq \{$ that John challenged Peter to make n videos of that quality $\mid n \in \mathbb{N}_{>0} \}$
d. $\exists \mathrm{q} \in \mathrm{C}_1$: that John challenged Peter to make one video of that quality $\lhd_c$ q

3.2.6 Three issues

There are three issues facing the approach sketched above. The first two issues concern the behavior of *even* in desire statements. The third issue is more general in nature and concerns the question whether desire predicates are indeed non-monotonic. This last issue is discussed in greater depth in the appendix.

Exclusive associates

The first puzzle relates to certain inferences induced by weak *even* in the scope of desire predicates. They relate to the interpretation of the sentential complement of the desire predicate. In the cases that we have studied so far, the assertive meaning of the sentential complement of a desire predicate containing weak *even* is indistinguishable from the assertive meaning of its counterpart without *even*. Accordingly, we have entailment relations along the lines of (74).

(74) a. Mary hopes to make even ONE video of that quality
b. $\Rightarrow$ Mary hopes to make one video of that quality

However, when the sister of *even* in its base position is such that its alternatives are mutually exclusive, no such entailments obtain, as indicated in (75) and (76).

(75) a. Mary hopes that her daughter will win even a BRONZE medal
b. $\Rightarrow$ Mary hopes that her daughter will win at least a bronze medal
c. $\nRightarrow$ Mary hopes that her daughter will win a bronze medal

(76) a. I hope to be even just an ASSISTANT professor when I retire
b. $\Rightarrow$ I hope to be at least an assistant professor when I retire
c. $\not\Rightarrow$ I hope to be an assistant professor when I retire

The sentence in (75-a) appears to convey that Mary hopes that her daughter will be among medal winners. This is distinct from the meaning conveyed by (75-c): that Mary hopes that her daughter will win a bronze medal, which might be interpreted as a less motherly stance. The same holds for (76): (76-c) conveys a certain lack of ambition that (76-a) does not. The negation-related semantics of *hope* predicts the sentence in (75-a) to have the assertive meaning in (77), which corresponds to the meaning of (75-c).

(77) λw. $\forall$w' $\in$ Dox(Mary, w): SIM(w', Dox(Mary, w) $\cap$ that Sue wins a bronze) $\succ_{\text{Mary,w}}$ SIM(w', Dox(Mary, w) $\cap$ that Sue wins no or a silver or a gold medal)

The issue can be resolved if we assume that there is an appropriate covert existential or disjunctive operator in the sentential complements of the desire predicates in (75-a) and (76-a). The operator quantifies over the alternatives determined by the focus structure of its sister and asserts that its propositional argument or a less likely alternative is true. An example of a structure containing such an operator, which we call AT LEAST and define in (78) (cf. Schwarz 2005), is given in (79-a); its meaning is sketched in (79-b).

(78) $[\![$ **AT LEAST** $]\!]^{g,c}$($\trianglelefteq_c$, C, p, w) = 1 iff $\exists$r $\in$ C [(r $\trianglelefteq_c$ p) $\wedge$ (r(w) = 1)]

(79) a. **[AT LEAST C_0] [Sue won a bronze$_F$ medal]**
b. $[\![$ (79-a) $]\!]^{g,c}$(w) = 1 iff $\exists$q $\in$ { that Sue won an x medal | x is bronze, silver or gold } [q(w) = 1] iff Sue won a bronze or a silver or a gold medal in w

Applied to our examples, we get structures along the lines of (80-a) where AT LEAST is in the scope of the desire predicate, while *even* moves above it. The sentential complement of the desire predicate has the meaning in (80-b) – that Sue won a medal – where Sue is Mary's daughter. The prejacent of *even* and the assertion of the sentence in (80-a) is given in (80-c): it corresponds to the intuitive paraphrase of the sentence. This effectively reduces the sentences in (75)/(76) to other examples discussed in this chapter. The consistency and plausibility of the scalar presupposition that *even* triggers in (80-a) – that there is an alternative that is more likely than that Mary hopes that Sue will win a medal – are explained along the same lines as above.

(80) a. **[even C_1] [$_{YP}$ Mary hopes [$_{XP}$ [AT LEAST C_0] her daughter will win a bronze$_F$ medal]]**
b. $[\![$ **XP** $]\!]^{g,c}$(w) = 1 iff Sue wins a bronze or a silver or a gold medal in w
c. $[\![$ **YP** $]\!]^{g,c}$(w) = 1 iff Mary hopes that Sue will win a bronze or a silver or a gold medal in w

Scope asymmetry

The second puzzle for the non-monotonic approach to desire is more resilient. It relates to an asymmetry between (a) sentences where *even* associates with a weak predicate and is at surface structure in the scope of a desire predicate and (b) sentences where *even* associates with a weak predicate and is at surface structure above the desire predicate. The former sentences are felicitous, while the latter sentences are pragmatically deviant:

(81) a. Mary hopes to make even ONE video of that quality
b. #Mary even hopes to make ONE video of that quality

This asymmetry is unexpected on the approach developed above. Namely, both sentences are assigned the same LF (82-a), which triggers a consistent scalar presupposition (82-b). This presupposition is plausible in contexts where it is taken for granted that if there are relevant preferences, people prefer stronger alternatives to weaker alternatives.

(82) a. **[even C_1] [Mary hopes to make one$_F$ video of that quality]**
b. $\exists$q $\in$ { that I hope to make n videos of that quality | n $\in \mathbb{N}_{>0}$ }:
that I hope to make one video of that quality $\lhd_c$ q

Monotonicity of desire predicates

The third and final puzzle for the approach developed in this section is independent of weak *even* and relates to inference patterns that desire predicates give rise to. We have seen that Heim's negation-related analysis of desire predicates treats these as non-monotone operators. However, a careful reader might have noticed that we have not provided any examples that would support this assumption. The reason for this is that it is difficult to come up with convincing examples where non-monotonicity of the predicates would come to light.[23] For example, the entailment described in (83) appears to be valid.

(83) a. John hopes to make more than five videos of that quality
b. $\Rightarrow$ John hopes to make more than one video of that quality

Furthermore, von Fintel (1999) observed that sequences along the lines of (84) appear to be contradictory: this is unexpected if the two clauses denote logically independent propositions, as predicted by the negation-related analysis discussed above.

(84) a. #John wants a free flight on the Concorde but he doesn't want a flight on the Concorde
b. #John wants a flight on the Concorde but he doesn't want a free flight on the Concorde

These issues are discussed at greater length in the appendix where it is shown, following mainly von Fintel (1999), that there appear to be no independent grounds that would motivate choosing a non-monotone analysis of desire predicates over a more standard upward-monotone modal analysis. Although one could treat the fact that desire predicates license weak *even* in their scope as an argument for their non-monotonicity, this would rob the discussion above of some of its explanatory value.

[23] There is one pattern that is an exception and that does seem to argue for non-monotonicity: the failure of disjunctive weakening under desire predicates (i). However, as is discussed in the appendix, the negation related analysis cannot explain (i) and its kin; non-innocuous assumptions have to be made to derive it.

(i) I want to send this letter $\not\Rightarrow$ I want to send this letter or burn it

3.3 Monotonic desire

If desire predicates and the imperative operator are upward-entailing, the occurrence of weak *even* in their scope is unexpected. We argue that weak *even* is licit in these environments because a strengthening mechanism can apply in grammar that rescues it.

3.3.1 Overview of the proposal

A restatement of the puzzle

The puzzle in its barest form is the following: if weak *even* triggers an inconsistent presupposition in a positive episodic sentence (85), why does embedding this sentence under an upward-entailing desire predicate or an imperative operator rescue the sentence?

(85) $[\![$ **even** $]\!]^{g,c}$(C, $[\![$ **I find one$_{\mathbf{F}}$ party that cares** $]\!]^{g,c}$) is defined only if $\exists$q $\in$ { that I find n parties that care | n $\in \mathbb{N}_{>0}$ }: that I find one party that cares $\lhd_c$ q

Since desire predicates are upward-entailing, the answer to this question cannot simply be that *even* may scope above the desire predicate. Namely, the domain of *even* in its derived position still contains only alternatives that entail the prejacent of *even*, causing its scalar presupposition to be illicit. Namely, the scalar presupposition in (86) contradicts the principle in (30), repeated below.

(86) $[\![$ **even** $]\!]^{g,c}$(C, $[\![$ **I hope to find one$_{\mathbf{F}}$ party that cares** $]\!]^{g,c}$) is defined only if $\exists$q $\in$ { that I hope to find n parties that care | n $\in \mathbb{N}_{>0}$ }: that I hope to find one party that cares $\lhd_c$ q

(30) Scalarity and entailment

If a proposition p entails a proposition q, q cannot be less likely than p

The goal

We propose that *even* with a weak prejacent can indeed be licit under a desire predicate because *even* can move above the desire predicate. However, the domain of alternatives over which scoped *even* quantifies is not the one given in (86) but rather the one in (87), wherein the prejacent of *even* is the first proposition in the set.

(87) { that I hope to find one party that cares & I am okay with finding exactly one party that cares, that I hope to find two parties that care & I am okay with finding exactly two parties that care, ... }

If the domain of *even* in its derived position is the one given in (87), then *even* triggers the scalar presupposition in (88). This scalar presupposition is consistent since the alternatives in the domain of *even* are mutually exclusive and so in principle any likelihood relation may hold of them. Furthermore, it is true in contexts in which it is more likely for an individual to hope to find more parties that care for the people than to hope to find less parties – i.e. in contexts in which people tend to 'hope for the best.'

(88) $[\![$ **even** $]\!]^{g,c}$(C, $[\![$ **I hope to find one$_\mathbf{F}$ party that cares** $]\!]^{g,c}$, w) is defined only if $\exists$q $\in$ {that I hope to find n parties that care & I am okay with finding exactly n parties that cares | n $\in \mathbb{N}_{>0}$}: that I hope to find one party that cares & I am okay with finding exactly one party that cares $\lhd_c$ q.

If defined, $[\![$ **even** $]\!]^{g,c}$(C, $[\![$ **I hope to find one$_\mathbf{F}$ party that cares** $]\!]^{g,c}$, w) = 1 iff I hope to find one party that cares & I am okay with finding exactly one party in w

The means

The main question is how do we get the domain of scoped *even* to be the one in (87). We propose that this is due to a strengthening in grammar, which is achieved by inserting a covert exhaustification operator EXH above the respective desire predicate and having it associate with the focused element.

(89) $\boxed{\textbf{[EXH C}_\mathbf{1}\textbf{]}}$ **[I hope [[even C$_\mathbf{2}$] PRO to find $\boxed{\textbf{one}_\mathbf{F}}$ party that cares]]**

A simplistic characterization of EXH utilized in this chapter is given in (90) (see the following chapter for a more involved characterization). It roughly corresponds to *only*: it takes a set of alternatives and a proposition as its arguments and asserts that the proposition is true and that all the alternatives that are not entailed by it are false. The set of alternatives over which EXH quantifies corresponds in our case to the focus meaning of its sister.

(90) $[\![$ **EXH** $]\!]^{g,c}$(C, p, w) = 1 iff p(w) = 1 $\wedge$ $\forall$q $\in$ C [p $\not\subseteq$ q $\wedge$ q(w) = 0]

Accordingly, movement of *even* above the modal and the exhaustification operator, as sketched in (91-a), results in its prejacent denoting the proposition described in (91-b). The alternatives in the domain of *even* are described in (91-c). Clearly, the prejacent given in (91-b) corresponds to the asserted proposition in (89), while the alternatives in (91-c) correspond to the alternatives described in (87), as desired.

(91) a. **[even C$_\mathbf{2}$] [EXH C$_\mathbf{1}$] [I hope [~~[even C$_\mathbf{2}$]~~ PRO to find $\boxed{\textbf{one}_\mathbf{F}}$ party ...]]**
b. that I hope to find one party that cares & it is not the case that I hope to find two parties that care ($\equiv$ that I hope to find one party that cares & I am okay with finding exactly one party in w)
c. { that I hope to find n parties that cares & I am okay with finding exactly n parties in w | n $\in \mathbb{N}_{>0}$ }

Extra inference about probability

The occurrences of *even* with a weak prejacent under desire predicates and in imperatives trigger bias. Similar to what we have done in section 3.2.4, we propose that this bias follows from the strengthened interpretation of these sentences (91). The desires of the attitude holder are linked to his pursuits. So, having a weaker desire (= being okay with the weakest alternative) will result in pursuit of outcomes that correspond to the weaker desire and that have a lower utility for the attitude holder than the outcomes corresponding to a stronger desire. This is legitimate only if their expected value is not lower than the expected value of the outcomes one would pursue if he had a stronger desire. This is the case only if the likelihood of the latter outcomes is sufficiently low.

Restricting overgeneration?

Weak *even* has a restricted distribution, as we have observed in the introductory chapters. If a grammatical strengthening mechanism is assumed to rescue certain occurrences of weak *even*, it has to be explained why it cannot rescue some other occurrences of weak *even*. For example, it needs to be explained why weak *even* cannot occur under epistemic modals, under *intend*, under nominal quantifiers, and in simple positive sentences. In all of these environments strengthening in the scope of *even* would allow it to trigger a scalar presupposition compatible with (30).

(92) a. #**[even C] [EXH [modal$_{\textbf{epist}}$ [$_{\uparrow}$ ... ~~[even C]~~ ... XP$_{\textbf{F}}$ ...]]]**
b. #**[even C] [EXH [intend [$_{\uparrow}$ ... ~~[even C]~~ ... XP$_{\textbf{F}}$ ...]]]**
c. #**[even C] [EXH [everyone/someone [$_{\uparrow}$ ... ~~[even C]~~ ... XP$_{\textbf{F}}$ ...]]]**
d. #**[even C] [EXH [$_{\uparrow}$ ... XP$_{\textbf{F}}$ ...]]]**

3.3.2 Modal semantics

Before proceeding, we briefly introduce the analysis of desire predicates adopted in the following. Desire predicates have a modal semantics that is relativized to two conversational backgrounds (von Fintel 1999). The first conversational background – the modal base – delivers a set of doxastically accessible worlds of the attitude holder, while the second conversational background – the ordering source – provides the propositions that are used in ordering this set. The ordering of worlds proceeds in the following manner: The ordering source g assigns the agent i and the evaluation world w a set of propositions g(i,w). These propositions are used to define a partial ordering among worlds along the lines of (93); a strict partial order is derived in the standard way.

(93) a. $w' \leq_{g(i,w)} w'' \equiv_{df}$ for all $p \in g(i,w)$: if $w'' \in p$, then $w' \in p$
b. $w' <_{g(i,w)} w'' \equiv_{df} w' \leq_{g(i,w)} w''$ and $\neg(w'' \leq_{g(i,w)} w')$

The output of the ordering source applied to a world and an agent corresponds, roughly, to the set of desires that the agent has at the world (94-a). For perspicuity, we assume that among doxastically accessible worlds one can always find a set of worlds that are not worse (with respect to the given ordering source) than other doxastically accesible worlds (limit assumption). These worlds constitute the set of best worlds according to the desires of the agent, which we will simply call desire-best worlds (94-b). The desire statement α *hopes p* then states that all the desire-best worlds for α, which are determined by the doxastic modal base f and the bouletic ordering source g, are such that p is true in them (94-c). The definedness condition of desire predicates is that their propositional argument is independent from the beliefs of the attitude holder (see the discussion in the preceding section).

(94) a. $g(i,w) = \{p \mid p$ is a desire of i in w$\}$
b. $\textsc{best}(X,Y) = \{w \mid w \in X$ and there is no $w' \in X$ such that $w' <_Y w\}$
c. If defined, $[\![$ **hope** $]\!]^{g,c}(f, g, p, i, w) = \forall w' \in \textsc{best}(\cap f(i,w), g(i,w))\ [\ p(w') = 1\ ]$

The semantics of the imperative operator is analogous to (94-c), though its presuppositions are different: besides the independence presupposition, it also triggers an authority presupposition responsible for its performative nature (cf. Schwager 2005).

In this approach, desire predicates clearly denote upward-monotone functions. This is demonstrated in (95): if I hope to make two videos, then all my desire-best worlds are such that I make two videos in them (95-b); it follows that all my desire-best worlds are such that I make one video in them (95-c) and, thus, I hope to make one video (95-d).

(95) a. If defined, $[\![$ **I hope to make two videos** $]\!]^{g,c}$
b. = { w | ∀w' ∈ BEST(∩f(i,w), g(i,w)) [$[\![$ **I make two videos** $]\!]^{g,c}$(w') = 1] }
c. ⊆ { w | ∀w' ∈ BEST(∩f(i,w), g(i,w)) [$[\![$ **I make one video** $]\!]^{g,c}$(w') = 1] }
d. = $[\![$ **I hope to make one video** $]\!]^{g,c}$

3.3.3 Consistency and plausibility of the scalar presupposition

Consistency

Our running example in this section will be the sentence in (96-a), which may have i.a. the LFs in (96-bc). Neither of these LFs results in a felicitous interpretation: the scalar presupposition triggered by *even* is inconsistent. Namely, the prejacent of *even* in both (96-b) and (96-c) is entailed by all of the alternatives and, consequently, cannot be less likely than them – the scalar presuppositions violate the principle in (30).

(96) a. I hope to find even ONE party that cares for the people
b. **[I hope [even C_4] [I find one$_F$ party that cares]]**
c. **[even C_4] [I hope [I find one$_F$ party that cares]]**

However, the sentence in (96-a) has another parse, given in (97): there is an intervening EXH operator between scoped *even* and the desire predicate. EXH associates with the focused element. We compute the meaning of the structure stepwise; we pay special attention to the domains of the two alternative-sensitive operators, *even* and EXH.

(97) **[even C_4] $\boxed{\text{EXH } C_2}$ [I 9 hope [PRO$_9$ to find $\boxed{\text{one}_F}$ party]]**

First: The domain of EXH in (97) consists of the focus alternatives to the sister of EXH. The assertive meaning of the sister of EXH is computed in (98) where f and g are the modal base and the ordering source, respectively.[24] (98) also introduces the following shorthand: '□one' stands for the proposition that I hope to find one party that cares and '◇!one' stands for the proposition that I am okay with finding exactly one party. The focus alternatives to the sister of EXH are given in (99).

(98) $[\![$ **I 9 hope [PRO$_9$ to find one$_F$ party** $]\!]^{g,c}$ =
λw. ∀w' ∈ BEST(∩f(I,w), g(I,w)) [$[\![$ **I find one party** $]\!]^{g,c}$(w') = 1] = □one

(99) C_2 = F(**I 9 hope [PRO$_9$ to find one$_F$ party**) = {□one, □two, □three, ...}

Second: EXH strengthens the proposition in (98) as in (100). We get the meaning that I hope to find one party that cares and that it is not the case that I hope to find two parties that care. This is equivalent to the proposition that I hope to find one party that cares and

[24] We have left the conversational background variables out of our syntactic representations for perspicuity reasons. We also ignore the independence presupposition of *hope*.

that I am okay with finding exactly one party that cares. The focus alternatives to the sister of scoped *even* in (97) and thus its domain are given in (101).

(100) $[\![$ **[EXH $\mathbf{C_2}$] [I 9 hope [PRO$_9$ to find one$_F$ party]]** $]\!]^{g,c} = [\![$ **EXH** $]\!]^{g,c}(\{\Box\text{one}, \Box\text{two}, \Box\text{three}, ...\}, \Box\text{one}) = \Box\text{one} \wedge \neg\Box\text{two} = \Box\text{one} \wedge \Diamond!\text{one}$

(101) C_4 = F(**[EXH $\mathbf{C_2}$] [I 9 hope [PRO$_9$ to find one$_F$ party]]**) = $\{\Box\text{one} \wedge \Diamond!\text{one}, \Box\text{two} \wedge \Diamond!\text{two}, \Box\text{three} \wedge \Diamond!\text{three} ...\}$

The meaning of the structure in (97) is computed in (102). It triggers the scalar presupposition that there is an alternative that is more likely than that I hope to find one party that cares and I am okay with finding exactly one party that cares.

(102) $[\![$ (97) $]\!]^{g,c}$(w) is defined only if $\exists q \in \{ \Box\text{one} \wedge \Diamond!\text{one}, \Box\text{two} \wedge \Diamond!\text{two}, ... \}$: $\Box\text{one} \wedge \Diamond!\text{one} \lhd_c q$. If defined, $[\![$ (102-a) $]\!]^{g,c}$(w) = 1 iff I hope to find one party that cares & I am okay with finding exactly one party in w

The scalar presupposition of the sentence is consistent since the alternatives over which *even* quantifies are mutually exclusive (103). That is, it is compatible with the principle in (30). The question is now in what contexts is the scalar presupposition plausible.

(103) $\forall p, q \in \{ \Box\text{one} \wedge \Diamond!\text{one}, \Box\text{two} \wedge \Diamond!\text{two}, \Box\text{three} \wedge \Diamond!\text{three}, ...\}$: $p \subseteq \neg q$

Plausibility

The presupposition of *even* in (102) is consistent but it is not trivial – it is not satisfied in all contexts and by all likelihood orderings. As we will see, the question in what contexts it is satisfied effectively reduces to the question in what contexts it is less likely that I am okay with finding exactly one party that cares for the people than, say, that I am okay with finding two parties that care for the people. Such an ordering obtains in contexts in which it is taken for granted that if there are relevant distinguishing preferences, then finding exactly two parties or more that care for the people is more desirable than finding exactly one party that cares for the people, i.e. in contexts in which it is taken for granted that I would be happier if I found exactly two or more parties that care than if I found exactly one party. Namely, given this information, the expectation is that one hopes to find a notable number of parties that care rather than that one hopes to find one party that cares and is okay with finding just one. Thus, in such a context there is an alternative that is more likely than the prejacent.

If the context were different and, say, it was taken for granted that finding exactly one party that cares is more desirable than, say, finding exactly two parties that care, it would be more likely that one is okay with finding exactly one party that cares than finding exactly two parties that care; the scalar presupposition would be implausible. If it was open in the context what the preference relation is between the two propositions, the plausibility of the scalar presupposition could not be determined and the sentence would either be deviant or an appropriate preference relation would be accommodated.

Comparison with (Kadmon & Landman 1993)

The above discussion arguably identified the same conditions for the plausibility of the scalar presupposition triggered by weak *even* in desire statements that have been identified as necessary conditions for the felicity of stressed *any* in the scope of *glad* by Kadmon & Landman (1993). In their discussion of the occurrence of stressed *any* in the scope of *glad*, they introduce the notions of "narrow wish" and "wide wish" as in (104) and (105) (Kadmon & Landman 1993:387):

(104) a. I'm glad that a linguist likes me
b. Wide wish: I want a linguist to like me

(105) a. I'm glad that a phonologist likes me
b. Narrow wish: I want a phonologist to like me

Let us assume that the domain of *anyone* in (106) consists of linguists and that its alternative is a domain that consists of phonologists.

(106) I'm glad that ANYONE likes me

They point out that stressed *anyone* is licensed under *glad* in (106) in contexts in which "the 'real wish' is identified with the 'narrow wish' [(105)]," which "establishes a particular relation between the 'narrow wish' and the 'wide wish': it determines that the 'narrow wish' is PREFERRED relative to the 'wide wish' " (Kadmon & Landman 1993:387). It consequently holds that

> if I am glad about the satisfaction of the 'wide wish', then GIVEN THAT I WOULD PREFER TO HAVE THE 'NARROW WISH' SATISFIED, if the 'narrow wish' were to be satisfied I would surely be glad about that.

They conclude that this suffices for the licensing of *anyone* in (106). We return to this in the final section of the chapter, for now we just translate Kadmon and Landman's observations into our terminology. The identification of the 'narrow wish' with the 'real wish' in (105) expresses that a phonologist liking me is more desirable than other linguists liking me (107). This parallels our condition that if there are distinguishing preferences, stronger alternatives are preferred to weaker alternatives, i.e. the turn of phrase that the 'narrow wish' is preferred relative to the 'wide wish.'

(107) It holds that for a phonologist to like me is more desirable than for a non-phonologist linguist to like me

The problem with Kadmon and Landman relying on the single conditional in the quote is that the reverse of the conditional is also true (108) – at least if we assume that *glad* is upward-monotone. Accordingly, unless one adopts a non-monotone semantics of *glad*, the cited conditional does not actually achieve what it is meant to achieve – support the idea that embedding stressed *any* under *glad* results in "strengthening" (cf. also the discussion of (101) and (102) in Kadmon & Landman 1993:388 and the final section of this chapter).

(108) If I am glad about the satisfaction of the 'narrow wish', then I am glad about the satisfaction of the 'wide wish'

Exclusive associates

An issue emerges with examples in which the alternatives to the sister of *even* at surface structure are mutually exclusive. As we have discussed in section 3.2.6, the (a)-sentences in the following examples entail the (b)-sentences rather than the (c)-sentences.

(75) a. Mary hopes that her daughter will win even a BRONZE medal
b. $\Rightarrow$ Mary hopes that her daughter will win at least a bronze medal
c. $\not\Rightarrow$ Mary hopes hthat her daughter will win a bronze medal

(76) a. I hope to be even just an ASSISTANT professor when I retire
b. $\Rightarrow$ I hope to be at least an assistant professor when I retire
c. $\not\Rightarrow$ I hope to be an assistant professor when I retire

As it stands, the above account makes the opposite prediction. This is illustrated in (109): Since the focus alternatives in the domain of EXH are mutually exclusive, EXH is effectively redundant. The meaning that is assigned to the structure in (109-a) is given in (109-d) and does not correspond to the intuitions about the sentence, even though the scalar presupposition is consistent and plausible in contexts in which winning shinier medals is preferred to winning the bronze medal.

(109) a. **[even C_4] [EXH C_2] [I hope her daughter wins a bronze$_F$ medal]**
b. C_2 = { $\Box$bronze, $\Box$silver, $\Box$gold }
c. C_4 = { $\Box$bronze, $\Box$silver, $\Box$gold }
d. $[\![$ (109-a) $]\!]^{g,c}$(w) is defined only if $\exists$q $\in$ { $\Box$bronze, $\Box$silver, $\Box$gold }: $\Box$bronze $\lhd_c$ q. If defined, $[\![$ (109-a) $]\!]^{g,c}$(w) = 1 iff Mary hopes her daughter win a bronze medal in w

We propose to resolve the issue as in section 3.2.6: there is a covert existential or disjunctive operator in the sentential complement of the (a)-sentences in (75) and (76). The operator quantifies over the alternatives determined by the focus structure of its complement and asserts that its propositional argument or a less likely alternative is true.

(110) $[\![$ **AT LEAST** $]\!]^{g,c}(\unlhd_c$, C, p, w) = 1 iff $\exists$r $\in$ C [(r $\unlhd_c$ p) $\wedge$ (r(w) = 1)]

The (a)-sentences in (75) and (76) thus have a structure along the lines of (111-a) where three particles associate with the focused element: *even*, EXH and AT LEAST.

(111) a. **[even C_2] [EXH C_1] [Mary hopes [$_{XP}$ [AT LEAST C_0] her daughter will win a bronze$_F$ medal]]**
b. C_0 = {bronze, silver, gold}
c. $[\![$ **XP** $]\!]^{g,c}$ = bronze $\vee$ silver $\vee$ gold
d. C_1 = {$\Box$(bronze $\vee$ silver $\vee$ gold), $\Box$(silver $\vee$ gold), $\Box$gold}
e. C_2 = {$\Box$(bronze $\vee$ silver $\vee$ gold) $\wedge$ $\Diamond$bronze, $\Box$(silver $\vee$ gold) $\wedge$ $\Diamond$silver, $\Box$gold}

The meaning of the structure is computed in (112). It corresponds to the intuitions reported for (75) and (76) above. Furthermore, the scalar presupposition is consistent since the alternatives in the domain of *even* are mutually exclusive. It is plausible in contexts in which winning a shinier medal is more desirable than winning a bronze medal.

(112) $[\![$ (112-a) $]\!]^{g,c}$(w) is defined only if $\exists$q $\in$ { $\Box$(bronze $\vee$ silver $\vee$ gold) $\wedge$ $\Diamond$bronze, $\Box$(silver $\vee$ gold) $\wedge$ $\Diamond$silver, $\Box$gold }: $\Box$(bronze $\vee$ silver $\vee$ gold) $\wedge$ $\Diamond$bronze $\lhd_c$ q.
If defined, $[\![$ (112-a) $]\!]^{g,c}$(w) = 1 iff Mary hopes that her daughter will win a medal & she is okay with her winning a bronze medal in w

3.3.4 Extra inference about probability

This brief subsection reproduces the discussion in section 3.2.4: Desires are inextricably linked with the acts that the attitude holder performs to bring about these desires. Thus, having a weaker desire will effectively result in pursuit of outcomes corresponding to the weak desire whose utility is lower than the utility of the outcomes one would pursue if one had a stronger desire – a consequence of the scalar presupposition triggered by weak *even*. For a value maximizer, this is only legitimate if the expected value of the former outcomes is not lower than that of the latter outcomes. This is only possible if the probability of the latter is sufficiently lower than that of the former. The low probability bias follows.

3.3.5 Beliefs, intentions and commands

Weak *even* is not licensed (i) under epistemic attitude predicates like *believe* and *know*, (ii) under attitude predicates like *intend* and *plan*, and (iii) under certain directive predicates. The relevant examples with infelicitous weak *even* are given in (113)–(115).

(113) <u>Doxastic and epistemic attitude predicates</u>
a. #Mary believes John found even ONE party that cares for the people
b. #John knows that Mary got even ONE cent for every case that the police have messed up

(114) #Mary intends to find even ONE party that cares for the people

(115) <u>Directive attitude predicates (class 1)</u>
Mary ordered/commanded John to find even ONE party that cares for the people

(116) <u>Directive attitude predicates (class 2)</u>
a. Mary challenged John to find even ONE party that cares for the people
b. I urge you to plant even ONE seed of this tuber

The data in (113)–(115) is at first sight problematic for our account because the same mechanism that we have applied to rescue structures where weak *even* is embedded under desire predicates like *wish, would like* and *glad* could be applied to (113)–(115). Namely, the crucial component of our account was that we assigned sentences like (117-a) the structure in (117-b) where the scalar operator moves above the desire predicate *wish* and an intervening exhaustification operator. Consequently, the prejacent of *even* is assigned the meaning in

(117-c) which does not stand in an entailment relation to its alternatives, e.g. (117-d). This is sufficient for the scalar presupposition triggered by *even* to be consistent.

(117)
a. I wish I had even one cent for every case that the police have messed up
b. **[even C_1] [EXH C_0] [I wish I had one$_F$ cent for every case that ...]**
c. I wish I had one cent for every case that the police have messed up & I am okay with exactly one cent for every case that the police have messed up
d. I wish I had two cents for every case that the police have messed up & I am okay with exactly two cents for every case that the police have messed up

The application of the same process does not seem to suffice in the cases of (113)–(115). That is, in contrast to desire sentences, an exhaustification of doxastic and epistemic sentences, sentences with *intend* and class 1 directive sentences is not enough for the scalar presuppositions of those sentences to be acceptable.

(118)
a. #John believes that Mary got even ONE cent for every case the police have messed up
b. **[even C_1] [EXH C_0] [John believes that Mary got one$_F$ cent for every case that the police have messed up]**
c. John believes that Mary got one cent for every case that the police have messed up & John believes that Mary might have got exactly one cent for every case that the police have messed up
d. John believes that Mary got two cents for every case that the police have messed up & John believes that Mary might have got exactly two cents for every case that the police have messed up

As we have accentuated above, compatibility with (30) is a necessary condition for the scalar presupposition triggered by *even* to be acceptable. However, it is not a sufficient condition – the scalar presupposition must also be plausible in the respective context. We suggest in the following that the scalar presuppositions triggered by *even* in (113)–(115) are implausible. In particular, unlike with desire predicates where their desiderative component and the relevant preferences in the context were shown to play a decisive role in making the scalar presupposition plausible, there is no component in the semantics of *believe* that could perform a similar function. Similar considerations apply to *intend* and *command*. Namely, there is no component of the meaning of these predicates that would support the scalar presupposition triggered by weak *even* (see discussion in the preceding section). Accordingly, weak *even* is pragmatically deviant under *intend* and *command*. This is different for *challenge* that has a component that can be utilized to support the respective scalar presupposition: it requires the challenged task to be difficult. Since it naturally holds that more difficult tasks qualify as more reasonable challenges, it may very well be less likely that someone is challenged to do an easy task rather than a hard task.

3.3.6 Two puzzles about overgeneration

Covert exhaustification may apply in the absence of intensional operators. Accordingly, it could be used to rescue weak *even* in non-intensional sentences – in simple episodic sentences and under nominal quantifiers. We describe the issues in the following, though leave them open for later investigation.

Simple episodic sentences

The sentence in (119) should be rescuable by covert exhaustification. Namely, it could be parsed as in (120-a). The scalar presupposition in (120-b) is consequently compatible with (30). Furthermore, it may very well be the case that it is least likely that John read exactly one book. That is, the presupposition in (120-b) is plausible in certain contexts. However, the sentence in (119) is judged to be deviant even in such contexts.

(119) #John read even ONE book

(120) a. **[even C_1] [EXH C_0] [John read one$_F$ book]**

b. $[\![$ (120-a) $]\!]^{g,c}$ is defined only if $\exists$q $\in$ { that John read exactly n books | $\mathbb{N}_{>0}$ }: that John read exactly one book $\lhd_c$ q

Nominal quantifiers

The second type of quantificational environment in which it might be expected that exhaustification of the associate of *even* might yield a licit interpretation involves argument positions of upward-monotone nominal quantifiers. However, as indicated in (121), such quantifiers do not allow *even* with weak prejacents in their scope.

(121) Upward-monotone quantifiers

a. #Everyone got even ONE cent for every case that the police have messed up

b. #Someone got even ONE cent for every case that the police have messed up

(122) a. #Everyone got even ONE cent

b. **[even C_2] [EXH C_1] [everyone [~~[even C_2]~~ t_1 got one$_F$ cent]]**

c. $[\![$ (122-a) $]\!]^{g,c}$ is defined only if $\exists$q $\in$ { that everyone got exactly n cents and someone got exactly n cents | $\mathbb{N}_{>0}$ }: that everyone got exactly one cent and someone got exactly one cent $\lhd_c$ q

3.4 Negative polarity items

This section extends our account of weak *even* in the scope of desire predicates and imperatives to occurrences of NPIs in these environments. As we have done in chapter 2, we treat NPIs as being potentially licensed by a covert *even*. Since this effectively reduces the licensing requirements of the respective NPIs to those of weak *even*, it allows us to explain their context-dependence in desire statements.

3.4.1 A statement of the puzzle

Similar to occurrences of NPIs under non-monotone quantifiers, the occurrences of NPIs in the scope of desire predicates and in imperatives, illustrated in (123), are unexpected on the semantic characterization of the NPI licensing condition in (124). Namely, desire predicates are either non-monotonic operators (see section 3.2) or they are upward-monotonic operators (see section 3.3) – in any case, they are not (Strawson) downward-entailing.

(123) a. I am glad that ANYONE likes me (Kadmon & Landman 1993)
b. Find me a politician that EVER cared for us AT ALL
c. He wished ANYONE AT ALL would look at him with that same love and sweetness

(124) NPI licensing condition
NPIs are only grammatical if they are in the scope of a Strawson DE operator. Some NPIs may further occur only in the scope of an anti-additive operator

A possible response to the data in (123) is to redefine the licensing conditions of NPIs. At least two approaches have been proposed that assume licensing conditions that are different from those in (124): the first approach requires NPIs to occur under non-upward-entailing operators (Progovac 1994:279), while the second approach requires NPIs to occur under non-veridical operators where veridicality is defined as in (125) (e.g. Giannakidou 1998).

(125) Veridicality
A propositional operator F is veridical iff Fp entails p

Such responses leave one crucial aspect of the data in (123) unexplained: their context-dependence. For example, Kadmon & Landman (1993:388) point out that (123-a) is only felicitous in contexts in which the attitude holder has a definite preference for a certain subset of people in the domain of *anyone* to like him. In this respect, the sentences in (123) resemble the occurrences of weak *even* in the scope of desire predicates that we have discussed above.

3.4.2 Derivation: licensing by EVEN

As we have done for NPIs occurring under non-monotone operators in chapter 2, we propose that NPIs in (123) are licensed by a covert *even*. That is, *any* and *ever* are licensed under desire predicate if and only if there is a covert *even* in the structure that associates with their domains and that triggers a scalar presupposition that is satisfied in the context.

Background assumptions on NPI licensing

We briefly recapitulate the core assumptions about NPI licensing that we adopt and that we have discussed in greater detail in chapter 2. First: *Any* and *ever* have the meanings of regular nominal and adverbial indefinites. Second: We assume that they have inherently focused domains (cf. Krifka 1995, Chierchia 2010 for a more sophisticated analysis). For example, the meaning of *anyone* is given in (126-a); its alternatives are in (126-b).

(126) a. $[\![\ \textbf{[any D}_\textbf{F}\textbf{] one}\ ]\!]^{g,c} = \lambda P_{(s,et)}.\ \lambda w_s.\ \exists x\ [\ D(x) \wedge \text{person}(x) \wedge P(x,w)\ ]$
b. $F(\textbf{[any D}_\textbf{F}\textbf{] one}) = \{\ \lambda P.\ \lambda w.\ \exists x\ [\ D'(x) \wedge \text{person}(x) \wedge P(x,w)\ ]\ |\ D' \subseteq D\ \}$

Third: Alternatives induced by *any* and *ever* must be exhaustified, i.e. an appropriate alternative-sensitive operator must associate with the focused domains of *any* and *ever*. The NPIs are consequently 'licensed' if the inferences triggered by the respective alternative-sensitive operator are licit. One such alternative-sensitive operator is a covert *even*, which we represent with EVEN. Its meaning is identical to the meaning of *even*:

(127) $[\![$ **EVEN** $]\!]^{g,c}$(C, p, w) is defined only if $\exists$q $\in$ C [p $\lhd_c$ q].
If defined, $[\![$ **EVEN** $]\!]^{g,c}$(C, p, w) = 1 iff p(w) = 1

Derivation: consistency

If the sentence in (128-a) is parsed without an exhaustification operator, EVEN triggers a presupposition that violates the condition in (30), regardless of whether it is generated in the embedded or in the matrix clause.[25] For example, if EVEN is located in the matrix clause, the alternatives over which it quantifies are those given in (128-c). All of them entail the prejacent (128-d) and so it cannot be the case that one of them is more likely than the prejacent – the scalar presupposition triggered by EVEN is incorrect.

(128) a. He wished ANYONE AT ALL would look at him
b. **[EVEN C_1] [he wished anyone$_{D_F}$ would look at him]**
c. {that he wished that there would be an x in D' that looked at him | D' $\subseteq$ D}
d. $\forall$q $\in$ (128-c): q $\Rightarrow$ that he wished that there would be an x in D that looked at him

An insertion of the exhaustification operator is thus necessary, just as it was with weak *even*. The relevant parse of (128-a) is given in (129-a) where EVEN scopes above EXH and the attitude predicate and associates with the domain of the NPI. For simplicity, we assume that the domain of *anyone* consists of three individuals: a, b, c. This means that the domain of EXH is the one given in (129-b).

(129) a. **[EVEN C_1] [EXH C_0] [he wished [anyone$_{D_F}$ would look at him]**
b. C_0 = {that he wished that there would be an x in D' that looked at him | D' $\subseteq$ {a,b,c}}

The meaning of the exhaustified clause in (129-a) is that the prejacent of EXH is true and that all the alternatives that are not identical with it are false (130). Namely, none of the alternatives except the prejacent itself is entailed by the prejacent.

(130) that he wished that there would be an x in {a,b,c} that looked at him & $\forall$D' $\subset$ {a, b, c}: $\neg$(that he wished that there would be an x in D' that looked at him)

This meaning is identical with (131) – this is the so-called free choice interpretation of *any* in the scope of a universal modal (cf. Fox 2007 for disjunction under universal modals). This is then the assertive meaning of (129-a), which is intuitively correct.

(131) that he wished that there would be an x in {a,b,c} that looked at him
& that he would be okay if a looked at him
& that he would be okay if b looked at him
& that he would be okay if c looked at him

[25] We rely in the following on the modal approach to desire predicates, though this is not crucial.

The domain of EVEN in (129-a) is described in (132). All of the propositions in (132) are mutually exclusive.

(132) { that he wished that there would be an x in D' that looked at him & $\forall$x $\in$ D': he would be okay if x looked at him | D' $\subseteq$ {a,b,c} }

Accordingly, the scalar presupposition that EVEN in (129-a) triggers, given in (133), is compatible with the condition in (30): since all the alternatives are mutually exclusive, there may very well be one alternative that is more likely than the prejacent.

(133) $[\![$ (129-a) $]\!]^{g,c}$ is defined only if $\exists$q $\in$ (132):
that he wished that there would be an x in {a,b,c} that looked at him & $\forall$x $\in$ {a,b,c}: he would be okay if x looked at him $\lhd_c$ q

Derivation: plausibility

The scalar presupposition in (133) is satisfied in contexts in which there exists a subset D' of {a,b,c} that is such that the attitude holder would find it better to be looked at by anyone in D' – "the desirable observers" – than by anyone in {a,b,c}$\setminus$D' – "the undesirable observers." Namely, it is more likely (a) that the attitude holder would wish that someone from the "desirable observers" would look at him and that for every "desirable observer" he would be okay with them looking at him than (b) that he would wish that someone from {a,b,c} – which includes the "undesirable observers" – would look at him and that for everyone in {a,b,c} he would be okay with them looking at him. For example, assume that the domain of *anyone* in (129-a) contains a group of really important people and that the attitude holder prefers to be looked at by important people than by unimportant people. It is more likely (a) that he would wish to be looked at by the really important people and be okay with anyone of the really important people looking at him than (b) that he would wish to be looked at by unimportant or important people and be okay with anyone of the important and unimportant people looking at him. Thus, the scalar presupposition in (133) is satisfied in such a context. On the other hand, if the attitude holder is indifferent between being looked at by a, b or c, the scalar presupposition in (133) cannot be evaluated as correct.

Derivation: factive desire predicates

An analogous derivation applies to Kadmon and Landman's examples of NPIs under factive desire predicates. For example, the sentence in (134-a) has the structure in (134-b). It triggers the two presuppositions in (135) – a factive presupposition due to *glad* (134-i) and a scalar presupposition due to EVEN (134-ii). The latter is consistent and plausible in contexts in which one prefers to be liked by some subset D' of people in the domain D of *anyone*. This parallels the observations by Kadmon and Landman.

(134) a. I am glad that ANYONE likes me
b. **[EVEN C_1] [EXH C_0] [I'm glad anyone$_{D_F}$ likes me]**

(135) $[\![$ (134-b) $]\!]^{g,c}$(w) is defined only if

(i) (I believe that) someone likes me in w,

(ii) $\exists$q $\in$ { that I am glad that an x in D' likes me & $\forall$x $\in$ D': I am okay with x liking me | D' $\subseteq$ D }: that I am glad that an x in D likes me & $\forall$x $\in$ D: I am okay with x liking me $\lhd_c$ q

However, we make a slightly different prediction with respect to what alternatives in fact have to obtain for (134) to be felicitous than what Kadmon and Landman say is the case. More to the point, they say that (134) conveys "the message that my 'real wish' is not satisfied" (Kadmon & Landman 1993:387), the 'real wish' being in our case that someone from D' likes me. We predict that this does not have to be the case – it is compatible with (135-i) that someone from D' likes me. However, we do make a weaker prediction that it is unlikely that someone from D' likes me, which is derived as in the preceding section (low probability bias). This prediction seems to be borne out in light of the following data:

(136)

a. I'm glad that ANYONE, let alone the greatest player, is doing something to help out those who were greatly harmed by the shutdown

b. I was being sincere, your Italian is good and I was just happy that someone, anyone (let alone you!) is bringing to light medieval, dialectical Italian[26]

c. Considering that none of us were even supposed to get this we should be happy that we have anything, let alone an app that streams this well[27]

A final remark concerning Kadmon and Landman's proposal relates to the semantics of *glad* that they must adopt for their account of the distribution of (stressed) *any* to go through. As we have indicated in section 3.3.3, Kadmon and Landman attempt to show that in an appropriate context strengthening is satisfied if we use *any* under *glad*. The core ingredient of their derivation that purports to show this is the following counterfactual (Kadmon & Landman 1993:387):

> if I am glad about the satisfaction of the 'wide wish' [= proposition denoted by the embedded clause with *any*], then GIVEN THAT I WOULD PREFER TO HAVE THE 'NARROW WISH' SATISFIED, if the 'narrow wish' were to be satisfied I would surely be glad about that [= the relevant alternative to the embedded clause with *any*].

However, since they define strengthening as in (137) (Kadmon & Landman 1993:369), the truth of the above conditional does not guarantee strengthening if *glad* is upward-entailing – it only guarantees that widening under *glad* does not weaken the statement in appropriate contexts. To keep (137) and their account of *any* under *glad*, Kadmon and Landman must assume that *glad* is non-monotone or exhaustified, as sketched above.

(137) *Any* is licensed only if the widening that it induces creates a stronger statement

[26] http://www.richardthompson-music.com/...

[27] http://androidforums.com/...

Derivation: restricted distribution

Finally, the restriction of NPIs to desire statements and imperatives (and DE and non-monotone environments) follows in our system from the same grounds that were responsible for the infelicity of weak *even* in other environments, as discussed in section 3.3.5: although the scalar presupposition triggered by EVEN is consistent, it is not plausible with epistemics, *intend* and under certain directive predicates.

(138) a. #I believe that ANYONE likes me
b. #Mary intends to find a politician that EVER cared for us AT ALL

(139) a. I challenge ANYONE AT ALL to defeat me at tetris
b. #Mary commanded me to find a politician that EVER cared for us AT ALL

3.4.3 Conclusion

We have derived the distribution, context-dependence and semantic import of stressed NPIs in desire statements and imperatives from the assumption that they are licensed by a covert *even* (Krifka 1995). This assumption effectively reduced the licensing requirements of NPIs in desire statements and imperatives to those of weak *even*.

We have pointed out in the first and second chapter that there are two "recalcitrant arenas" of NPI licensing that are not subsumed by the classical characterization that NPIs are licensed in Strawson DE environments – licensing by non-monotone quantifiers and licensing by desire predicates. We have shown that the heavily context-dependent felicity of NPIs in these two types of environments can be given a uniform explanation by assuming that the distribution of NPIs may be governed by a covert *even*.

3.5 Conclusion

In this chapter we looked at occurrences of weak *even* in desire statements as well as in imperatives and under certain modals. There are two prominent approaches to semantics of desire. On the first approach, which has been propounded by Heim (1992) and others, desire predicates are non-monotone operators. This approach has the welcome consequence of allowing us to, without further ado, subsume weak *even* in desire statements (and imperatives, on certain assumptions) under the prediction from the introductory chapter, repeated in (140). Furthermore, the approach provides for a straightforward explanation of why weak *even* is restricted to only non-doxastic modal environments – doxastic modalities have an upward-entailing semantics.

(140) A prediction of the scope-theoretic approach to *even*

A sentence with weak *even* may be acceptable if *even* is at surface structure in the scope of a (Strawson) downward-monotone operator or a non-monotone operator, i.e. in the scope of a non-upward-monotone operator

However, the greatest strength of the approach for our purposes turns out to also be its greatest weakness. As we discuss in detail in the appendix, desire predicates do appear to behave like upward-entailing operators. In response to this, we provided an explanation of the phenomena in a more standard modal analysis. We proposed that weak *even* is rescued in modal environments by the insertion of an exhaustification operator above the modals. We have argued that its restricted distribution can to a great extent be explained by showing that the scalar presupposition in many other environments cannot be evaluated as true. However, some issues persist – in particular, the question of what prevents exhaustification from rescuing weak *even* in positive episodic sentences.

Finally, in parallel to our strategy in chapter 2, we extended the analysis of weak *even* in desire statements and imperatives to ill-understood occurrences of NPIs in these environments by assuming that their licensing is governed by a covert *even*. We showed that the strong correlation between the behavior of weak *even* and NPIs in these environments – e.g. they exhibit the same kind of context-dependence – can be given a uniform explanation.

CHAPTER 4

Concessive scalar particles

There is an assortment of challenges that polarity items like *any* and *ever* pose for linguistic theory. The two most prominent ones have been, on the one hand, finding an adequate description of their distribution (Ladusaw 1979, von Fintel 1999 and others) and, on the other hand, providing an explanation of this distribution (Krifka 1995, Chierchia 2006 and others). A further challenge has been accounting for the variation in the distribution of different polarity items. For example, certain polarity items have been claimed to occur only in downward-entailing (DE) contexts – e.g. *ever* – while others may additionally occur in modal contexts and, with some qualifications, in positive episodic sentences – e.g. *any*.

Analogous challenges are posed to linguistic theory by the different distributions of scalar particles, which to great extent mirror what we find in the domain of polarity items. For example, certain scalar particles (or collocations of particles) have been claimed to occur only in DE contexts – e.g. *auch nur* in German (Guerzoni 2003) – while others are distributed more freely – e.g. *même* in French.

This chapter tackles a class of expressions that have been characterized as concessive scalar additive particles (Giannakidou 2007, Alonso-Ovalle 2009, Lahiri 2010). The representatives of this class are *magari* in Slovenian, *esto ke* in Greek (Giannakidou 2007), and *aunque sea* and *siquiera* in Spanish (Alonso-Ovalle 2009, Lahiri 2010). We will use the expression *magari** as a blanket concessive scalar additive particle.

*Magari** has a restricted distribution: it occurs in a variety of DE contexts, in questions, as well as under desire predicates, priority[1] modals and in imperatives. It associates with a weak element in its immediate scope. The three definitive semantic characteristics of *magari** are (i) that it triggers a scalar inference comparable to that triggered by weak *even*, (ii) that it often appears to trigger an additive inference and (iii) that it is in certain environments glossed with *at least*, which is taken to reflect its so-called concessive nature.

[1]Priority modals include deontic, bouletic and teleological modals (Portner 2009 for classification).

We account for the distribution and semantic import of *magari** by treating it as being morphologically complex: it consists of a scalar component EVEN and an existential component AT LEAST. The distribution of *magari** is governed by the inferences that these two components give rise to. In positive episodic environments, *magari** is marked because an inconsistent meaning is generated. In DE environments, *magari** may be licit if EVEN scopes above the DE operator, stranding AT LEAST in its base position. Finally, in modal environments, *magari** may be licit if EVEN scopes above the modal and the stranded AT LEAST gets a free choice interpretation.

The semantic import of *magari** supervenes on the semantic contributions of its components: (i) the scalar inference is triggered by EVEN, while (ii) the apparent additive inference is conditioned by AT LEAST; (iii) the so-called concessive flavor that *magari** exhibits in certain environments echoes the free choice interpretation of AT LEAST in those environments and the scalar inference triggered by EVEN.

4.1 Distribution

There are three main types of environments in which *magari** may occur: DE environments, modal environments and questions (Giannakidou 2007, Alonso-Ovalle 2009, Lahiri 2010). In all of these environments, *magari** associates with a weak element in its immediate scope. It is glossed with *even* or *at least* in English; the two glosses vary depending on the embedding operator. We ignore some minor differences in the distribution of *magari** across languages – e.g. *aunque sea* in Spanish may only occur in subjunctive environments, arguably due to its subjunctive morphology (Lahiri 2010).

4.1.1 Positive episodic environments

*Magari** is infelicitous in upward-entailing (UE) episodic environments. It does not make a difference if the associate of *magari** is interpreted as the lowest or as the highest element on a pragmatic scale (1). In this respect it crucially differs from English *even*, which may in UE contexts associate with an element that is highest on a pragmatic scale. This is illustrated by the felicitous gloss in (1).

(1) *Janez je prebral magari Sintaktične strukture
Janez aux read magari Syntactic Structures
'John read even Syntactic Structures'

Re-interpreting the sentence as expressing epistemic uncertainty does not improve its felicity. This holds even in cases where *magari** is in the scope of disjunction, which has been claimed to be able to rescue certain polarity items in episodic environments, e.g. *vreun* in Romanian (Falaus 2011).

(2) *Janez je prebral LGB ali pa magari Sintaktične strukture
Janez aux read LGB or prt magari Syntactic Structures
'John read LGB or even Syntactic Structures'

4.1.2 Downward-entailing environments

*Magari** occurs in a variety of (Strawson) DE environments. Most prominently, it is licensed in the restrictor of the universal quantifier and in the antecedent clause of the conditional. This is illustrated by the examples in (3) where the focused associates of *magari* are *bronze* and the weak predicate *one*. (4) contains sentences showing that *magari* is licensed under *without* and *doubt*.[2] In all DE environments, *magari** is glossed with *even*.

(3) a. Vsak študent, ki je rešil magari ENO samo nalogo, je zdelal izpit
every student who aux solved magari one alone exercise has passed exam
'Every student that solved even one single exercise passed the exam'

b. Če Peter osvoji magari BRONASTO medaljo, bo postal junak
if Peter wins magari bronze medal will become hero
'If Peter wins even (just) the bronze medal, he will become a hero'

(4) a. Janez je končal letnik brez da bi rešil magari ENO nalogo
Janez aux finished year without that aux solve magari one exercise
'John finished the school year without solving even one exercise'

b. Janez dvomi, da bo Peter odgovoril na magari ENO vprašanje
Janez doubts that aux Peter answer on magari one question
'John doubts that Peter will answer even one question'

Lahiri (2010) notes that *magari** – *aunque sea* in Spanish – in conditionals and under universal quantifiers is subject to two constraints which he describes along the following lines: the antecedent and restrictor clauses in which *magari** is generated must be pragmatically weaker than its alternatives, while the matrix clause has to be pragmatically stronger than its alternatives. For example, although the matrix clause in (5-b) is pragmatically stronger than its alternatives, the antecedent clause is not pragmatically weaker. On the other hand, (5-a) satisfies both conditions: the matrix clause is pragmatically strong, while the antecedent clause is pragmatically weak.

(5) a. Si lees aunque sea UN libro, vas a aprobar
if you read magari* one book, you will pass

b. #Si lees aunque sea CINCO libros, vas a suspender el examen
if you read magari* five books you will fail the exam

c. #Si lees aunque sea UN libro, vas a suspender el examen
if you read magari* one book, you will fail the exam

d. #Si lees aunque sea CINCO libros, vas a aprobar
if you read magari* five books you will pass

[2] It has been observed that *magari** might have a slightly narrower distribution in DE contexts than some NPIs. More to the point, its distribution has been claimed to resemble that of Krifka's (1995) 'strong NPIs' (cf. Alonso-Ovalle 2009). We leave the weighing of different licensing DE environments of *magari** for another occasion, esp. because there seems to be cross-speaker variation, as has also been observed with respect to 'strong NPIs' by Krifka (1995).

Finally, it should be mentioned that *magari** is not licensed under clausemate negation, unless the negation is in a DE context (there is some cross-linguistic variation in this respect). This flip-flop behavior resembles that of positive polarity items and is illustrated in (6).[3,4]

(6) a. #Peter ni osvojil magari BRONASTE medalje
Peter not win magari bronze medal
'Peter didn't win even a bronze medal'
b. Janez dvomi, da Peter ni osvojil magari BRONASTE medalje
Janez doubts that Peter not win magari bronze medal
'John doubts that Peter didn't win even a bronze medal'

4.1.3 Interrogatives

*Magari** occurs in interrogative clauses. As in DE environments, *magari** associates with a pragmatically weak element and is glossed with *even*. Furthermore, it triggers negative bias: the speaker who utters (7) expects a negative answer to the question. In this respect, the behavior of *magari** in questions parallels the behavior of weak *even*.

(7) Je Janez rešil magari ENO nalogo?
aux John solve magari one exercise?
'Did John solve even one exercise?'

4.1.4 Modal environments

*Magari** may occur in imperatives, under bouletic attitude predicates and under priority modals. An example of *magari* in an imperative is given in (8) where it is glossed with *at least*. The associate of *magari* is interpreted as being low on the pragmatic scale.

(8) Preberi magari SINTAKTIČNE STRUKTURE
read.imp magari Syntactic Structures
'Read at least Syntactic Structures'

The imperative in (8) may be uttered in a context in which it is known that the hearer will be able to read only one book. And the hearer can comply with the imperative by reading,

[3] To the extent that *magari** is felicitous under negation, the scalar particle needs to bear focal stress and has a so-called anti-indiscriminative 'not just any' type of interpretation (cf. Horn 2005). An example of a felicitous discourse of this sort is given in (i).

(i) Peter didn't read MAGARI* Syntactic Structures. He read PRECISELY Syntactic Structures

[4] *Magari** is not subject to the Immediate Scope Constraint (cf. Linebarger 1980). This is illustrated by the contrast in (i).

(i) a. *If every student did any of his assignments, the professor will be happy
b. Če je vsak študent rešil magari ENO svojo nalogo, potem bo prfoks vesel
if aux every student solve magari one exercise then aux prof happy
'If every student solved even one exercise, then the professor will be happy'

say, only *Lectures on Government and Binding*. The command does not imply that one must read Syntactic Structures and possibly something in addition to that.

*Magari** is also licensed under desire predicates like *want, wish* and *hope* but is infelicitous under doxastic/epistemic embedding predicates like *think* and *know*. The associate of *magari** is low on the pragmatic scale and it is glossed with *at least*.

(9) a. Janez si želi, da bi Peter osvojil magari BRONASTO medaljo
John self want that aux Peter win magari bronze medal
'John wishes that Peter would win at least a bronze medal'

b. *Janez je mislil, da je Peter osvojil magari BRONASTO medaljo
John aux think that aux Peter won magari bronze medal
'John thought that Peter won at least a bronze medal'

Finally, two examples with *magari** under existential and universal modals are in (10). The modals that allow for an embedded *magari** have a priority flavor (bouletic, deontic, teleological); *magari** is not licensed under epistemic modals. Under an existential modal, *magari** is glossed with *even*, while under a universal modal it is glossed with *at least*.

(10) a. Za potni list mi Janez lahko pošlje magari POSKENIRANO sliko
for passport me John can send magari scanned photo
'To get a passport, John may send me even a scanned photo'

b. Za potni list mi mora Janez poslati magari POSKENIRANO sliko
for passport me must John send magari scanned photo
'To get a passport, John needs to send me at least a scanned photo'

*Magari** in modal environments is accompanied by distinctive entailments, which we illustrate in (11) and (12). We will argue that these play a role in determining its glosses with *even* and *at least* in English under existential and universal modals, respectively.

(11) (9-a) ⇒ John wants Peter to win a medal and he is okay with Peter winning bronze and he is okay with Peter winning silver, and he is okay with Peter winning gold

(12) a. (11-a) ⇒ John may send me a photo and he may send me a scanned photo, and he may send me an original photo

b. (11-b) ⇒ John must send me a photo and he may send me a scanned photo, and he may send me an original photo

To summarize: *Magari** is licensed in three types of environments: in DE environments, in questions, and in modal environments. It is glossed with *even* in DE environments, in questions and under existential modals; it is glossed with *at least* in imperatives, under universal modals and under attitude predicates. In all of these environments, the associate of *magari** is a low element on the respective pragmatic scale.

4.2 Proposal

We propose that *magari** is morphologically complex. It spells out two components: a scalar component and an existential component. It is acceptable only if the inferences triggered by these two components are consistent and satisfied in the context. We show that this may be the case if they are separated by a DE operator or the trace of *whether* in interrogatives. Finally, *magari** is acceptable in certain modal environments because its existential component can receive a free choice interpretation, much like some other existential quantifiers.

4.2.1 Ingredients

The distribution of *magari** is regulated by the two focus-sensitive operators that it spells out – EVEN and AT LEAST. They associate with the same focused element.[5] Thus, a clause containing *magari** has a base-generated structure along the lines of (13-b).

(13) a. ... Peter read magari* ONE book
b. ... **[EVEN C_1] [AT LEAST C_0] [Peter read one$_F$ book]**

EVEN triggers the scalar presupposition that its prejacent is less likely than a relevant alternative; it is otherwise truth-conditionally vacuous. A simple illustration of the semantic contribution of EVEN is given in (15) where the domain of EVEN, C_1, consists of the focus alternatives to its sister. We assume that EVEN may scope out of its base-generated position.

(14) $[\![$ **EVEN** $]\!]^{g,c} = \lambda C.\ \lambda p{:}\ \exists q \in C\ [\ p \lhd_c q\ ].\ \lambda w.\ p(w) = 1$

(15) $[\![$ **[EVEN C_1] Peter kissed Mary$_F$** $]\!]^{g,c}(w)$ is defined only if $\exists q \in$ { that Peter kissed x | x is a relevant individual }: that Peter kissed Mary $\lhd_c$ q.
If defined, $[\![$ **[EVEN C_1] P. kissed Mary$_F$** $]\!]^{g,c}(w) = 1$ iff Peter kissed Mary in w

AT LEAST has a weak existential meaning (cf. Schwarz 2005): it takes a set of alternatives, C, as its first argument and a proposition, p, as its second argument. It imposes a condition on its second argument that it must be more likely than all of the alternatives in its first argument (cf. Guerzoni 2003, Lahiri 2010). The assertive meaning of AT LEAST is that there is an alternative in its first argument, C, that is true and that is at most as likely as its second argument, p. Obviously, this alternative may be the second argument, p, itself.

(16) $[\![$ **AT LEAST** $]\!]^{g,c} = \lambda C.\ \lambda p{:}\ \forall q{\in}C\ [p{\neq}q \rightarrow q \lhd_c p].\ \lambda w.\ \exists q{\in}C\ [q \unlhd_c p \wedge q(w) = 1]$

The meaning of a structure containing AT LEAST is computed in (17). The domain of AT LEAST is the same as that of EVEN in (15) – it is the focus meaning of the sister of AT LEAST. The sentence presupposes that it is most likely that Peter kissed Mary. If the relevant people are Mary, Sue and Polly, the assertive meaning of the sentence is that Peter kissed (at least) one of them. As always, the import of the existential quantifier corresponds to that of disjunction; we utilize primarily the disjunctive notation in the following.

[5] For perspicuity, we remain vague about multiple focus association. In our representations we simplistically utilize a single F-marking and assume that two focus particles may associate with it (cf. Krifka 1991, Wold 1996, Beck 2006 for discussion of selective focus association).

(17) $[\![$ **[AT LEAST C_1] Peter kissed Mary$_F$**$]\!]^{g,c}$(w) is defined only if $\forall$q $\in$ { that Peter kiss x | x is a relevant person }: q $\neq$ that Peter kissed Mary $\rightarrow$ q $\lhd_c$ that Peter kissed Mary. If defined, $[\![$ **[AT LEAST C_1] Peter kissed Mary$_F$** $]\!]^{g,c}$(w) = 1 iff $\exists$q $\in$ { that Peter kissed x | x is a relevant individual } [q(w) = 1] iff Peter kissed Mary or Sue or Polly in w

4.2.2 Positive episodic environments

We have seen that *magari** is not licensed in positive episodic environments, regardless of whether its associate is the lowest or the highest element on the scale. This is represented in (18), which contains slightly rearranged glosses of Slovenian examples. We are assuming throughout this section that the speaker is entertaining the ranking according to which Peter winning a bronze medal is most likely (least remarkable) and Peter winning a gold medal is least likely (most remarkable).

(18) a. #**[EVEN C_2] [AT LEAST C_1] [Peter won a gold$_F$ medal]**
b. #**[EVEN C_2] [AT LEAST C_1] [Peter won a bronze$_F$ medal]**

The markedness of the structures in (18) is a consequence of the inferences triggered by the two particles. We begin by looking at the structure in (18-a) where the associate of the two particles is pragmatically strong. In this structure, AT LEAST triggers an incorrect scalar presupposition. Namely, it triggers the presupposition that Peter winning a gold medal is the most likely among the alternatives (19-c);[6] this contradicts our assumptions about the context. Since the sentence inherits this presupposition, it is undefined in the context.[7]

(19) a. **[$_{ZP}$ [EVEN C_2] [$_{XP}$ [AT LEAST C_1] [Peter won a gold$_F$ medal]]]**
b. C_1 = {bronze, silver, gold}
c. $[\![$ **XP** $]\!]^{g,c}$ is defined only if $\forall$q $\in$ {bronze, silver, gold}: q $\neq$ gold $\rightarrow$ q $\lhd_c$ gold (= only if bronze, silver $\lhd_c$ gold)

[6]Shorthand convention: 'gold' stands for the proposition that Peter won gold etc.

[7]If we were to assume that AT LEAST does not trigger a scalar presupposition, the infelicity of (18-a) could be explained by AT LEAST being semantically vacuous in that structure (a strategy pursued in Crnič 2011). That is, the structure in (18-a) would have a contextually equivalent meaning as the structure in (i).

(i) **[EVEN C_2] [Peter won a gold$_F$ medal]**

The relevant principle is informally stated in (ii) and is a general economy condition that can be seen in action elsewhere in grammar. For example, it arguably underlies the markedness of the sentences in (iii) (remember: in tennis you cannot win more than three sets).

(ii) The principle of non-vacuity
The meaning of a lexical item used in the discourse must affect the meaning of its host sentence (either its truth-conditions or its presuppositions)

(iii) a. #At least EVERY boy came to the party
b. #Roger Federer won three sets or more

The meaning of the structure in (18-b) is infelicitous because of the presupposition triggered by EVEN. The prejacent of EVEN in this structure is that Peter won a bronze or a silver or a gold medal. This is computed in (20-c): AT LEAST quantifies over the alternatives that Peter won a bronze medal, that he won a silver medal etc, given in (20-b), and outputs the proposition that one of these alternatives is true (20-c).

(20) a. #$[_{ZP}$ **[EVEN $\mathbf{C_2}$]** $[_{XP}$ **[AT LEAST $\mathbf{C_1}$] [Peter won a bronze$_{\mathbf{F}}$ medal]]]**
b. C_1 = {bronze, silver, gold}
c. $[\![$ **XP** $]\!]^{g,c}$ is defined only if $\forall q \in$ {bronze, silver, gold}: $q \neq$ bronze $\rightarrow q \lhd_c$ bronze.
If defined, $[\![$ **XP** $]\!]^{g,c}$ = bronze $\vee$ silver $\vee$ gold

The domain of EVEN in (18-b) consists of the propositions in (21).[8] Let us elaborate on this: EVEN associates with *bronze*; the alternatives to *bronze* are the predicates silver and

[8]An important and possibly non-innocuous simplification is made in (21): instead of the focus alternatives of the sister of EVEN, which are all partial propositions, we only include their assertive components in the domain of EVEN. We do this because otherwise we would face the difficulty of evaluating propositions all of which except one are unsatisfiable (as discussed in Crnič 2011). Namely, as we have seen in (19), the meaning of the sister of EVEN in (21) is defined only in contexts in which winning bronze is most likely. Its focus alternatives are not defined in such contexts; they are defined only in contexts in which winning silver and gold, respectively, is most likely. Notice that a similar state of affairs obtains with other examples containing scalar particles in the scope of other co-associating scalar particles:

(i) a. Even if John is merely/just/only a LIEUTENANT, he deserves your respect
b. Beide schienen nur körperlich anwesend gewesen zu sein, er bezweifelte sogar, dass sie
both seemed only physically present been to be he doubted even, that they
auch nur EIN Wort Simpsons gehört hatten
even one word of Simpson heard have

It has been suggested that the comparison of likelihoods of relevant alternatives invoked by EVEN involves the comparison of likelihoods of solely their assertive components (e.g. Wilkinson 1996). Our simplification is in the spirit of this suggestion. There are many different ways of implementing this suggestion. For example, it can be implemented (i) by adopting a two-dimensional approach to meaning (Karttunen & Peters 1979, Dekker 2008) and (ii) by assuming that the domain of a focus-sensitive operator consists of syntactic forms that are derived from its sister by replacing the associate with appropriate expressions of the same type (cf. Fox & Katzir 2011). Thus, the alternatives to the sentence **Peter wins a bronze$_{\mathbf{F}}$ medal** are those in (ii):

(ii) F(**Peter wins a bronze$_{\mathbf{F}}$ medal**) = {**Peter wins a bronze medal**, **Peter wins a silver medal**, **Peter wins a gold medal**}

The modified meaning of AT LEAST is given in (iii). (iii-a) describes its assertive component: its import is that of a propositional existential quantifier; (iii-b) describes its presuppositional component: its import is that the assertive meaning of its sister is less likely than the assertive meanings of its alternatives.

(iii) a. $[\![$ **[AT LEAST $\mathbf{C_i}$] XP** $]\!]_a^{g,c} = \lambda w.\ \exists q \in C_i\ [\ [\![\ q\ ]\!]_a^{g,c} \unlhd_c [\![$ **XP** $]\!]^{g,c} \wedge [\![\ q\ ]\!]^{g,c}(w)=1\ ]$
b. $[\![$ **[AT LEAST $\mathbf{C_i}$] XP** $]\!]_p^{g,c} = \forall q \in C_i\ [\ [\![\ q\ ]\!]_a^{g,c} \lhd_c [\![$ **XP** $]\!]_a^{g,c}\ ]$

An example of the meaning of a structure containing AT LEAST is given in (iv): (iv-a) describes its assertive meaning – that Peter wins bronze or silver or gold – while (iv-b) describes its presuppositional meaning – that Peter wins bronze is most likely.

(iv) a. $[\![$ **[AT LEAST $\mathbf{C_1}$] [Peter wins bronze$_{\mathbf{F}}$]** $]\!]_a^{g,c} = \lambda w.$ Peter wins a medal in w
b. $[\![$ **[AT LEAST $\mathbf{C_1}$] [Peter wins bronze$_{\mathbf{F}}$]** $]\!]_p^{g,c}$ = silver, gold $\lhd_c$ bronze

gold. Accordingly, the domain of EVEN in (21-a) contains besides the prejacent, i.e. (bronze $\vee$ silver $\vee$ gold), the proposition that there is an alternative to Peter winning silver that is at most as likely as it and true, i.e. (silver $\vee$ gold), and the proposition that there is an alternative to Peter winning gold that is at most as likely as it and true, i.e. (gold). The scalar presupposition triggered by AT LEAST is in (21-b-i): it is most likely that Peter won bronze; the presupposition is intuitively correct. The scalar presupposition triggered by EVEN is in (21-b-ii). And this presupposition is incorrect.

(21) a. $\mathrm{C}_2 = \{(\text{bronze} \vee \text{silver} \vee \text{gold}), (\text{silver} \vee \text{gold}), \text{gold}\}$
b. $[\![\ \mathbf{ZP}\ ]\!]^{g,c}$ is defined only if
(i) silver, gold $\lhd_c$ bronze,
(ii) $\exists \mathrm{q} \in \mathrm{C}_2$: $(\text{bronze} \vee \text{silver} \vee \text{gold}) \lhd_c \mathrm{q}$.
If defined, $[\![\ \mathbf{ZP}\ ]\!]^{g,c} = \text{bronze} \vee \text{silver} \vee \text{gold}$

Namely, the presupposition in (22-b-ii) states that there is a relevant alternative that is more likely than the proposition that Peter won a bronze or silver or gold medal. This cannot be the case since all the alternatives in the domain of EVEN – esp. that Peter won silver or gold, that Peter won gold – entail the prejacent. And if a proposition entails another proposition, it cannot be less likely than it:

(22) Scalarity and entailment
If a proposition p entails a proposition q, q cannot be less likely than p

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The modified meaning of EVEN is defined in (v): its assertive meaning is an identity function (v-a), while its presupposition is that the assertive meaning of its sister is less likely than the assertive meaning of at least one of its alternatives.

(v) a. $[\![\ \mathbf{[EVEN\ C_i]\ XP}\ ]\!]_a^{g,c} = [\![\ \mathbf{XP}\ ]\!]_a^{g,c}$
b. $[\![\ \mathbf{[EVEN\ C_i]\ XP}\ ]\!]_p^{g,c} = \exists \mathrm{q} \in \mathrm{C_i}\ [\ [\![\ \mathbf{XP}\ ]\!]_a^{g,c} \lhd_c [\![\ \mathrm{q}\ ]\!]_a^{g,c}\ ]$

With these ingredients in hand, we illustrate the import of co-associating EVEN and AT LEAST on the schematic structure in (vi-a). The domain of EVEN is given in (vi-b).

(vi) a. **[EVEN $\mathbf{C_2}$] [neg [AT LEAST $\mathbf{C_1}$] [Peter wins bronze$_\mathbf{F}$]]**
b. $\mathrm{C}_2 = \{$**[neg [AT LEAST $\mathbf{C_1}$] [Peter wins bronze$_\mathbf{F}$]], [neg [AT LEAST $\mathbf{C_1}$] [Peter wins silver$_\mathbf{F}$]], [neg [AT LEAST $\mathbf{C_1}$] [Peter wins gold$_\mathbf{F}$]]**$\}$

The assertive meaning of the structure is in (vii-a), while its presupposition is in (vii-b). Both of the meanings are consistent and intuitively correct, as will be discussed in the main text.

(vii) a. $[\![\ \text{(vi-a)}\ ]\!]_a^{g,c} = [\![\ \mathbf{neg}\ ]\!]_a^{g,c}([\![\ \mathbf{[AT\ LEAST\ C_1]\ [Peter\ wins\ bronze_F]}\ ]\!]^{g,c}) = \neg(\text{bronze}\vee\text{s.}\vee\text{g.})$
b. $[\![\ \text{(vi-a)}\ ]\!]_p^{g,c} = \big[\text{silver, gold} \lhd_c \text{bronze}\big] \wedge \big[\exists \mathrm{q} \in \mathrm{C}_2\text{: } \neg(\text{bronze} \vee \text{silver} \vee \text{gold}) \lhd_c [\![\ \mathrm{q}\ ]\!]_a^{g,c}\big]$

In the main text we continue to employ the more conservative approach to the semantics of EVEN, though we implicitly assume that the comparison of likelihoods of the respective alternatives involves comparison of assertive meanings, possibly along the lines described in this footnote.

To summarize: We have shown that *magari** is illicit in positive episodic sentences because its components trigger false presuppositions. If the associate of the two particles is a weak element, the scalar presupposition triggered by EVEN will be false; if the associate of the two particles is not a weak element, the scalar presupposition triggered by AT LEAST will be false.

4.2.3 Downward-entailing environments

*Magari** is licensed in a variety of DE environments. Following Lahiri's (1998) work on Hindi NPIs, we account for this by allowing EVEN to take scope above the respective DE operator where it subsequently triggers a consistent scalar presupposition.

(23) **[EVEN C_2] $\boxed{\mathbf{OP_{DE}}}$ [~~[EVEN C_2]~~ [AT LEAST C_1] [Peter won a bronze$_F$ medal]]**

In (24) we derive the consistent inferences of a conditional sentence containing *magari**. EVEN scopes out of the embedded clause at LF in (23). Its sister at LF denotes the proposition in (24-b). The scalar presupposition triggered by AT LEAST is correct: it is more likely that Peter wins a bronze medal than that he wins a silver or a gold medal. This meaning is inherited by the sentence.

(24) a. **[EVEN C_2][$_{XP}$[if [AT LEAST C_1] Peter wins bronze$_F$][he becomes a hero]]**
b. $[\![$ **XP** $]\!]^{g,c}$ is defined only if silver, gold $\lhd_c$ bronze. If defined, $[\![$ **XP** $]\!]^{g,c} = \lambda$w. $\forall$w' $\in$ B(w) [(bronze $\vee$ silver $\vee$ gold)(w') $\rightarrow$ hero(w')] = that if Peter wins a medal he will become a hero

The domain of EVEN in (24-a) consists of the alternatives in (25-a), i.e. propositions of the form that if Peter wins at least an x medal, he will become a hero. It triggers the presupposition in (25-b). Since the prejacent of EVEN, computed in (24-b), entails all the alternatives in the domain of EVEN, it may very well be less likely than one of them, e.g. that if Peter wins gold he will become a hero.

(25) a. C_2 = {that if Peter wins a medal he will become a hero, that if Peter wins silver or gold he will become a hero, that if Peter wins gold he will become a hero}
b. $[\![$ (24-a) $]\!]^{g,c}$ is defined only if $\exists$q $\in$ C_2: that if Peter wins a medal he will become a hero $\lhd_c$ q

Thus, we have explained why *magari** is felicitous in (24-a): EVEN scopes above the DE operator where it triggers a correct presupposition; AT LEAST stays in situ and triggers a correct presupposition as well.

The final issue relates to Lahiri's observations about *magari** in conditionals. As we have seen in (5), *magari** is felicitous only in antecedents of conditionals in which the antecedent is pragmatically weak and the matrix clause is pragmatically strong:

(26) a. **[EVEN C_2] [[if [[AT LEAST C_1] you read one$_F$ book]][you will pass]]**
b. #**[EVEN C_2] [[if [[AT LEAST C_1] you read five$_F$ books]][you will fail]]**
c. #**[EVEN C_2] [[if [[AT LEAST C_1] you read one$_F$ book]][you will fail]]**
d. #**[EVEN C_2] [[if [[AT LEAST C_1] you read five$_F$ books]][you will pass]]**

(26-bd) are ruled out because AT LEAST triggers a scalar presupposition that is false: it is not the case that it is most likely that you read five books, e.g. it is more likely that you read one book.[9] On the other hand, the two presuppositions that (26-a) triggers are correct: the presupposition triggered by AT LEAST is that it is most likely that you read one book (compared to reading two books etc.), while the presupposition triggered by EVEN is that there is an alternative that is more likely than that if you read one book, you will pass the exam; an alternative that verifies the latter presupposition is that if you read three books you will pass the exam. Finally, the presupposition triggered by AT LEAST in (26-c) is that it is most likely that you read one book (compared to reading two books etc.) – this is correct. However, the presupposition triggered by EVEN is problematic. Although it is satisfiable – the prejacent is the logically strongest alternative and is thus at most as likely as the other alternatives – it is arguably false. Namely, it naturally holds that the more you read, the less likely it is that you will fail. Accordingly, the likelihood of the proposition that if you read one book you will fail cannot be noticeably lower than the likelihood of the proposition that if you read more than one book you will fail. This explains the infelicity of (26-c). If the context were different, the presupposition of EVEN in (26-c) might be felicitous. This would be the case if reading many books were detrimental to achieving good results in exams.

To summarize: *Magari** is licensed in DE environments because its EVEN component may outscope a DE operator while its AT LEAST component remains in situ. EVEN consequently triggers a scalar presupposition that is compliant with (22) and may be satisfied in the context. If it is satisfied, the occurrence of *magari** is acceptable (cf. Lahiri 1998 for *even*-NPIs in Hindi).[10]

4.2.4 Interrogatives

*Magari** may occur in interrogative clauses. In them it triggers negative bias – the speaker expects a negative answer. This behavior parallels the behavior of weak *even*.

[9] The sentence in (i-a) could instead of (26-d) be assigned the structure where EVEN stays in situ and AT LEAST moves (i-b). The scalar presuppositions of EVEN and AT LEAST would in this case be satisfied: the presupposition of EVEN is that there is an alternative that is more likely than that you read five books – this is correct (say, that you read one book); the presupposition of AT LEAST is that it is most likely that if you read five books you will pass – this is correct as well. Thus, if the sentence in (i-a) could have the structure in (i-b), it would falsely be predicted to be licit and convey that if you read five books, you will pass the exam (note that the existential import of AT LEAST is vacuous in (i-b)).

(i) a. Si lees aunque sea CINCO libros, vas a aprobar
'If you read magari* five books, you will pass the exam'
b. **[AT LEAST C_2] [[if [[EVEN C_1] ~~[AT LEAST C_2]~~ you read five$_F$ books]][you will pass]]**

However, the structure in (i-a) is arguably ruled out on independent grounds that govern the distribution of multiple focus operators. Namely, the structure in which one focus particle moves across another (co-associating) focus particle violates superiority. If two focus operators are attracted by the same target, only the higher of the two can move – this is EVEN in the case at hand.

[10] We have not explained the fact that *magari** does not to occur under (unembedded) clausemate negation. This is an instance of a more general pattern that we also find with certain nominal free choice items (cf. Kratzer & Shimoyama 2002 for *irgendein*). We come back to this in the following chapter.

(27) a. Did you read magari* one paper? ($\rightsquigarrow$ negative bias)
b. Did you read even one paper? ($\rightsquigarrow$ negative bias)

In our system, questions with *magari** are negatively biased for the same reason that questions with weak *even* are negatively biased: the only LF of an interrogative clause with *magari** that has a licit interpretation – i.e. that denotes a set containing a defined answer – denotes a set of answers in which only the negative answer is defined (Guerzoni 2004). We illustrate this for the question in (27-a).

The question in (27-a) has the two possible structures in (28): in (28-a) EVEN stays in situ, while in (28-b) EVEN scopes above the trace of *whether*.

(28) a. **[whether [$8_{(st)(st)}$[$t_{8_{(st)(st)}}$[EVEN C_2] [AT LEAST C_1] [you read one_F paper]**
b. **[whether [8 [EVEN C_2] [t_8 [AT LEAST C_1] [you read one_F paper]**

If we simplify Guerzoni's semantics and assume that the meaning of *whether* is the one in (29), we derive the meanings for the two structures described in (30) and (32), which we discuss in turn.

(29) $[\![\textbf{ whether }]\!]^{g,c} = \lambda f_{((st)(st))(st)}.\ \{f(\lambda p.p), f(\lambda p.\neg p)\}$

The LF in (28-a) denotes the set of propositions in (30). These propositions are defined only in contexts in which (31) holds, which is the scalar presupposition triggered by EVEN. The presupposition is clearly in violation of (22). Namely, since the propositions that you read n papers, where n > 1, entail the proposition that you read one paper, none of them can be less likely than it. Thus, the LF has an undefined meaning, i.e. it denotes a set of undefined propositions.

(30) $[\![\text{ (30-a) }]\!]^{g,c} =$
$[\![\textbf{ whether }]\!]^{g,c}\big(\lambda f.f([\![\textbf{ [EVEN C}_1\textbf{] [AT LEAST C}_1\textbf{] [you read one}_F\textbf{ paper] }]\!]^{g,c})\big) =$
$\big\{[\![\textbf{ [EVEN C}_1\textbf{] [AT LEAST C}_1\textbf{] [you read one}_F\textbf{ paper] }]\!]^{g,c},$
$\neg[\![\textbf{ [EVEN C}_1\textbf{] [AT LEAST C}_1\textbf{] [you read one}_F\textbf{ paper] }]\!]^{g,c}\big\}$

(31) $\exists q \in \{\text{that you read n papers} \mid n \in \mathbb{N}_{>0}\}$: that you read one paper $\lhd_c$ q

The LF in (28-b) denotes the set of answers in (32). The presupposition of the first answer is the same as that of the answers in (30), given in (31), and thus illicit. The second answer in (32) triggers the presupposition in (33). This presupposition is licit: the prejacent of EVEN entails all the alternatives and may very well be less likely than one of them. Thus, the only defined answer in the meanings of the two structures in (28) is the second answer in (32). Since it is a negative answer, the negative bias of the question is explained.

(32) $[\![\text{ (28-b) }]\!]^{g,c} =$
$[\![\textbf{ whether }]\!]^{g,c}\big(\lambda f.[\![\textbf{ EVEN C}_1]\!]^{g,c}(f([\![\textbf{ [AT LEAST C}_1\textbf{] [you read one}_F\textbf{ p.] }]\!]^{g,c}))\big) =$
$\big\{[\![\textbf{ [EVEN C}_1\textbf{] [AT LEAST C}_1\textbf{] [you read one}_F\textbf{ paper] }]\!]^{g,c},$
$[\![\textbf{ EVEN C}_1]\!]^{g,c}\neg[\![\textbf{ [AT LEAST C}_1\textbf{] [you read one}_F\textbf{ paper] }]\!]^{g,c}\big\}$

(33) $\exists q \in \{$that you didn't read n papers $\mid n \in \mathbb{N}_{>0}\}$: that you didn't read one paper $\lhd_c q$

To summarize: Appropriating Guerzoni's (2004) approach to weak *even* in questions, we have derived the bias triggered by *magari**, which is decomposed into co-associating EVEN and AT LEAST, from the fact that in questions and elsewhere the associate of EVEN is obligatorily a weak element – this is a requirement imposed by AT LEAST. Accordingly, the only LF of a question that denotes a set that contains a defined answer denotes a set whose only defined answer is negative. This explains the bias.

4.2.5 Modal environments

The puzzle

The final class of environments in which *magari** is licensed are modal environments, more precisely, imperatives, bouletic attitude predicates and bouletic/teleological modals. These environments generally license upward-entailing (UE) inferences, i.e. they behave similar to UE environments discussed in section 4.2.2. This is illustrated in (34) with overtly modalized sentences.

(34) a. You must call your mother tonight $\Rightarrow$ You must call your mother
b. $\Box$call-tonight, (call-tonight $\rightarrow$ call) $\Rightarrow$ $\Box$call

That these environments license *magari** is thus at first sight unexpected. Namely, if EVEN stays in situ in such an environment, it triggers an inconsistent presupposition. And the same holds if it scopes above the respective modal. For illustration, the imperative sentence may have the structure in (35-b) and trigger the scalar presuppositions in (35-cd). Although the presupposition triggered by AT LEAST in (35-c) is correct, the scalar presupposition triggered by EVEN (35-d) is incorrect: it clashes with the fact that the prejacent is entailed by all the alternatives (35-e) and is thus at least as likely as them.

(35) a. Win magari* a BRONZE medal
b. **[EVEN C_2] [IMP [[AT LEAST C_0] you win a bronze$_F$]]**
c. $\forall q \in \{$bronze, silver, gold$\}$: $q \neq$bronze $\rightarrow q \lhd_c$ bronze
d. $\exists q \in \{\Box$(bronze$\vee$silver$\vee$gold),$\Box$(silver$\vee$gold),$\Box$gold$\}$: $\Box$(bronze$\vee$silver$\vee$gold)$\lhd_c q$
e. $\Box$(bronze$\vee$silver$\vee$gold) $\Leftarrow$ $\Box$(silver$\vee$gold) $\Leftarrow$ $\Box$gold

Preview of the derivation

We propose that the domain of quantification of EVEN in (35-b) is different than stated in (35-d). Namely, it instead contains the mutually exclusive alternatives in (36).

(36) a. $\Box$(bronze $\vee$ silver $\vee$ gold) $\wedge$ $\Diamond$bronze $\wedge$ $\Diamond$silver $\wedge$ $\Diamond$gold
b. $\Box$(silver $\vee$ gold) $\wedge$ $\Diamond$silver $\wedge$ $\Diamond$gold
c. $\Box$gold

Accordingly, the scalar presupposition it triggers, given in (37), complies with (22). The presupposition is satisfied in contexts in which the speaker considers winning, say, a gold medal as preferable to winning other medals. The imperative conveys that you must win a medal and that any medal will be okay. This corresponds to the intuitions about the sentence in (35-a).

(37) $\exists q \in \{(36\text{-a}), (36\text{-b}), (36\text{-c})\}$: $\Box(\text{bronze} \vee \text{silver} \vee \text{gold}) \wedge \Diamond\text{bronze} \wedge \Diamond\text{silver} \wedge \Diamond\text{gold} \lhd_c q$

The derivation of the felicity of *magari** under modals proceeds in 4 steps: (Step 1) we motivate that (36-a) is a reading that existential quantifiers like AT LEAST may have under modals – the reading is called free choice; we also provide tools for deriving it. (Step 2) uses what we garnered in Step 1 to explain the felicity of *magari** in imperatives and under attitude predicates. (Step 3) introduces and derives free choice under existential modals. (Step 4) applies what we garnered in Step 3 to explain *magari** under existential modals.

(Step 1) Free choice & universal modals

Although imperatives, desire predicates and modals are upward-entailing, it is known that they do not license all weakening inferences. Most famously, they are subject to the so-called Ross's paradox – they do not license disjunctive weakening inferences:

(38) a. Send this letter! $\not\Rightarrow$ Send this letter or burn it!
b. I want to send this letter $\not\Rightarrow$ I want to send this letter or burn it

We follow Aloni (2007) in treating this apparent failure of weakening as a consequence of free choice. We illustrate this without loss of generality on the basis of imperatives that contain embedded disjunction.

There are different approaches to free choice disjunction (e.g. Zimmermann 2000, Geurts 2005, Fox 2007 and others). We propose that free choice is derived in grammar by an exhaustification operator EXH associating with disjunction or, equivalently, a domain of an existential quantifier (Fox 2007, Chierchia 2010).[11] The insertion of an exhaustification operator plays an important role elsewhere in the grammar, e.g. in deriving scalar implicatures:

(39) John ate cake or soup $\rightsquigarrow$ John didn't eat cake and soup

According to Fox (2007), this implicature is generated if the sentence is assigned the structure in (40-b). The alternatives in the domain of EXH, given in (40-c), are determined by the scalar item with which EXH associates (cf. Sauerland 2004 for disjunction).

(40) a. John ate cake or soup
b. **[EXH C_1] [John ate cake or soup]**
c. $C_1 = \{\text{cake} \vee \text{soup}, \text{cake}, \text{soup}, \text{cake} \wedge \text{soup}\}$

The meaning of EXH is defined in (41): it takes a proposition p and a set of alternatives C as its arguments and returns the proposition that p is the only true alternative among

[11] Adoption of Fox's (2007) mechanism for deriving the free choice effect is not crucial for our analysis. A different account may be employed as well (e.g. Zimmermann 2000, Aloni 2007). However, it is important that EVEN may scope above whatever is responsible for the free choice effect, i.e. free choice effects must be generated in grammar.

the "innocently excludable" alternatives in C. An alternative to a proposition is innocently excludable iff it is included in every way of negating as many alternatives to the proposition as possible without contradicting the proposition (we refer to Fox 2007 for discussion and concrete computations of innocently excludable alternatives).

(41) a. $[\![\textbf{EXH}]\!]^{g,c} = \lambda \mathrm{C}_{(st)t}.\ \lambda \mathrm{p}_{(st)}.\ \lambda \mathrm{w}_s.\ \mathrm{p(w)} = 1 \wedge \forall \mathrm{q} \in \mathrm{IE(C,p)}\ [\ \neg \mathrm{q(w)} = 1\ ]$
b. $\mathrm{IE(C,p)} = \cap\{\mathrm{A'} \subseteq \mathrm{A} \mid \mathrm{A'}$ is a maximal set in A s.t. $\mathrm{A'}^{\neg} \cup \{\mathrm{p}\}$ is consistent$\}$
c. $\mathrm{A'}^{\neg} = \{\ \neg \mathrm{p} \mid \mathrm{p} \in \mathrm{A'}\ \}$

In the case of (40), the innocently excludable alternative is the one given in (42-a) – that John ate cake and soup. The meaning of EXH applied to its arguments is given in (42-b): the prejacent of EXH is true – that John ate cake or soup – and the innocently excludable alternative is false – that John didn't eat cake and soup.

(42) a. $\mathrm{IE(C_1, cake \vee soup)} = \{\mathrm{cake} \wedge \mathrm{soup}\}$
b. $[\![\textbf{EXH}]\!]^{g,c}(\mathrm{C_1, cake \vee soup}) = (\mathrm{cake} \vee \mathrm{soup}) \wedge \neg(\mathrm{cake} \wedge \mathrm{soup})$

When a disjunction is in the scope of an imperative operator or any other universal modal, a greater number of alternatives is innocently excludable. This is illustrated in (43): the negation of all the alternatives in (43-d) is jointly consistent with the prejacent.

(43) a. Send this letter or burn it!
b. **[EXH $\mathbf{C_1}$] [IMP [you send this letter or burn it]]**
c. $\mathrm{C_1} = \{\Box(\mathrm{send} \vee \mathrm{burn}), \Box\mathrm{send}, \Box\mathrm{burn}, \Box(\mathrm{send} \wedge \mathrm{burn})\}$
d. $\mathrm{IE(C_1, \Box(send \vee burn))} = \{\Box\mathrm{send}, \Box\mathrm{burn}, \Box(\mathrm{send} \wedge \mathrm{burn})\}$

The meaning of (43-b) is computed in (44): it conveys that you must send the letter or burn it but you don't have to send it and you don't have to burn it and, trivially, you don't have to send it and burn it – i.e. all innocently excludable alternatives are false.

(44) $[\![\textbf{EXH}]\!]^{g,c}(\mathrm{C_1}, \Box(\mathrm{send} \vee \mathrm{burn})) = \Box(\mathrm{send} \vee \mathrm{burn}) \wedge \neg\Box\mathrm{send} \wedge \neg\Box\mathrm{burn} \wedge \neg\Box(\mathrm{send} \wedge \mathrm{burn})$

This meaning is equivalent with the proposition in (45-a), verbalized in (45-b): namely if all the best accessible worlds are such that you send or burn the letter in them and not all of them are such that you send the letter in them and not all of them are such that you burn the letter in them, it holds that in some of them you send the letter and in some of them you burn the letter. This is the free choice inference.

(45) a. $\Box(\mathrm{send} \vee \mathrm{burn}) \wedge \Diamond\mathrm{send} \wedge \Diamond\mathrm{burn}$
b. You must send this letter or burn it
& you may send this letter & you may burn this letter

The apparent failure of disjunctive weakening in (38) can now be explained if we assume that there is a preference to exhaustify disjunction in the scope of the imperative operator, i.e. that there is a preference for free choice interpretation of disjunction in modal environments. Namely, that you must send this letter clearly does not entail that you may send this letter and that you may burn it.

(Step 2) *Magari under universal modals**

We are now in a position to account for the felicity of *magari** in imperatives and other environments involving universal modal quantification (desire predicates, overt modal sentences). As we have pointed out above, *magari** is predicted to be infelicitous in these contexts: if EVEN stays in situ (46-a), it triggers a scalar presupposition that violates (22); if EVEN scopes above the imperative operator (46-c), the same state of affairs obtains due to the upward-monotonicity of IMP – the prejacent of scoped EVEN is entailed by all of its alternatives.

(46) a. Win magari* a BRONZE medal!
b. **[IMP [[EVEN C_2] [AT LEAST C_0] you win a bronze$_F$]]**
c. **[EVEN C_2] [IMP [~~[EVEN C_2]~~ [AT LEAST C_0] you win a bronze$_F$]]**

However, since AT LEAST is an existential quantifier, it can get a free choice interpretation in sentences like (46-a). This reading is generated if an exhaustification operator that associates with the domain of AT LEAST is inserted above the imperative operator.[12] The relevant structure is in (47).

(47) **[EVEN C_2] [$_{XP}$ $\boxed{\text{[EXH } C_1]}$ IMP [[AT LEAST $\boxed{C_0}$] you win a bronze$_F$]]**

The alternatives in the domain of the exhaustive operator in (47) are given in (48-a). All of them are innocently excludable with respect to the prejacent of EXH. Consequently, the meaning of the exhaustified imperative is the one given in (48-b): you must win a medal and any medal will do – a free choice reading of AT LEAST. The presupposition triggered by AT LEAST is *ex hypothesi* correct: it is more likely that you win bronze than other medals.

(48) a. $C_1 = \{\Box(\text{bronze}\vee\text{silver}\vee\text{gold}), \Box(\text{bronze}\vee\text{gold}), \Box(\text{silver}\vee\text{gold}), \Box(\text{bronze}\vee\text{silver}), \Box\text{bronze}, \Box\text{silver}, \Box\text{gold}\}$
b. $[\![\ \mathbf{XP}\ ]\!]^{g,c}$ is defined only if silver, gold $\lhd_c$ bronze. If defined, $[\![\ \mathbf{XP}\ ]\!]^{g,c} = \Box(\text{bronze}\vee\text{silver}\vee\text{gold}) \wedge \forall q \in C_1[\Box(\text{bronze}\vee\text{silver}\vee\text{gold}) \nsubseteq q \rightarrow q \text{ is false}] = \Box(\text{bronze}\vee\text{silver}\vee\text{gold}) \wedge \Diamond\text{bronze} \wedge \Diamond\text{silver} \wedge \Diamond\text{gold}$

The alternatives over which EVEN quantifies in (47) are given in (49); they are mutually exclusive. This means that the scalar presupposition triggered by EVEN will comply with (22), i.e. none of the alternatives except the prejacent entail the prejacent.

(49) $C_2 = \{\ \Box(\text{bronze}\vee\text{silver}\vee\text{gold}) \wedge \Diamond\text{bronze} \wedge \Diamond\text{silver} \wedge \Diamond\text{gold},\ \Box(\text{silver}\vee\text{gold}) \wedge \Diamond\text{silver} \wedge \Diamond\text{gold}, \Box\text{gold}\ \}$

The meaning of (47) is computed in (50). The non-presuppositional content of imperative is that you must win a medal and that winning any medal will be okay; this has been

[12] It is conceivable that EXH would associate with *bronze* in (46). Although an appropriate though slightly weaker reading would be derived in the case at hand, the suggested association would run into trouble in existential modal sentences where an unattested reading would be predicted. The obligatory association of EXH with the domain of AT LEAST can be achieved by stipulating that the domain of AT LEAST itself requires exhaustification. This idea has predecessors in the discussion of polarity items (Krifka 1995, Chierchia 2006, 2010). This leaves our predictions about the meaning of *magari** in DE environments unaffected.

computed in (48). Furthermore, (47) triggers two presuppositions: the scalar presupposition triggered by AT LEAST, computed in (48) and repeated in (50-i), is clearly correct; the scalar presupposition triggered by EVEN, given in (50-ii), is correct in only particular contexts – in contexts where the speaker prefers, say, the hearer winning gold to the hearer winning bronze or silver.

(50) $[\![$ (47) $]\!]^{g,c}$(w) is defined only if
(i) silver, gold $\lhd_c$ bronze,
(ii) $\exists$q $\in$ C_2: $\Box$(bronze $\vee$ silver $\vee$ gold) $\wedge$ $\Diamond$bronze$\wedge$$\Diamond$silver$\wedge$$\Diamond$gold $\lhd_c$ q.
If defined, $[\![$ (47) $]\!]^{g,c}$(w) = 1 iff you must win bronze or silver or gold and you may win bronze and you may win silver and you may win gold in w

The derivation of the felicity of *magari** under desire predicates and certain universal modals proceeds in parallel: a free choice interpretation of the embedded AT LEAST is generated; EVEN scopes above the respective predicates and the free choice generating exhausification operator; in its derived position it may trigger a licit presupposition.

(Step 3) Free choice & existential modals

The same reasoning sketched above for imperatives (and other universal modals) applies also to existential modals, which are also known to provide for free choice readings of existential (disjunctive) operators in their scope, as is illustrated in (51).

(51) You may have cake or soup $\rightsquigarrow$ You may have cake and you may have soup

In the framework adopted here, this reading is achieved by recursive exhaustification of the domain of the existential quantifier. The structure that is assigned to the disjunctive modal sentence in (51) that generates the free choice inference is in (52).

(52) **[EXH C_2] [$_{XP}$ [EXH C_1] [may [you have cake or soup]]**

The lower exhaustive operator quantifies over the alternatives described in (53-a). Only one of these alternatives is innocently excludable with respect to the prejacent of EXH (53-b). Accordingly, the output of the lower EXH in (52-a) is the proposition in (53-c): that you may have cake or soup and you may not have both cake and soup. Notice that this does not yet correspond to the free choice reading of the disjunction (51).

(53) a. C_1 = {$\Diamond$(cake $\vee$ soup), $\Diamond$cake, $\Diamond$soup, $\Diamond$(cake$\wedge$soup)}
b. IE(C_1, $\Diamond$(cake $\vee$ soup)) = {$\Diamond$(cake $\vee$ soup)}
c. $[\![$ **XP** $]\!]^{g,c}$ = $\Diamond$(cake$\vee$soup) $\wedge$ $\neg\Diamond$(cake$\vee$soup)

The domain of the higher exhaustive operator is given in (54-a). All of the alternatives in (54-a) are innocently excludable alternatives with respect to the prejacent (54-b).

(54) a. C_2 = {$\Diamond$(cake$\vee$soup)$\wedge\neg\Diamond$(cake$\wedge$soup), $\Diamond$cake$\wedge\neg\Diamond$soup, $\Diamond$soup$\wedge\neg\Diamond$cake, $\Diamond$(cake$\wedge$soup)}
b. IE(C_2, $\Diamond$(cake$\vee$soup)$\wedge\neg\Diamond$(cake$\vee$soup)) =
{$\Diamond$cake$\wedge\neg\Diamond$soup, $\Diamond$soup$\wedge\neg\Diamond$cake, $\Diamond$(cake$\wedge$soup)}

Consequently, the structure in (52) has the meaning in (55): the prejacent of EXH is true, while all the innocently excludable alternatives are false. It conveys that you may have cake or soup and you may have cake and you may have soup (and you may not have both).

(55) $[\![\text{(52)}]\!]^{g,c} = \Diamond(\text{cake} \vee \text{soup}) \wedge \neg\Diamond(\text{cake} \wedge \text{soup}) \wedge \neg(\Diamond\text{cake}\wedge\neg\Diamond\text{soup}) \wedge \neg(\Diamond\text{soup}\wedge\neg\Diamond\text{cake})$
$= \Diamond(\text{cake} \vee \text{soup}) \wedge \Diamond\text{cake} \wedge \Diamond\text{soup} \wedge \neg\Diamond(\text{cake} \wedge \text{soup})$

(Step 4) *Magari** under existential modals

At first sight, *magari** is predicted to be infelicitous under existential modals: if EVEN stays in situ (56-b), it triggers a scalar presupposition that violates (22); if EVEN scopes above the existential modal (56-c), the same state of affairs obtains due to the upward-monotonicity of the modal – the prejacent of scoped EVEN is entailed by all of its alternatives.

(56) a. You may win magari* a BRONZE medal (to qualify for the Hall of Fame)
b. **[may [[EVEN C_2] [AT LEAST C_0] you win a bronze$_F$]]**
c. **[EVEN C_2] [may [~~[EVEN C_2]~~ [AT LEAST C_0] you win a bronze$_F$]]**

However, the sentence in (56-a) may also have an LF along the lines of (57-b) where EVEN scopes above the existential modal and two exhaustification operators that associate with the domain of AT LEAST, while AT LEAST remains in the scope of the modal.

(57) a. You may win magari a BRONZE medal (to qualify for the Hall of Fame)
b. **[EVEN C_3] [EXH C_2] [EXH C_1] may [[AT LEAST C_0] you win bronze$_F$]**

The prejacent of EVEN and thus the assertive meaning of (57) is in (58-a), which is computed analogously to disjunctive cases discussed in Step 3. It is that you may win any medal to qualify for the Hall of Fame. The alternatives over which EVEN quantifies are given in (58-b).

(58) a. $[\![$ **[EXH C_2] [EXH C_1] may [[AT LEAST C_0] you win bronze$_F$]** $]\!]^{g,c} = \Diamond\text{bronze} \wedge \Diamond\text{silver} \wedge \Diamond\text{gold}$
b. $C_3 = \{ (\Diamond\text{bronze} \wedge \Diamond\text{silver} \wedge \Diamond\text{gold}), (\Diamond\text{silver} \wedge \Diamond\text{gold}), \Diamond\text{gold} \}$

The sentence also triggers two presuppositions. The scalar presupposition triggered by AT LEAST, given in (59-i) is *ex hypothesi* correct: it is most likely that you will win a bronze medal. The scalar presupposition triggered by EVEN is in (59-ii). It is compatible with (22) since the prejacent entails all the alternatives. It is also plausible: it is more likely that, say, winning gold may get you in the Hall of Fame than winning any medal.

(59) $[\![\text{(59-b)}]\!]^{g,c}(w)$ is defined only if
(i) silver, gold $\lhd_c$ bronze
(ii) $\exists q \in C_3$: $(\Diamond\text{bronze} \wedge \Diamond\text{silver} \wedge \Diamond\text{gold}) \lhd_c q$.
If defined, $[\![\text{(59-b)}]\!]^{g,c}(w) = 1$ iff you may win bronze and you may win silver and you may win gold (to qualify for the Hall of Fame) in w

To summarize: We have shown that *magari** triggers consistent inferences in modal environments because (i) AT LEAST may be assigned a free choice interpretation and (ii) EVEN may scope to a position above the operators that generate this free choice interpretation. In its moved position, the prejacent of EVEN is not entailed by any of the alternatives and may thus be less likely than some (or all) of them.[13]

4.2.6 Different glosses

We have seen that *magari** can be glossed either with *at least* or with *even*, depending on the environment in which it is located. The gloss with *at least* is found in imperatives, under desire predicates and under priority universal modals – under universal modals in short.

(60) I wish I had won magari* a BRONZE medal
'I wish I had won at least a bronze medal'

Our proposal naturally explains this gloss and it also allows us to describe more rigorously what is meant with the characterization of *magari** as a 'concessive' operator. First: That *magari** in these sentences should have a gloss with *at least* follows from the free choice readings that we derive for the existential quantifier AT LEAST in the scope of the universal modal. This is repeated in (61): the sentence in (60-a) has the structure in (61-a) and the assertive meaning in (61-b).

(61) a. **[EVEN C_2] [EXH C_1] [I wish [[AT LEAST C_0] I had won a bronze$_F$ medal]]**
b. $\Box$(bronze $\vee$ silver $\vee$ gold) $\wedge$ $\Diamond$bronze $\wedge$ $\Diamond$silver $\wedge$ $\Diamond$gold

The meaning of the imperative in (61-b) corresponds to what has been suggested to be the meaning of the corresponding universal modal sentence containing *at least* (e.g. Geurts & Nouwen 2007). This is given in (62). Thus, the assertive import of *magari** in (61) matches that of *at least* in (62), which we argue is the reason for it being glossed with *at least*.

(62) a. I wish I had won at least a BRONZE medal
b. $\Box$(bronze $\vee$ silver $\vee$ gold) $\wedge$ $\Diamond$bronze $\wedge$ $\Diamond$silver $\wedge$ $\Diamond$gold

[13] If desire predicates and certain modals were non-monotone (Heim 1992 for desire predicates), the account of the felicity of the occurrences of *magari** in their scope would not require covert exhaustification. The scalar presupposition would be satisfiable since all the alternatives would be logically independent. It would also be correct in contexts in which individuals prefer to win shinier medals.

(i) a. I wish I won magari* a bronze medal
b. **[EVEN C_1] [I wish [[AT LEAST C_0] I won a bronze$_F$ medal]**
c. $[\![$ (i-b) $]\!]^{g,c}$(w) is defined only if (i) silver, gold $\lhd_c$ bronze and (ii) $\exists$q $\in$ { that I wish I won bronze or silver or gold, that I wish I won silver or gold, that I wish I won gold }: that I wish I won a bronze or silver or gold medal $\lhd_c$ q. If defined, $[\![$ (i-b) $]\!]^{g,c}$(w) = 1 iff that I wish I won bronze or silver or gold in w

The assertive import of the sentence, however, is weaker than what we have derived in our modal account. Namely, (i-a) does not entail that I am okay with winning any particular medal. This could be subsequently derived as a scalar implicature.

Second: Three factors conspire to yield the so-called concessive flavor of *magari** under universal modals – the presupposition triggered by AT LEAST, the obligatory free choice effect, and the presupposition triggered by EVEN. According to the first two factors, the prejacent of AT LEAST is the most likely among its alternatives and already it is considered as desirable by the attitude holder (the attitude holder is okay with it obtaining). A consequence of the last factor is that the less likely alternatives are more desirable. This yields concessivity: although the attitude holder prefers less likely alternatives, she finds all the alternatives acceptable, even the most likely (and least desirable) alternative.

Under existential modals and in DE environments *magari** is glossed with *even*. As with universal modals, we have argued that in these cases EVEN takes scope above the modal and the free choice generating operators. This is repeated in (63-b); the meaning of the structure is repeated in (64).

(63) a. To qualify for the hall of fame, you may win magari* a BRONZE medal
b. **[EVEN C_3] [EXH C_2] [EXH C_1] [may [AT LEAST C_0] [you win bronze$_F$]]**

(64) $[\![$ (64-b) $]\!]^{g,c}$ is defined only if (i) silver, gold $\lhd_c$ bronze and (ii) $\exists$q $\in$ C_3: ($\Diamond$bronze $\wedge$ $\Diamond$silver $\wedge$ $\Diamond$gold) $\lhd_c$ q. If defined, $[\![$ (64-b) $]\!]^{g,c}$ = $\Diamond$bronze $\wedge$ $\Diamond$silver $\wedge$ $\Diamond$gold

Jointly, the assertive meaning and the scalar presuppositions in (64) correspond to the import of *even* in such sentences. Namely, *even* is commonly assumed to trigger two inferences: (i) a scalar inference and (ii) an additive inference (= there are alternatives other than the prejacent that are true). For example, (65) conveys that winning other medals besides bronze also qualifies you for the Hall of Fame.

(65) It's even the case that you may win a BRONZE medal to qualify

Appropriately, the meaning in (64) licenses both inferences: (i) the scalar inference is reflected by the presuppositions in (64-i-ii), while (ii) the additive inference simply corresponds to the assertion in (64) (= free choice inference). This explains the gloss of *magari** with *even* in existential modal environments.

The exact same state of affairs as under existential modals obtains in case *magari** is generated in a DE environment. We illustrate this on an example where *magari** occurs in the restrictor of the universal quantifier in (66).

(66) a. Everyone who won magari* a BRONZE medal qualified for the hall of fame
b. **[EVEN C_1] [everyone [1 [AT LEAST C_0] $t_1$won bronze$_F$ medal]] [qualified]**

EVEN in (66-b) quantifies over the alternatives in (67-a). The meaning of (66-b) is in (67-b).

(67) a. C_1= { that everyone who won bronze or silver or gold qualified, that everyone who won silver or gold qualified, that everyone who won gold qualified }
b. $[\![$ (67-b) $]\!]^{g,c}$ is defined only if (i) silver, gold $\lhd_c$ bronze and (ii) $\exists$q $\in$ C_1: that everyone who won bronze or silver or gold qualified $\lhd_c$ q. If defined, $[\![$ (67-b) $]\!]^{g,c}$(w) = 1 iff everyone who won bronze or silver or gold qualified

It holds that the prejacent of EVEN in (66) entails all the relevant alternatives:

(68) (everyone who won bronze or silver or gold qualified) ⇒ (everyone who won silver qualified) & (everyone who won gold qualified)

Together, the scalar presuppositions described in (67-b) and the entailments in (68) correspond to the two inferences associated with *even*. This explains the gloss of *magari** with *even* in DE environments.

4.2.7 Restricting overgeneration

The core ingredient of our derivation of the felicity of *magari** in modal environments has been the assumption that the existential component of *magari** gets a free choice interpretation under desire predicates, priority modals and in imperatives. However, free choice effects can be observed in other environments as well, e.g. under nominal quantifiers and epistemic modals:

(69) a. Everyone had cake or soup $\rightsquigarrow$ Someone had cake & someone had soup
b. John believes that Mary ate cake or soup $\rightsquigarrow$ According to John, Mary might have eaten cake & Mary might have eaten soup

The approach to free choice that we have adopted above correctly predicts the inferences in (69) to be possible. For example, the structure in (70-a) is assigned the meaning in (70-d): the exhaustification operator quantifies over the alternatives in (70-b); it triggers the inference that not everyone had cake and that not everyone had soup; if the prejacent of EXH is true, this means that someone had cake and that someone had soup.

(70) a. **[EXH C_0] [everyone had cake or soup]**
b. C_0 = {that everyone had cake or soup, that everyone had cake, that everyone had soup, that everyone had cake and soup}
c. IE(C_0, that everyone had cake or soup) = {that everyone had cake, that everyone had soup, that everyone had cake and soup}
d. $[\![$ **EXH** $]\!]^{g,c}$(C_0, that everyone had cake or soup) = that everyone had cake or soup & that someone had cake & that someone had soup

This is problematic for our account of *magari**: *magari** is marked in the scope of nominal quantifiers in positive episodic sentences, as illustrated for Slovenian in (71-a), as well as under epistemic attitude predicates, as illustrated in (71-b). Since free choice appears to be possible in these environments, the infelicity of the sentences is puzzling.

(71) a. ??Vsak od nas je v karieri osvojil magari BRONASTO medaljo
everyone of us aux in career win magari bronze medal
b. ??Janez misli, da je Peter osvojil magari BRONASTO medaljo
John thinks that aux Peter win magari bronze medal

We propose that the sentences are infelicitous due to implausible scalar presuppositions. The sentence in (71-a) has the structure in (72-a): EXH is generated above the universal quantifier and associates with the domain of AT LEAST, while EVEN moves above both EXH and the universal quantifier. The sentence has the free choice interpretation computed in (72): if defined, it conveys that everyone of us won a medal in their career and some of us won a bronze, some of us won a silver and some of us won a gold medal.

(72) a. **[EVEN C_6] [EXH C_7] [[everyone 1 [[AT LEAST C_9] t_1 win $bronze_F$]**
b. If defined, $[\![$ (72-a) $]\!]^{g,c}$ = that everyone won a medal and for each medal in {bronze, silver, gold} someone won it

The scalar presuppositions triggered by AT LEAST and EVEN in (72-a) are consistent. The former presupposition is that it is most likely for one to win a bronze medal (73-i). The latter presupposition is that there is an alternative that is more likely than that everyone won a medal and for every medal, someone won it (73-ii).

(73) $[\![$ (72-a) $]\!]^{g,c}$ is defined only if
(i) $\forall$x $\in$ C_9: that x won silver, that x won gold $\lhd_c$ that x won bronze
(ii) $\exists$q $\in$ {that everyone won a medal from D and for each medal in D someone wins it | D $\in$ {{bronze, silver, gold}, {silver, gold}, {gold}}}: that everyone won a medal and for each medal in {bronze, silver, gold} someone won it $\lhd_c$ q

The presupposition in (73-ii) is implausible in light of (73-i). For it to be true, it would have to hold in the context that although it is most likely for everyone that they won a bronze medal, it is more likely that, say, everyone won a medal and there were silver and gold medal winners but no bronze medal winner than that everyone won a medal and there were bronze, silver and gold medal winners. Although this is not contradictory, it is false in natural contexts.

A parallel explanation can be provided for the infelicity of *magari** under doxastic attitude predicates. The structure of (71-b) is given in (74-a): EXH is generated above the modal and associates with the domain of AT LEAST to generate the free choice reading of AT LEAST; EVEN moves from its base position and takes scope above EXH; its domain of quantification is given in (74-b). The sentence triggers two presuppositions: the presupposition triggered by AT LEAST is that it is most likely that Peter won a bronze medal, while the presupposition triggered by EVEN is that there is an alternative that is more likely than that John thinks that Peter won a medal and that he might have won any medal.

(74) a. **[EVEN C_2] [EXH C_1] John thinks [[AT LEAST C_0] Peter win a $bronze_F$]**
b. C_2 = { $\Box$(bronze$\vee$silver$\vee$gold) $\wedge$ $\Diamond$bronze $\wedge$ $\Diamond$silver $\wedge$ $\Diamond$gold, $\Box$(silver$\vee$gold) $\wedge$ $\Diamond$silver $\wedge$ $\Diamond$gold, $\Box$gold }
c. $[\![$ (74-a) $]\!]^{g,c}$ is defined only if (i) silver, gold $\lhd_c$ bronze and (ii) $\exists$q $\in$ C_2: $\Box$(bronze$\vee$silver$\vee$gold) $\wedge$ $\Diamond$bronze $\wedge$ $\Diamond$silver $\wedge$ $\Diamond$gold $\lhd_c$ q.
If defined, $[\![$ (47) $]\!]^{g,c}$(w) = 1 iff John thinks Peter won a medal and that he might have won bronze and that he might have won silver and that he might have won gold in w

Unlike in the case of desire predicates where the analogous presupposition is licit due to the plausibility that less likely alternatives are more desirable (and thus more likely to be true in the best desire worlds), there is nothing inherent in doxastic modality that would make the resolution of in (74-b-ii) plausible in natural contexts.

To summarize: The core ingredient of our account of the distribution of *magari** has been the assumption that the existential component of *magari** may get a free choice interpretation in modal environments; this allows the moved scalar component of *magari** to trigger a scalar presupposition compatible with (22). Since the approach to free choice adopted above allows for free choice readings of disjunction and existential quantifiers in the scope of nominal quantifiers and doxastic/epistemic modality, the account predicts that *magari** may be licensed in the scope of nominal quantifiers and doxastic/epistemic modals. We have suggested that the reason why *magari** is not licensed in these environments lies in the implausible scalar presupposition triggered by its scalar component.

4.3 Previous approaches

This section briefly discusses the three previous approaches to *magari** and some of the issues that they face. First: Giannakidou (2007) and Alonso-Ovalle (2009) assign *magari** – *esto ke* in Greek, *siquiera* in Spanish – the assertive meaning in (75). That is, *magari** is truth-conditionally vacuous, though it makes a semantic contribution at the level of presupposition.

(75) If defined, $[\![$ **magari*** $]\!]^{g,c}$(C, p, w) = 1 iff p(w) = 1

The characterization in (75) faces a problem in deriving the correct inferences for sentences in which *magari** occurs in the surface scope of universal modal operators. For example, the sentence in (76-a) is assigned the structure in (76-b) where *magari** stays in situ at LF. The interpretation of (76-b) is in (76-c) – that you must win a bronze medal. This prediction is wrong: the imperative rather conveys (76-d) – that you must win a medal and any medal will do. Thus, any account that treats *magari** as having a vacuous assertive meaning will fail to explain the behavior of *magari** under universal modals. Notice that nothing would change if *magari** were to scope above the imperative operator – its import would still be predicted to be the one in (76-c).

(76) a. Win magari* a BRONZE medal!
b. **IMP [magari* C] [you win a bronze$_F$ medal]**
c. Predicted: $\Box$bronze
d. Fact: $\Box$(bronze $\vee$ silver $\vee$ gold) $\wedge$ $\Diamond$bronze $\wedge$ $\Diamond$silver $\wedge$ $\Diamond$gold

As we have seen in the preceding section, our system correctly predicts that (76-a) has the interpretation in (76-d). This is due to the interaction of two factors: (i) we proposed that *magari** has an existential component and (ii) this existential component gets a free choice interpretation in modal environments (otherwise the sentence would have an illicit scalar presupposition).

Furthermore, Giannakidou (2007:68) assigns *esto ke* a scalar and a negative additive presupposition. The negative additive presupposition is given in (77) and mirrors the presupposition of Rooth's (1985) negative polarity *even*.

(77) $[\![$ **magari*** $]\!]^{g,c}$(C, p, w) is defined only if $\exists$q $\in$ C [q $\neq$ p $\wedge$ q(w) = 0]

This characterization predicts unattested presuppositions for, say, sentences where *magari** is generated in an antecedent clause of a conditional. An example of such a sentence is given in (78-a). The predicted presupposition for (78-a) is that either Peter didn't win a silver medal or he didn't win a gold medal (78-c), whereby the antecedent clause of a conditional is a hole for presupposition projection. This presupposition is false: the sentence may be used in contexts in which it is both uncertain whether Peter won a silver medal and uncertain whether he won a gold medal.

(78) a. If Peter wins magari* a BRONZE medal, he will become a hero
b. **[if [magari* $\mathbf{C_1}$] Peter wins $\mathbf{bronze_F}$][he becomes a hero]]**
c. $[\![$ (78-b) $]\!]^{g,c}$(w) is defined only if Peter didn't win silver in w or Peter didn't win gold in w

Second: Lahiri (2010) proposes an ambiguity analysis of *magari** in which he assigns distinct meanings to *magari** in DE and to *magari** in modal environments. We focus on his treatment of *magari** in modal contexts in the following. He proposes that in modal contexts *magari** decomposes into two components, SOLO and EVEN'. These components have vacuous assertive meanings and trigger the presuppositions given in (79) (Lahiri 2010:23). The difference between EVEN and EVEN' is that EVEN' takes an additional propositional argument and compares likelihoods of conditional sentences where the prejacent and its alternatives constitute the respective antecedents and the additional propositional argument constitutes the consequent.

(79) a. $[\![$ **SOLO** $]\!]^{g,c}$(C, p, w) is defined only if $\forall$q $\in$ C [p $\neq$ q $\rightarrow$ q $\lhd_c$ p].
If defined, $[\![$ **SOLO'** $]\!]^{g,c}$(C, p, w) = 1 iff p(w) = 1
b. $[\![$ **EVEN'** $]\!]^{g,c}$(C, q, p, w) is defined only if $\forall$r $\in$ C [p $\neq$ r $\rightarrow$ (if p then q) $\lhd_c$ (if r then q)]. If defined, $[\![$ **EVEN'** $]\!]^{g,c}$(C, p, w) = 1 iff p(w) = 1

The imperative in (80-a) is assigned the structure in (80-b) where EVEN' scopes above the imperative operator. The first propositional argument of the scoped EVEN' is resolved to the proposition that you qualify for the Hall of Fame. The scalar presupposition triggered by SOLO is given in (80-d): that you win a bronze medal is most likely; the scalar presupposition triggered by EVEN' is given in (80-e): that if you win a bronze medal, you qualify for the Hall of Fame is least likely. These presuppositions are intuitively correct.

(80) a. Win magari* a bronze medal
b. **[EVEN' $\mathbf{C_3}$ $\mathbf{q_2}$] [IMP [SOLO' $\mathbf{C_1}$] [you win a $\mathbf{bronze_F}$ medal]]**
c. q_2 = that you qualify for the Hall of Fame
d. that you win silver, that you win gold $\lhd_c$ that you win bronze
e. if you win bronze, you qualify for the hall of fame
$\lhd_c$ if you win silver, you qualify for the hall of fame,
if you win gold, you qualify for the hall of fame

The main problem for this analysis is that it disassociates the scalar component of *magari** in modal environments from the more standard characterizations of scalar particles, including the scalar component that *magari** spells out in DE environments. In the same vein, it is not clear what regulates the distribution of EVEN', i.e. why *magari** spells out EVEN' only in modal environments. Finally, the free choice meaning that (80-a) conveys, described in (76-d) is not predicted by the account, though it could potentially be derived by pragmatic reasoning.

To summarize: The main problem for the previous approaches to *magari** is to account for its occurrence and import in modal environments. We have shown that they either have difficulty in deriving the correct import of *magari** in modal environments or they have difficulty in explaining why the import that they derive is restricted to modal environments and is not observed in, say, positive episodic sentences.

4.4 Conclusion

There is a class of expressions – so-called concessive scalar additive particles – that convey a scalar meaning and occur solely in DE, interrogative and modal environments. Its representatives are *esto ke* in Greek, *aunque sea, siquiera* in Spanish, and *magari* in Slovenian. An analysis of these expressions must, on the one hand, account for their semantic contribution and, on the other hand, explain their distribution. We proposed that this is achieved if concessive scalar additive particles are treated as being morphologically complex – in particular, we proposed that they spell out two particles, EVEN and AT LEAST.

The inferences triggered by the two components of *magari** were shown to yield consistent and correct meanings in DE environments if EVEN moves above the DE operator. Without employing additional maneuvers, the inferences triggered by the two components in positive episodic sentences and modal environments are incorrect. However, a rescue strategy is available in the latter environments that is absent in the former: AT LEAST may get a free choice interpretation. Consequently, EVEN that scopes above the modal and the free-choice generating operators may trigger a correct scalar presupposition and the respective sentences are licit. Finally, we have shown how the glosses of *magari** with *even* and *at least* in different environments depend on the interaction of its two components with their respective environments.

CHAPTER 5

Scalar particles and competition

Even may associate both with strong and weak elements in its immediate surface scope. In the latter case it must move above an appropriate operator at LF for the sentence to be licit. We call the former occurrences of *even* 'strong *even*' and the occurrences of the latter *even* 'weak *even*.' Not all scalar particles exhibit such a degree of freedom. For example, certain scalar particles can associate only with a weak element in their immediate surface scope, while others can only associate with a strong element. To capture this and other facets of cross-linguistic variation of scalar particles, we propose – first – that besides the scalar component that corresponds to *even* as defined above, some scalar particles spell out a further scalar component and – second – that the distribution of a scalar particle is not determined in isolation of what other scalar particles there are in the language.

5.1 Five types of scalar particles

We outline the cross-linguistic variation of scalar particles. The variation is along two dimensions: (i) whether the minimal clause in which the scalar particle is generated is stronger or weaker than its alternatives and if it must be weak (ii) whether the scalar particle occurs under clausemate negation. Two implicational relations are established.

5.1.1 The typology

Strength of the minimal clause. There is a great variety in the distribution of different particles and collocations of particles that have traditionally been classified as scalar particles, both within and across languages (Gast & van der Auwera 2011 for a recent overview). Scalar particles can initially be grouped into three main classes, depending on whether they associate with weak or strong elements in their immediate surface scope. First class: The most indiscriminate class includes *même* in French and *even* in English – they can associate both with weak and strong elements. If they associate with a weak element, they must be appropriately embedded. This is illustrated in (1) and (2).

(1) a. John read even SEVEN/*ONE books
b. SS & LF: **[even [John read seven$_\mathbf{F}$/one$_\mathbf{F}$ books]]**

(2) a. Mary didn't read even ONE book
b. SS: **[not [even [Mary read one$_\mathbf{F}$ books]]]**
c. LF: **[even [not [Mary read one$_\mathbf{F}$ books]]]**

Second class: *sogar* in German, *perfino* in Italian and *celo* in Slovenian fall into the class of scalar particles that may surface only as strong scalar particles. This is illustrated with *sogar* in (3) and (4): superficially it is as if *sogar* cannot scope out of its base position.

(3) a. Hans has sogar SIEBEN Bücher gelesen
Hans had sogar seven books read
b. SS & LF: **[sogar [John read seven$_\mathbf{F}$ books]]**

(4) a. *Hans hat nicht sogar EIN Buch gelesen
Hans had not sogar one books read
b. SS & LF: **[not [sogar [John read one$_\mathbf{F}$ book]]**

Third class: *auch nur, einmal* in German, *so much as* in English and *niti* in Slovenian fall into the class of scalar particles that may surface only as weak scalar particles. They must be appropriately embedded, similar to weak *even.* This is illustrated in (5) and (6): superficially it is as if *einmal* must scope out of its base position and above an appropriate operator. For now, we simplistically assume that it is the scalar particle itself that moves at LF.

(5) a. *Hans hat einmal SIEBEN/EIN Bücher/Buch gelesen
Hans had sogar seven/one books read
b. SS & LF: **[einmal [John read seven$_\mathbf{F}$ books]]**

(6) a. Hans hat nicht einmal EIN Buch gelesen
Hans had not einmal one books read
b. SS: **[not [einmal [John read one$_\mathbf{F}$ book]]**
c. LF: **[einmal [not [John read one$_\mathbf{F}$ book]]**

The three classes of scalar particles described above are summarized in (7).

(7) <u>Three types of scalar particles</u>
a. Scalar particles that may be weak or strong (*even*, *même*)
b. Scalar particles that may only be strong (*sogar, perfino*)
c. Scalar particles that may only be weak (*auch nur, so much as*)

When it comes to scalar particles that are only strong, the implicational relation in (8) can be abduced from the data discussed by Gast & van der Auwera (2011), e.g. in German and Italian *sogar* and *perfino* may only be strong, while *auch nur* and *anche solo* may only be weak. The relation is not a bi-implication: e.g. in English *so much as* may only be weak but there is no scalar particle that is only strong.

(8) <u>Implicational relation for strong scalar particles</u>
There is a scalar particle that is only strong in the language
⇒ There is a scalar particle that is only weak in the language

Occurrence under negation. Gast & van der Auwera (2011) further split up the class of scalar particles that may only be weak into three subclasses. First subclass: Some scalar particles like *so much as* may occur both in the immediate scope of negation and in other DE or non-upward-entailing environments. This is illustrated in (9) which exemplifies an occurrence of *so much as* in the antecedent of a conditional, which is a Strawson-DE environments, and under clausemate negation.

(9) a. If you so much as read ONE book, you'll pass the exam
b. John didn't so much as read ONE book

Second subclass: Some scalar particles like *einmal* in German and *niti* in Slovenian may only occur in the immediate scope of negation. In (10), we illustrate that *niti* is illicit in the antecedent clause of a conditional.

(10) a. *Če si prebral niti ENO knjigo, boš zdelal
if aux read niti one book, aux pass
b. Janez ni prebral niti ENE knjige
John not read niti one book

Third subclass: Some scalar particles like *auch nur* in German may not occur in the immediate scope of negation, though it does occur in other DE environments or non-upward-entailing environments. This is illustrated in (11): *auch nur* is felicitous in the antecedent clause of the conditional but not under clausemate negation.

(11) a. Wenn du auch nur EIN Buch gelesen hast, wirst du bestehen
if you auch nur one book read has will you pass
b. *Hans hat nicht auch nur EIN buch gelesen
Hans has not auch nur one book read

The three classes of scalar particles that may only be weak are summarized in (12).

(12) Three classes of scalar particles that may only be weak
a. Weak scalar particles that may but do not have to occur in the immediate scope of negation (*so much as*)
b. Weak scalar particles that may only occur in the immediate scope of negation (*niti, einmal*)
c. Weak scalar particles that may not occur in the immediate scope of negation (*auch nur*)

At least for languages with negative concord or n-indefinites (e.g. Slovenian, German, Greek), the implicational relation in (13) appears to hold for weak scalar particles.

(13) Implicational relation for weak scalar particles
There is a scalar particle that may only be weak and that only occurs in the immediate scope of negation in the language ⇒ No other weak scalar particle that may only be weak occurs in the immediate scope of negation in the language

5.1.2 Overview of the chapter

Outline of the proposal

The crux of our proposal is that variation in scalar particles is variation in morphology. All scalar particles share the scalar component that requires its sister to denote a proposition that is less likely than a relevant alternative. We represent this component with EVEN. There is another component to scalar particles, which is however not shared by all scalar particles: a scalar component that requires its sister to denote a proposition that is most likely among the alternatives (cf. Guerzoni 2003, Lahiri 2010). Following Lahiri (2010), we represent this component with SOLO. Scalar particles may thus spell out the base-generated configurations of co-associating components in (14).[1]

(14) a. **[EVEN]**
b. **[EVEN] [SOLO]**

Three main classes of scalar particles. In a language like German, *sogar* spells out (14-a), while *auch nur* spells out (14-b). However, this does not suffice to account for the peculiar restrictions on the associates of *sogar* and *auch nur*. For example, *sogar* could occur in a weak minimal clause where EVEN would scope out. We block this by assuming that *sogar* and *auch nur* form a scale and compete for insertion (cf. Amsili & Beyssade 2010 on *aussi* 'also' in French):

(15) a. ⟨sogar, auch nur⟩
b. **⟨[EVEN], [EVEN] [SOLO]⟩**

The competition is governed by the rule that you should make your sentence presuppose as much as possible (Maximize Presupposition). On the one hand, this necessitates *sogar* to only be base-generated as adjoined to clauses denoting strong propositions: if the clause denoted a weak proposition, *auch nur* would have to be inserted since this would lead to a stronger global presupposition of the sentence. On the other hand, *auch nur* may only be adjoined to clauses denoting weak propositions: if it were adjoined to a strong clause it would either trigger an incorrect presupposition or SOLO would have to move above EVEN which we show to be ruled out by an independent condition on movement.

The combinations in (14) allow us to differentiate three classes of scalar particles: scalar particles that spell out only (14-a) (*sogar*), scalar particles that spell out only (14-b) (*auch nur*), and scalar particles that may spell out either (*even*). This leaves two further classes of scalar particles unaccounted for – classes that differ with respect to occurrence restrictions under clausemate negation.

Two further classes of scalar particles. Two further classes of scalar particles can be differentiated: weak scalar particles that occur only in the immediate scope of negation (*einmal* in German, *niti* in Slovenian) and weak scalar particles that may not occur in

[1] As in the previous chapter, we remain vague about multiple focus association. We call two focus-sensitive operators co-associating iff they associate with the same focused element. If we were to assume that focus can only be an associate of one focus particle, we would have to have multiple indexed foci in our representation and their indexation would be subject to independent principles (cf. Krifka 1991, Beck 2006).

the immediate scope of negation (*auch nur*). These two classes emerge if there is another configuration in the language that scalar particles may spell out (16): a configuration in which one of the element bears an uninterpretable negative feature.

(16) **[EVEN] [SOLO]$_{\textbf{[uNEG]}}$**

Scalar particles that spell out this configuration (*einmal*, *niti*) are also compete with other scalar particles, in particular with those that spell out (14-b) (*auch nur*, *tudi*):

(17) **⟨[EVEN] [SOLO], [EVEN] [SOLO]$_{\textbf{[uNEG]}}$⟩**

It holds that (16) may be spelled out only under clausemate negation where its feature can be checked. Elsewhere Condition then dictates that (14-b) may not be spelled out under clausemate negation but only in other DE or non-upward-entailing environments. The summary of the variation of scalar particles is in (18): in (18-a) there are scalar particles that either may surface as strong (*even*) or must surface as strong (*sogar*); in (18-b) there are scalar particles that either may surface as weak (*even*) or must surface as weak (*so much as*) or must surface as weak in non-negative environments (*auch nur*); in (18-c) there are scalar particles that must surface as weak in negative environments (*niti*).

(18) a. **[EVEN]** ↔ even, même, tudi; sogar
b. **[EVEN] [SOLO]** ↔ even, même, tudi; so much as; auch nur
c. **[EVEN] [SOLO]$_{\textbf{[uNEG]}}$** ↔ niti, oute, einmal

Structure of the chapter

Section 2 introduces two key ingredients that make up weak scalar particles. The first ingredient is a scalar particle that requires its sister to denote a proposition that is less likely than a relevant alternative, while the second ingredients requires its sister to denote a proposition that is more likely than all of its alternatives. Furthermore, we propose that scalar particles form scales and compete for insertion. The competition is regulated primarily by the principle that you should use alternatives that have stronger presuppositions if these presuppositions are satisfied in the context. Another independent principle is operative in grammar that plays a role in restricting the distribution of scalar particles: Attract Closest (Chomsky 1995). Together these two principles allow us to correctly differentiate three main classes of scalar particles.

Section 3 looks at the relationship between weak scalar particles and negation in Slovenian, Greek, German and Italian. We argue that the obligatory occurrence of some and obligatory non-occurrence of other scalar particles in the immediate scope of negation should be explained in terms of an Elsewhere Condition. In languages with negative concord (Slovenian, Greek, Italian), this parallels other cases of competition between n-words and non-n-words. In languages without negative concord (German), this parallels the competition between n-indefinites and regular or negative polarity indefinites.

Section 4 brings the disparate pieces together and presents a parametric framework in which the distribution of scalar particles is derived. Only two morphological parameters are required: (i) whether the scalar particles spells out one or two scalar components and (ii) whether it has a negative feature.

5.2 Decomposition

This section first describes the constitutive components of scalar particles that may only associate with a weak element in their immediate surface scope. Subsequently, we argue that the distribution of strong scalar particles can be derived only if we do not treat the distributions of scalar particles as being independent of each other. Rather, we propose that the variation in the distribution of scalar particles partly depends on them competing for insertion.

5.2.1 Obligatorily weak scalar particles

Decomposition

We propose that obligatorily weak scalar particles spell out two scalar components. The first component corresponds to *even* in preceding chapters, while the second component is roughly its reverse – i.e. its presupposition is roughly the negation of the presupposition triggered by the first component. We represent the first component with EVEN and the second component with SOLO, which we model after *solo* in Lahiri (2010) (cf. also Guerzoni 2003 on *auch nur*). The meaning of EVEN is given in (19): its sole semantic contribution is that it triggers a presupposition that its prejacent is more likely than a relevant alternative in its domain.

(19) $[\![\textbf{EVEN}]\!]^{g,c}(\mathrm{C, p, w})$ is defined only if $\exists \mathrm{q} \in \mathrm{C}\ [\ \mathrm{p} \lhd_{\mathrm{c}} \mathrm{q}]$.
If defined, $[\![\textbf{EVEN}]\!]^{g,c}(\mathrm{C, p, w}) = 1$ iff $\mathrm{p(w)} = 1$

The second component is defined in (20): it takes a set of alternatives, C, as its first argument and a proposition, p, as its second argument and it presupposes that the proposition p is most likely among the alternatives.

(20) $[\![\textbf{SOLO}]\!]^{g,c}(\mathrm{C, p, w})$ is defined only if $\forall \mathrm{q} \in \mathrm{C}\ [\ \mathrm{q} \neq \mathrm{p} \rightarrow \mathrm{q} \lhd_{\mathrm{c}} \mathrm{p}]$.
If defined, $[\![\textbf{SOLO}]\!]^{g,c}(\mathrm{C, p, w}) = 1$ iff $\mathrm{p(w)} = 1$

Structures containing SOLO have meanings along the lines of (21). The only contribution of SOLO is to trigger the presupposition that its sister denotes the most likely among its alternatives.

(21) $[\![\textbf{[SOLO } \mathbf{C_1}\textbf{] Peter kissed Mary}_{\mathbf{F}}]\!]^{g,c}(\mathrm{w})$ is defined only if $\forall \mathrm{q} \in \{$ that Peter kissed x | x is a relevant individual $\}$: q $\neq$ that Peter kissed Mary $\rightarrow$ q $\lhd_{\mathrm{c}}$ that Peter kissed Mary. If defined, $[\![\textbf{[SOLO } \mathbf{C_1}\textbf{] Peter kissed Mary}_{\mathbf{F}}]\!]^{g,c}(\mathrm{w}) = 1$ iff Peter kissed Mary in w

Thus, obligatorily weak scalar particles like *auch nur* spell out the combination of the two focus-sensitive operators in (22). The presuppositions of EVEN and SOLO clash in their base position and so one of them has to scope above an appropriate non-upward-entailing operator; this explains their non-occurrence in positive episodic sentences.

(22) **[EVEN] [SOLO]** $\leftrightarrow$ auch nur

Some examples of non-upward-entailing operators under which obligatorily weak scalar particle like *auch nur* may occur are given in (23)–(25): in (23) *auch nur* is embedded under a downward-entailing operator; in (24) it is embedded under an imperative operator; in (25) it is embedded under desire predicates. If the respective associates of *auch nur* were replaced with strong elements in these examples, the sentences would be infelicitous.[2]

(23) Ich bezweifle, dass du auch nur EIN Buch gelesen hast
I doubt that you auch nur one book read has
'I doubt that you have read even one book'

(24) Zeig mir auch nur EINE Partei, die sich wirklich ums Volk kümmert
show me auch nur one party that self really for people care
'Show me even one party that cares for the people!'

(25) a. Man wünscht sich auch nur einen Politiker dieses Kalibers in Deutschland
one wishes oneself even one politician of this calibre in Germany
'One wishes that there would exists even one politician of this class in Germany'

b. Ich hoffe auch nur 20% von deiner Begeisterung, die du ihm geschenkt hast, bei ihm wach halten zu können
I hope even 20% of your enthusiasm that you him given have with him sustain to be able
'I hope to be able to make him retain even 20% of his excitement'

c. Ich will auch nur eine einzige authentische Studie sehen, die nachweislich und empirisch einen kausalen Zusammenhang zwischen Spielen und (zunehmender!) Gewaltbereitschaft zeigt
I want even one single authentic study see that controllably and empirically a causal connection between games and growing violent tendendency shows
'I want to see even one empirical study that shows that there is a connection between violence and games'

The sentence in (23) has the structure in (26): *auch nur* spells out (22) where the scalar component EVEN moves above the downward-entailing predicate *doubt* at LF, while SOLO stays in situ.

(26) **[EVEN C_1] [I doubt that [~~[EVEN C_1]~~ [SOLO C_0] you read one$_F$ book]]**

The structure in (26) gives rise to the presuppositions in (27-b): the presupposition in (27-b-i) is that it is most likely that you read one book and is triggered by AT LEAST; the presupposition in (27-b-ii) is that it is less likely that I doubt that you read one book than, say, that I doubt that you read two books. The two presuppositions are correct. The analysis of the sentences in (25) and (26) proceeds along the lines discussed in chapter 2 and 3, respectively.

(27) $[\![$ (27-a) $]\!]^{g,c}$(w) is defined only if

(i) $\forall$q $\in$ { that you read n books | n $\in \mathbb{N}_{>0}$ }: q $\lhd_c$ that you read one book

[2]http://www.handelsblatt.com/..., http://www.inahallermann.de/..., http://www.focus.de/...

(ii) $\exists q \in \{$ that I doubt that you read n books | $n \in \mathbb{N}_{>0}$ $\}$: that I doubt that you read one book $\lhd_c$ q.

If defined, $[\![$ (27-a) $]\!]^{g,c}$(w) = 1 iff I doubt that you read one book in w

As it stands, the assumption that *auch nur* spells out the configuration in (22) does not explain the fact that *auch nur* may associate only with a weak element in its immediate surface scope: it falsely predicts that if appropriately embedded, *auch nur* should also be able to associate with a strong element in its immediate scope. For example, the infelicitous sentence in (28-a) where *auch nur* associates with a strong element in its immediate surface scope could be assigned the structure in (28-b) where SOLO scopes out of its base position and EVEN stays in situ.

(28) a. #Ich bezweifle, dass du auch nur SIEBEN Bücher gelesen hast
I doubt that you auch nur seven book read has

b. **[SOLO C_0] [I doubt that [[EVEN C_1] ~~[SOLO C_0]~~ you read seven$_F$ books]]**

The scalar presuppositions triggered by the two focus-sensitive operators in (28-b) are correct. They are given in (29): SOLO presupposes that it is most likely that I doubt that you read seven books (29-i), while EVEN presupposes that there is a relevant alternative that is more likely than that you read seven books (29-ii); the assertive meaning of the sentence is that I doubt that you read seven books. All of these inferences are consistent and may very well be true in the context.

(29) $[\![$ (29-b) $]\!]^{g,c}$ is defined only if

(i) $\exists q \in \{$ that you read n books | $n \in \mathbb{N}_{>0}$ $\}$: that you read seven book $\lhd_c$ q

(ii) $\forall q \in \{$ that I doubt that you read n books | $n \in \mathbb{N}_{>0}$ $\}$: q $\lhd_c$ that I doubt that you read seven books.

If defined, $[\![$ (29-a) $]\!]^{g,c}$(w) = 1 iff I doubt that you read seven books in w

Thus, the structure in (28-b) has to be ruled out on grounds other than having inconsistent entailments. We propose that it is ruled out because in it a focus-sensitive operator moves across a co-associating focus-sensitive operator – the structure in (28-b) violates superiority. That is, if there are two (co-associating) focus-sensitive operators in the structure, one in the c-command domain of the other, only the higher of the two may move. Slightly differently, focus particles in (28-b) are attracted by the same target and so their movement is subject to Attract Closest (30) (Chomsky 1995:280,295).

(30) Attract Closest

α can raise to target K only if there is no legitimate operation Move β targeting K, where β is closer to K

5.2.2 Obligatorily strong scalar particles

There are scalar particles that may only be base-generated adjoined to a clause denoting a strong proposition. An example of such a particle is *sogar* in German. We propose that these particles spell out only one of the scalar components that obligatorily weak scalar particles spell out – namely EVEN.

(31) $[\textsc{even}] \leftrightarrow$ *sogar*

On its own, the morphological rule in (31) does not derive the restricted distribution of *sogar*. Namely, the infelicitous sentence in (32-a) can be assigned the LF in (32-b) where EVEN scopes above *doubt*. In its scoped position EVEN triggers a correct presupposition (32-c) and so the sentence should be licit.

(32) a. #Ich bezweifle dass du sogar EIN Buch gelesen hat
b. **[EVEN C$_3$] [I doubt [~~[EVEN C$_3$]~~ you read one$_F$ book]]**
c. $\exists$q $\in$ { that I doubt that you read n books | n $\in \mathbb{N}_{>0}$ }: that I doubt that Hans read one book $\lhd_c$ q

However, this reasoning ignores the conception of scalar particles as forming scales and competing for insertion (cf. Amsili & Beyssade 2010 for *aussi* 'also' in French). In particular, *sogar* forms a scale with *auch nur*:

(33) a. ⟨sogar, auch nur⟩
b. **⟨[EVEN], [EVEN] [SOLO]⟩**

The competition for insertion is governed by the principle of presupposition maximization that requires you to make your contribution presuppose as much as possible as long as the presupposition is satisfied (cf. Heim 1991 and others). In the case at hand, the principle adjudicates between the following alternative structures:

(34) a. χ **[EVEN C$_3$] [I doubt [~~[EVEN C$_3$]~~ you read one$_F$ book]]**
b. ✓ **[EVEN C$_3$] [I doubt [~~[EVEN C$_3$]~~ [SOLO C$_0$] you read one$_F$ book]]**
c. ⇒ Ich bezweifle dass du auch nur EIN Buch gelesen hat

In (34-a), *sogar* is inserted; EVEN scopes above *doubt* at LF. The structure presupposes that there is an alternative that is more likely than that I doubt that you read one book. In (34-b), *auch nur* is inserted; EVEN scopes above *doubt* at LF while SOLO stays in situ. The structure presupposes that there is an alternative that is more likely than that I doubt that you read one book and that it is most likely than that you read one book. The presuppositions of both (34-a) and (34-b) are satisfied in natural contexts and, furthermore, their assertive import is the same – that I doubt that you read one book. Accordingly, the structures denote contextually equivalent propositions. The principle of presupposition maximization dictates that the structure in (34-b) should be used. This explains why *sogar* may not be base-generated as adjoined to a clause that denotes a weak proposition: the respective structure would violate the principle of presupposition maximization.

5.2.3 Summary

We derived the distribution of obligatorily weak scalar particles from the assumption that they spell out two mutually inconsistent scalar components and a principle that effectively precludes movement of focus particles across co-associating focus particles. The crucial ingredient in our derivation of the distribution of obligatorily strong scalar particles has been the assumption that they compete for insertion with the obligatorily weak particles. This competition account sheds light on the implicational relation described in the introductory section, repeated below: for there to be a strong scalar particle in the language, there has to be a scalar particle in the language that triggers stronger global presuppositions if base-generated adjoined to a weak clause – i.e. there has to be a weak scalar particle in the language. If there is no such particle, nothing would prevent the other particles from being base-generated as adjoined to weak clauses.

(35) Implicational relation for strong scalar particles
There is a scalar particle that is only strong in the language
⇒ There is a scalar particle that is only weak in the language

Finally, there are scalar particles that may spell out both of the two configurations described above, e.g. *even* and *même*. The summary of the morphological rules for some of the scalar particles discussed so far is given in (36).

(36) a. **[EVEN]** ↔ sogar, even
b. **[EVEN] [SOLO]** ↔ auch nur, even

5.3 Scalar particles and negation

Obligatorily weak scalar particles often exhibit a peculiar distribution in the scope of negation, which is left unexplained by having them spell out [EVEN][SOLO]. On the one hand, some weak scalar particles may only occur in the immediate scope of negation. Two prototypical examples are the n-word scalar additive *niti* in Slovenian and *einmal* in German. On the other hand, some weak scalar particles may not occur in the immediate scope of negation. Two prototypical examples are *tudi* 'also' in Slovenian[3] and *auch nur* in German. This pattern is not restricted solely to Slovenian and German but obtains in many other languages that have a dedicated weak scalar additive that occurs only under clausemate negation (e.g. Czech, Polish, Spanish).

5.3.1 N-words, N-indefinites and Elsewhere Condition

Before proceeding to account for the distribution of weak scalar particles under negation, we describe a parallel pattern in the domain of n-words and n-indefinites in Slavic languages and German. The distribution of different types of indefinites is often conditioned by what other indefinites there are in the language. For example, Slavic languages have, on the one hand, indefinites that are n-words or n-indefinites and, on the other hand, indefinites that are not n-words but are NPIs or regular indefinites (cf. Pereltsvaig 2004). It holds that under negation only the featurally most specific indefinites can be used – n-words; indefinites that are NPIs but not n-words are precluded from such contexts. This is illustrated in (37) for a Slovenian n-word indefinite *nikogar*, a plain indefinite *nekoga* and an NPI *wh*-indefinite *koga*.

[3] *Tudi* in Slovenian may also take a strong prejacent. As indicated by the gloss, it may also act as a non-scalar additive particle.

(37) a. Janez ni videl nikogar
John not seen no one
b. *Janez ni videl nekoga
John not seen someone
c. *Janez ni videl koga
John not seen who

A similar pattern has been observed also for German n-indefinites: the first indefinite under negation must be an n-indefinite. This is illustrated in (38) (Jäger 2010:734): (38-a) contains an n-indefinite *nichts*, while (38-b) contains a plain indefinite *etwas*.

(38) a. Er isst nichts
he eats nothing
b. *Er isst nicht etwas
he eats not something

This pattern is explained by assuming that n-indefinites and n-words have an uninterpretable [uNEG] feature that competing indefinites lack. This formal feature plays a role solely for morphology and does not have a semantic reflex. Elsewhere Condition then favors an insertion of an indefinite that bears a [uNEG] feature over a semantically identical indefinite wherever the [uNEG] feature can be checked – in the scope of a (possibly covert) clausemate negation.[4]

5.3.2 Extension to scalar particles

N-word scalar particles in Slovenian (Spanish, Italian and Greek)

We propose that Elsewhere Condition is also active in restricting the distribution of weak scalar particles. The relevant pattern is exemplified in (39) and (40) with two particles in Slovenian: weak *tudi* may occur in DE and other non-upward-entailing environments that are not negative, while *niti* may only occur under clausemate negation.

(39) a. Če si prebrali tudi ENO knjigo, boš zdelal izpit
if aux read tudi one book, aux pass exam
b. #Če si prebrali niti ENO knjigo, boš zdelal izpit
if aux read niti one book, aux pass exam

(40) a. #Janez ni prebral tudi ENE knjige
John not read tudi one book
b. Janez ni prebral niti ENE knjige
John not read niti one book

We propose that the two particles have an identical meaning – they spell out EVEN and SOLO. However, *niti* additionally bears a [uNEG] feature, which is uncontroversial considering it is

[4] This can also be implemented in an OT approach to realization of negative features (e.g. by appropriately ranking the constraints NegAttr and *Neg of de Swart 2010).

an n-word. Thus, the configuration that it spells is the one in (41). The uninterpretable negative feature must be checked locally by clausemate negation; this restricts the distribution of *niti* to the scope of clausemate negation.

(41) **[EVEN][SOLO]$_{\textbf{[uNEG]}}$** $\leftrightarrow$ niti

This also indirectly restricts the distribution of *tudi*. Namely, *tudi* spells out the configuration in (42) that lacks the uninterpretable negative feature. Since we are assuming that the featurally most specific particle among *niti* and *tudi* must be used under negation, the former is inserted. *Tudi* may thus only occur in non-negative environments.

(42) **[EVEN][SOLO]** $\leftrightarrow$ tudi

The same reasoning should in principle apply to scalar particles in other negative concord languages (Spanish, Italian and Greek): n-word weak scalar particles (*oute*) and non-n-word weak scalar particles (*kan*) have the same meanings but differ with respect to having an uninterpretable negative feature. A principle that requires to insert the featurally most specific scalar particle whenever you can dictates to insert an n-word weak scalar additive in the immediate scope of negation and non-n-word weak scalar particles elsewhere. Interestingly, both in Spanish and Greek, an insertion of an non-n-word weak scalar additive is possible under clausemate negation if also the n-word weak scalar additive is inserted (43) (cf. Alonso-Ovalle 2009).

(43) Pedro no habla *(ni) siquiera chino
Pedro not speaks ni siquiera Chinese

As we will see shortly, the interaction between negation, n-words and non-n-word scalar particles can be quite intricate in a language. More to the point, various other factors may play a role in determining whether a weak scalar particle may occur under clausemate negation than just the featural specifity of the respective particle.

N-word scalar additive in German?

We propose that an analysis along the lines above should also be extended to German *(nicht) einmal*. As we have indicated above, regular indefinite expressions (*etwas* 'something,' *jemand* 'someone') and NPI indefinite expressions (*je* 'ever') have an intriguing distribution in German: they may not be the first indefinite in the scope of (covert) clausemate negation – the first indefinite must be an n-indefinite. The structure of a simple sentence containing an n-indefinite is given in (44) where the negation is abstract (Penka & Zeijlstra 2005).

(44) a. Er isst nichts
he eats nothing
b. **[OP$_{\textbf{[iNEG]}}$ [he eats [a thing]$_{\textbf{[uNEG]}}$]]**

We propose that *nicht einmal* corresponds to n-indefinites *niemand, nichts* and *kein NP* in the nominal domain and *nie* in the adverbial domain, while *auch nur* corresponds to non-n-indefinites. That is, *nicht einmal* and *auch nur* are semantically indistinguishable. However, *nicht einmal* has an uninterpretable [uNEG] feature that *auch nur* lacks. Accordingly, since featurally most specific elements must be inserted in the immediate scope of negation, *auch nur* does not occur there. An example of a structure containing *nicht einmal* and its interpretation is given in (45): EVEN scopes above the covert negation operator, while SOLO is stranded in its base position (45-b). SOLO triggers the scalar presupposition in (46-d-i) – it is most likely that I read one book. EVEN triggers the scalar presupposition in (45-d-ii) – there is an alternative that is more likely than that I did not read one book. Both presuppositions are correct. The assertive meaning of the sentence is that I did not read one book.

(45) a. Ich habe nicht einmal EIN Buch gelesen
I have not even one book gelesen

b. **[EVEN C_1] [OP$_{[iNEG]}$ [~~[EVEN C_1]~~[SOLO C_0]$_{[uNEG]}$ I read one$_F$ book]]**

c. $[\![$ (45-b) $]\!]^{g,c}$(w) is defined only if

(i) $\forall$q $\in$ {that I read n books | n $\in \mathbb{N}_{>0}$}: q $\neq$ that I read one book $\rightarrow$ q $\lhd_c$ that I read one book,

(ii) $\exists$q $\in$ {that I did not read n books | n $\in \mathbb{N}_{>0}$}: that I did not read one book $\lhd_c$ q.

If defined, $[\![$ (45-b) $]\!]^{g,c}$(w) = 1 iff I did not read one book in w

We now check the extent to which the proposed correspondence between indefinites and scalar particles obtains in German – that is, whether *nicht einmal* and *auch nur* exhibit the same behavior as their proposed counterparts *niemand* and *jemand* in the nominal domain. In German, only the first indefinite in the immediate scope of (covert) negation may be an n-indefinite; all other indefinites may not be n-indefinites. This is illustrated in (46) (Jäger 2010:794): only the first indefinite is an n-indefinite (*niemand*); all subsequent indefinites are either plain (*etwas*) or NPI indefinites (*je*).

(46) Niemand hat {je, *nie} {etwas, *nichts} gegessen
no one has {ever, never} {something, nothing} eaten

If *auch nur* corresponds to non-n-indefinites, it is predicted to be licit in the presence of another n-indefinite, e.g. *nie* 'never' or *niemand* 'no one.' This is borne out:

(47) a. Niemand hat auch nur EIN Buch gelesen
no one has even one book read

b. Ich habe nie auch nur EIN Buch gelesen
I have never even one book read

Furthermore, *auch nur* is predicted to be able to occur with *nicht einmal* in the same clause: namely, if *nicht einmal* corresponds to an n-indefinite, a subsequent occurrence of *auch nur*, which corresponds to non-n-indefintes, should be licit. This prediction is borne out:[5]

(48) a. Ich habe nicht einmal dem PETER auch nur EINE Mark gegeben
I have not even the Peter even one mark gave

[5] The (b)-example: http://www.deutschegrammophon.com/...

b. Aber ich glaube, dass nicht einmal der OPERNFREMDE auch nur EINE
but I believe that not even the Opera novice even one
einzige Minute Leerlauf empfand
single minute idleness felt

The predictions are different for Slavic languages where there is no constraint against having multiple n-words under negation and thus all indefinites (or scalar particles) under clausemate negation have to be n-indefinites (or negative scalar particles). In accordance with our above characterization, *tudi* should not be able to occur under clausemate negation at all, even if it follows n-indefinites. This predictions is borne out:

(49) a. *Nihče ni pozdravil tudi MARIJE
no one not greeted also Mary
b. *Janez ni dal niti PETRU tudi ENE marke
John not given even Peter also one mark

Languages without n-word scalar particles

In languages where there is no scalar particle that would have a [uNEG] feature, the prediction is that all weak scalar particles should be able to occur under negation. The reason is that there is no competition between negative and non-negative scalar particles and so Elsewhere Condition does not apply. An example of such a language and such scalar particles are *so much as* and *even* in English. They may both occur under negation:

(50) a. I didn't even see PETER
b. Mary didn't so much as OPEN that dissertation

5.3.3 Summary

The limited distribution of *niti* in Slovenian, *oute* in Greek, *(nicht) einmal* in German and other negative scalar particles follows from the fact that they bear a [uNEG] feature. This feature is checked by an overt negative operator in languages like Slovenian and a covert negative operator in German. Their non-negative counterparts, e.g. *tudi* in Slovenian and *auch nur* in German, share the meaning of *niti* and *nicht einmal* but lack the negative feature. They are precluded from occurring under negation by Elsewhere Condition that dictates to use the featurally most specific competing element.

(51) a. **[EVEN][SOLO]** $\leftrightarrow$ tudi, auch nur
b. **[EVEN][SOLO]**$_{\textbf{[uNEG]}}$ $\leftrightarrow$ niti, nicht einmal

In languages in which there are no scalar particles that bear a [uNEG] feature, the prediction is that all weak scalar particles should be able to occur in the immediate scope of negation.

5.4 Conclusion

This chapter looked at the cross-linguistic variation of scalar particles. Five classes of scalar particles were identified with respect to (i) whether they may associate with weak or strong elements in their immediate surface scope and (ii) whether the scalar additive may occur in the immediate scope of negation (cf. Gast & van der Auwera 2011). An account of the variation of scalar particles was provided according to which scalar particles spell out one (or two) of the following combinations of operators:

(52) a. **[EVEN]** ↔ sogar (Germ), celo (Slo); tudi (Slo), même (Fra), even
b. **[EVEN] [SOLO]** ↔ auch nur (Germ), ne fût-ce que (Fra); tudi, même, even
c. **[EVEN] [SOLO]$_{\textbf{[uNEG]}}$** ↔ nicht einmal (Germ), niti (Slo), ni (Spa), oute (Gre)

These combinations of operators are in competition. The best candidate is determined by Maximize Presupposition – this forces the scalar particles that spell out (52-a) to be strong. Another condition was shown to be relevant for the distribution of weak scalar particles: Attract Closest. This condition restricts movement of SOLO, which is base-generated below EVEN. Finally, if there is a scalar additive that spells out (52-c) in the language, all else being equal, only it may occur in the immediate scope of negation.

CHAPTER 6

Additivity

If *even* associates with a weak element, it may have an acceptable interpretation only if it is embedded under an appropriate non-upward-monotone operator. If *even* associates with a strong element, there is no limitation on its distribution. Although this is the most prominent difference between the two types of occurrences of *even*, it is not the only one. Another class of differences relates to their additive behavior. The goal of of this chapter is to explore these differences and to get a better empirical understanding of the additive inferences accompanying *even*. An account of additivity is provided that expands on the morphological decomposition of *even* from the preceding chapters by assuming that the scalar and the additive presupposition are triggered by different components of *even* and may take distinct scopes at LF.

6.1 Introduction

This section describes some asymmetries between weak and strong *even* with respect to their additive entailments in a variety of environments investigated in the preceding chapters.

6.1.1 Weak *even* and non-additivity

The discussion of the occurrences of weak *even* in downward-entailing, non-monotone and certain modal environments in the preceding chapters revolved around the question of whether the scalar presupposition triggered by *even* in those sentences is correct. The second defining property of the scalar particle – its additivity – was left aside. This is reflected in the meaning adopted for it:[1]

(1) $[\![\textbf{ even }]\!]^{g,c}$(C, p, w) is defined only if $\exists$q $\in$ C [p $\lhd_c$ q].
If defined, $[\![\textbf{ even }]\!]^{g,c}$(C, p, w) = 1 iff p(w) = 1

[1]Although weak *even* spells out in addition to (1) a scalar component SOLO, as discussed in chapter 5, we largely ignore it in this chapter for perspicuity. Nothing would change in our discussion and derivations if we did not ignore it.

The behavior of weak *even* in non-monotone and certain modal environments appears to warrant the choice of not encoding additivity into the lexical entry for *even*. Namely, *even* does not appear to trigger any additive inferences in these sentences. We show this in the remainder of the section. Weak *even* in non-monotone environments: The sentence in (2-a) may be used to describe a situation in which no one in the whole world read that dissertation, though exactly four people opened it.

(2) a. Exactly four people in the whole world have even OPENED that dissertation
b. $\not\Rightarrow$ Exactly four people in the whole world have read that dissertation

We have argued that the sentence in (2-a) is licit if *even* moves above the non-monotone quantifier at LF (4). Thus, if additivity were encoded in the meaning of scoped *even*, it would be expected that (3-a) entails (3-b) or some similar proposition, contrary to fact.

(3) **[even $\mathbf{C_0}$] [exactly 4 people ...] 1 [~~[even $\mathbf{C_0}$]~~ $\mathbf{t_1}$ opened$_{\mathbf{F}}$ that dissertation]**

Weak *even* in imperatives and under desire predicates: The imperative in (4-a) imposes no additional requirements on the hearer other than to show the speaker one political party that cares for the people.

(4) a. Show me even ONE political party that cares for the people
b. $\not\Rightarrow$ You must show me two or more political parties that care for the people

Weak *even* under factive desire predicates behaves the same way: (5-a) may be used to describe a situation in which John came to our party exactly once.

(5) a. It's great that John came to our party even ONCE
b. $\not\Rightarrow$ John came to our party twice or more times

Finally, the same pattern can be observed with the occurrences of weak *even* in Strawson DE environments. For example, the sentence in (6) fails to have any additive entailments: it can be used to describe a state in which John believes that he did not do anything else with the book except open it. This is confirmed by the felicity of the discourse in (7).

(6) a. John is sorry that he even OPENED the book
b. $\not\Rightarrow$ John believes that he read the book

(7) John is sorry that he even OPENED the book, though he is glad that opening it is the only thing he did with it

The structure of (6-a) is given in (8) where *even* moves above the downward-entailing operator at LF. As suggested by (6) and (7), it does not trigger an additive inference in its scoped position.

(8) **[even $\mathbf{C_0}$] [John is sorry that [~~[even $\mathbf{C_0}$]~~ he opened$_{\mathbf{F}}$ the book]]**

6.1.2 Strong *even* and additivity

The facts are different if *even* takes surface scope above the respective embedding operators and associates with a weak element in their scope. This is illustrated in (9): the sentence in (9-a) presupposes that John is sorry that he read the book and, due to the factive presupposition of *sorry*, it consequently entails that John believes that he read the book. Accordingly, the discourse in (10) is infelicitous.

(9) a. John is even sorry that he OPENED the book
    b. $\Rightarrow$ John believes that he read the book

(10) #John is even sorry that he OPENED the book, though he is glad that opening it is the only thing he did with it

The contrast between (6)/(7) and (9)/(10) is puzzling. Namely, on our current assumptions, the two sentences have the same LF, given in (11). Accordingly, there should not be any difference between the sentences with respect to the inferences that they give rise to.

(11) **[even C_0] [John is sorry that he opened$_F$ the book]**

6.1.3 Preview of the resolution

We propose that *even* spells out two components: a scalar component EVEN and an additive component ADD. The former is the bearer of the scalar presupposition, while the latter is the bearer of the additive presupposition; the two particles associate with the same focused element. Positive episodic sentences with *even* have the schematic structure along the following lines:

(12) **[EVEN] [ADD] [$_\uparrow$ ... XP$_F$ ...**

The scalar component scopes out of its base position if its associate is weak; it potentially strands the additive component. This is schematized in (13).

(13) **[EVEN] [$_{\not\uparrow}$ OP [~~[EVEN]~~ [ADD] [$_\uparrow$ ... XP$_F$ ...**

The additive component is devised so that it cannot give rise to local uninformativity or overinformativity (contradiction) (cf. Rullmann 1997). Accordingly, it does not give rise to any additive inference when it is adjoined to a clause that denotes a weak proposition. This property of the additive component is also responsible for why additive inferences are not always generated with strong *even* (14) (cf. von Stechow 1990, Rullmann 1997 and others).

(14) Yesterday, John even danced only with SUE $\not\Rightarrow$ John danced (only) with other people

6.1.4 Another puzzle about weak *even* and additivity

The occurrences of weak *even* in the scope of desire predicates and in imperatives trigger inferences along the lines of (15-c). That is, the sentences do not seem to convey the assertive meaning that their counterparts without *even* convey.

(15) a. I hope to win even a BRONZE medal
b. $\not\Rightarrow$ I hope to win a bronze medal
c. $\Rightarrow$ I hope to win a medal & I am okay with a bronze medal

Furthermore, the occurrences of weak *even* in the scope of strictly downward-entailing operators have additive entailments along the lines of (16-b).

(16) a. I didn't win even a BRONZE medal
b. $\Rightarrow$ I didn't win any medal

We propose that this data follows from the fact that when EVEN scopes out of its base position, a co-associating AT LEAST operator is present in the embedded clause (cf. Schwarz 2005). This suffices to derive the desired inferences in (15) and (16).

(17) a. **[EVEN] ... [OP$_{\mathbf{DE}}$ ... [~~[EVEN]~~ [ADD] [AT LEAST] ... XP$_{\mathbf{F}}$ ...**
b. **[EVEN] ... [OP$_{\mathbf{MOD}}$ ... [~~[EVEN]~~ [ADD] [AT LEAST] ... XP$_{\mathbf{F}}$ ...**

6.2 Downward-entailing environments

6.2.1 Description of the data

If the associate of *even* occurs in a DE environment, different entailments come about depending on whether *even* is on the surface above or below the DE operator. The relevant configuration is thereby one where the associate of *even* is weak. Namely, if the associate of *even* is strong, *even* must take scope below the DE operator since it would otherwise trigger a false scalar inference. This is illustrated in (18) and (19) where *understand* is taken to be the strongest element on the entailment scale ⟨*open, read, understand*⟩.

(18) I doubt that John even UNDERSTOOD the book
$\Rightarrow$ there is a more likely alternative than that John understood the book

(19) #I even doubt that John UNDERSTOOD the book
$\Rightarrow$ there is a more likely alternative than that I doubt that J understood the book $\lightning$

If the associate of *even* is a pragmatically weak element, both surface scopes of *even* are acceptable. Now, in many cases no difference with respect to additive inferences is noticeable between the two surface scopes of *even*. This is exemplified by the two sentences in (20) that arguably have the same entailments, given in (21).

(20) a. I doubt that John even OPENED the book
b. I even doubt that John OPENED the book

(21) a. $\Rightarrow$ there is a more likely alternative than that I doubt that J. opened the book
b. $\Rightarrow$ that I doubt that John read or understood the book

However, if the associate of *even* is a weak predicate and the respective operator is presuppositional, e.g. *sorry* in (22)-(23), the two types of sentences will have distinguishable interpretations. As accentuated in the introduction, (22-a) does not trigger an additive inference. That is, it allows for the possibility that John did not do anything with the book except open it.

(22) a. John is sorry that he even OPENED the book
b. Additive inference: ——

This is different for (23): the sentence in (23-a) presupposes that John is sorry that he read or/and understood the book and, due to the factive presupposition of *sorry*, this entails that John believes that he read or/and understood the book. Thus, the sentences in (22-a) and (23-a) trigger distinct additive inferences.

(23) a. John is even sorry that he OPENED the book
b. Additive inference: John is sorry that he read or/and understood the book ($\Rightarrow$ John believes that he read or/and understood the book

6.2.2 Previous approaches

There are three classical approaches to additive inferences triggered by weak and strong *even*: the scope-theoretic approach and two versions of the ambiguity approach. The scope-theoretic approach by Karttunen & Peters (1979) assumes that *even* triggers an existential additive presupposition in (24-ii). Furthermore, *even* may move at LF, especially if it would otherwise trigger an illicit scalar presupposition (cf. Lahiri 1998).

(24) $[\![$ **even** $]\!]^{g,c}$(C, p, w) is defined only if
(i) $\forall$q $\in$ C [q $\neq$ p $\rightarrow$ p $\lhd$ q]
(ii) $\exists$q $\in$ C [q $\neq$ p $\wedge$ q(w) = 1]
If defined, $[\![$ **even** $]\!]^{g,c}$(C, p, w) = 1 iff p(w) = 1

Accordingly, this approach assigns both the sentence in (22) and the sentence in (23) the same logical form (25-a). This is clear for the case in (23) where *even* c-commands *sorry* already at surface structure. In the case of (22) where *even* is embedded in a lower clause at surface structure, it must move above *sorry* at LF since it would otherwise trigger an illicit scalar presupposition. Hence, the scope-theoretic approach of Karrtunen and Peters has no way of deriving the different interpretations of (22) and (23) – namely, one cannot assign different meanings to the same structure. Both sentences are predicted to trigger the additive presupposition in (25-b).

(25) a. **[even C_0] [John is sorry that he opened$_{\mathbf{F}}$ the book]**
b. $[\![$ (25-a) $]\!]^{g,c}$(w) is defined only if $\exists$q $\in$ {that John is sorry that he x the book | x is read, understand}: q(w) = 1

The first version of the ambiguity approach is by Rooth (1985) and it assumes that in (Strawson) DE environments *even* may spell out the particle **even$_{\mathbf{NPI}}$**, which triggers an existential presupposition that is the opposite of that of the regular *even* (26-ii).

(26) $[\![$ $\mathbf{even_{NPI}}$ $]\!]^{g,c}$(C, p, w) is defined only if

(i) $\forall q \in C$ [$q \neq p \rightarrow q \lhd p$]

(ii) $\exists q \in C$ [$q \neq p \wedge q(w) = 0$]

If defined, $[\![$ **even** $]\!]^{g,c}$(C, p, w) = 1 iff p(w) = 1

Applied to our example in (22), which has the structure in (27-a), this yields the additive presupposition that John didn't read the book or that he didn't understand the book. The presupposition projects and we get the inference that John believes that he didn't read or that he didn't understand the book (27-b).

(27) a. **[John is sorry that [[even$_{\mathbf{NPI}}$ $\mathbf{C_0}$] he opened$_{\mathbf{F}}$ the book]]**

b. $[\![$ (27-a) $]\!]^{g,c}$(w) is defined only if $\forall$ w' $\in$ Dox(J,w) [$\exists q \in$ {that John x the book | x is read, understand} [q(w) = 0]]

As argued conclusively by Wilkinson (1996), this entailment is not warranted. This is demonstrated by the felicitous discourse in (28) that indicates that (22) may be used in a context in which John believes that he read and understood the book, contrary to (27-b).

(28) John read the book and understood its contents and is now sorry that he even OPENED it

The second version of the ambiguity approach is Rullmann's pragmatic treatment of additive presupposition. It does better than Rooth's approach. He derives the lack of the additive presupposition in (22) in the following way (Rullmann 1997:60):

> [F]rom the fact that the proposition [that John opened the book] is true we cannot conclude anything about the propositions that are less likely than [it]. [...] We can thus explain the absence of the existential presupposition in [(22)] from the fact that the proposition expressed by the complement clause is at the same time presupposed to be true (due to the factivity of *be sorry*) and more likely than all the alternative propositions (due to the scalar presupposition of NPI *even*).

In the case of (23), *even* is generated above *sorry*: its prejacent is least likely and asserted to be true. The pragmatic reasoning may then lead us to conclude that all the more likely alternatives are true as well. This derives the asymmetry between the two examples. However, as with other instantiations of the ambiguity approach, Rullmann's treatment is hostage to the requirement of explaining the distribution of $even_{NPI}$ – it is not clear why $even_{NPI}$ should only be able to occur in DE and other non-upward-entailing environments.

6.3 Decomposing *even*

To deal with the above puzzle, we decompose *even* into two components – EVEN and ADD. The additive component may stay in situ and is devised so as not to yield uninformativity or contradiction, which is inspired by Rullmann's (1997) treatment of additivity.

6.3.1 Scalar component EVEN

In (29) we repeat our characterization of the focus-sensitive operator EVEN from the preceding chapters. Its primary contribution is that it triggers the presupposition that there is an alternative in its domain that is more likely than its prejacent.

(29) $[\![$ **EVEN** $]\!]^{g,c}$(C, p, w) is defined only if $\exists$q $\in$ C [p $\lhd_c$ q].
If defined, $[\![$ **EVEN** $]\!]^{g,c}$(C, p, w) = 1 iff p(w) = 1

A trivial example illustrating the semantic contribution of EVEN is given in (30): it leaves the assertive meaning of the sentence untouched and triggers a scalar presupposition.

(30) $[\![$ **[EVEN C$_0$] [John$_F$ arrived late]** $]\!]^{g,c}$(w) is defined only if $\exists$q $\in$ C$_0$$\subseteq$ {that x arrived late | x is a relevant person}: that John arrived late $\lhd_c$ q. If defined, $[\![$ **[EVEN C$_0$] [John$_F$ arrived late]** $]\!]^{g,c}$(w) = 1 iff John arrived late in w

6.3.2 Additive component ADD

The second component of *even* is ADD. It triggers a restricted universal additive presupposition, while its assertive component is vacuous (cf. van Rooy 2003).[2] We stipulate that the restriction of the universal additive presupposition is to propositions that are more likely than it and are not incompatible with it. This prevents a structure with ADD from presupposing propositions that would entail the prejacent of ADD or its negation and thus make the prejacent (locally) redundant or contradictory.

(31) $[\![$ **ADD** $]\!]^{g,c}$(C, p, w) is defined only if $\forall$q $\in$ C [(p $\lhd_c$ q) $\wedge$ (p$\cap$q $\neq \emptyset$) $\rightarrow$ q(w) = 1].
If defined, $[\![$ **ADD** $]\!]^{g,c}$(C, p, w) = 1 iff p(w) = 1

An example illustrating the semantic contribution of ADD is given in (32): just like EVEN, it leaves the assertive meaning of the sentence untouched. It triggers the additive presupposition that John read the first four volumes (these volumes are more likely to be read by John than the fifth volume).

(32) $[\![$ **[ADD C$_0$] [John read the fifth$_F$ volume]** $]\!]^{g,c}$(w) is defined only if $\forall$q $\in$ C$_0$ $\subseteq$ { that John read the n-th volume | n $\in \mathbb{N}_{>0}$ } [(that John read the 5th volume $\lhd_c$ q) $\wedge$ (that John read the 5th volume $\cap$ q $\neq \emptyset$) $\rightarrow$ q(w) = 1], only if John read the first four volumes in w. If defined, $[\![$ **[ADD C$_0$] [John$_F$ read the fifth$_F$ volume]** $]\!]^{g,c}$(w) = 1 iff John read the fifth volume in w

6.3.3 Derivation: high scope of *even*

We derive first the additive entailment of (23). The sentence in (23) has the structure in (33) and the meaning in (34). Two presuppositions are triggered by the sentence: the additive presupposition is described in (33-i), while the scalar presupposition is described in (33-ii).

[2] A transposition of our analysis into an existential one is trivial.

(33) **[EVEN C_6] [ADD C_5] [John is sorry that he opened$_F$ the book]**

(34) $[\![$ (34-a) $]\!]^{g,c}$(w) is defined only if

(i) $\forall$q $\in C_5 \subseteq$ {that John is sorry that he x the book | x is open, read, understand}: (that John is sorry that he opened the book $\lhd_c$ q) $\wedge$ (that John is sorry that he opened the book $\cap$ q $\neq \emptyset$) $\rightarrow$ q(w) = 1

(ii) $\exists$q $\in C_6 \subseteq$ {that John is sorry that he x the book | x is open, read, understand}: that John is sorry that he opened the book $\lhd_c$ q

If defined, $[\![$ (34-a) $]\!]^{g,c}$(w) = 1 iff John is sorry that he opened the book in w

The additive presupposition requires every relevant alternative to the prejacent that is more likely than it and compatible with it to be true. If the domain of ADD is restricted to, say, the prejacent and the proposition that John is sorry that he read the book, the sentence presupposes that John is sorry that he read the book. Namely, that John is sorry that he read the book is both compatible with the prejacent and arguably more likely than it. The scalar presupposition of the sentence is that there is an alternative that is more likely than the prejacent; this is verified by the proposition that John is sorry that he read the book.

6.3.4 Derivation: low scope of *even*

We now compute the additive inference of the sentence in (22). A possible structure of the sentence is as given in (35): EVEN scopes above *sorry*, while ADD stays in situ.

(35) **[EVEN C_3] [John is sorry [~~[EVEN C_3]~~[ADD C_6] he opened$_F$ the book]]**

The sentential complement of *sorry* in (35) has the meaning in (36). Since it holds that the proposition that John opened the book is entailed by all of the alternatives, it is at least as likely as them – i.e. no alternative is more likely than it. This means that the sentential complement of *sorry* in (35) does not trigger an additive presupposition.

(36) $[\![$ **[ADD C_6] [he opened$_F$ the book]** $]\!]^{g,c}$(w) is defined only if $\forall$q $\in C_6 \subseteq$ {that John x the book | x is open, read, understand}: (that John opened the book $\lhd_c$ q) $\wedge$ (that John opened the book $\cap$ q $\neq \emptyset$) $\rightarrow$ q(w) = 1.

If defined, $[\![$ **[ADD C_6] [he opened$_F$ the book]** $]\!]^{g,c}$(w) = 1 iff John opened the book in w

Accordingly, the only presupposition triggered by (35) is the correct scalar presupposition described in (37). The structure does not trigger any additive inference.

(37) $[\![$ (35) $]\!]^{g,c}$(w) is defined only if $\exists$q $\in C_3 \subseteq$ {that John is sorry that he x the book | x is open, read, understand}: that John is sorry he opened the book $\lhd_c$ q. If defined, $[\![$ (35) $]\!]^{g,c}$(w) = 1 iff John is sorry that he opened the book in w

If the parse of the sentence in (22) were such that both EVEN and ADD would move above *sorry*, an additive presupposition would be triggered, as seen in the preceding subsection.

To conclude: We have been able to derive different inferences for the sentences in (22) and (23) by assigning them distinct structures. This is possible because *even* spells out a scalar and an additive component, which may take distinct scope at LF. In particular, the additive component may be stranded when EVEN moves and is effectively neutralized when it occurs adjoined to a clause that denotes a weak proposition. In this respect, our analysis bears resemblance to ambiguity approaches to *even*, which can also assign distinct structures to the two sentences. Finally, the account makes an intricate prediction: if (i) *even* were base-generated as adjoined to a clause that denotes neither the strongest nor the weakest proposition among its alternatives and (ii) EVEN could move above an operator where its scalar presupposition would be satisfied, a scalar inference that is generated high in the clause and an additive inference that is generated low in the clause should be detectable. We have not yet been able to adequately test this prediction.

6.4 Positive episodic environments

6.4.1 Description of the data

Even in positive episodic sentences tends to trigger an additive presupposition:

(38) a. Even JOHN arrived late
b. Additive inference: Some/All other relevant individuals arrived late

However, it is known at least since von Stechow (1990) and Rullmann (1997) that *even* in some cases does not trigger an additive inference in positive episodic sentences. This is illustrated by the examples in (39).[3] In none of these examples is it reasonable to claim that the focal stress is anywhere but on the capitalized words and that, accordingly, the additive presupposition is weaker than what we would expect it to be with stress on capitalized words (though see the discussion in Wilkinson 1996).

(39) a. A: Is Claire an ASSISTANT professor?
B: No, she's even an ASSOCIATE professor
b. A: Mary won a bronze medal
B: No, she even won a SILVER medal
c. Yesterday, John even danced only with SUE

(40) a. She's even an ASSOCIATE professor
b. Additive inference: ——

6.4.2 Previous approaches

Theories that assume that *even* in positive episodic environments uniformly triggers an additive inference are in trouble when faced with such data: although in many cases they

[3]There is some disagreement among the speakers about the acceptability of these examples. Interestingly, some speakers do report some kind of an event additive inference for these examples. For instance, some speakers find (39-c) acceptable only if there has been a previous event in which John danced only with x where x is distinct from Sue. A more comprehensive empirical study is mandated.

make a correct prediction, as in (38), they falter over the examples like (40). Two prominent examples of such theories are Karttunen & Peters (1979) and Rooth (1985), according to which the sentence has a contradictory inference, as is illustrated in (41). Their riposte to this issue would have to be that in examples like (41), the additive presupposition is somehow systematically cancelled.

(41) #⟦ **[even C_0] [she is an associate$_F$ professor]** ⟧^{g,c}(w) is defined only if Claire is an assistant or a full professor in w.
If defined, ⟦ **[even C_0] [she is an associate$_F$ professor]** ⟧^{g,c}(w) = 1 iff Claire is an associate professor in w

An approach that does not assume additivity as part of the lexical meaning of *even* faces the opposite challenge: it predicts the correct inference for (40) but struggles with cases where additive inference does obtain (38). If a proponent of such an approach could derive the additive inference in (38) on independent pragmatic grounds, he would be in a better shape than someone who encodes additivity into lexical semantics of *even*. Namely, he would not have to stipulate a cancellation mechanism that is tailored solely to the additive presupposition of *even*. Rullmann (1997:59) attempts to do just that:

> *Even* can only be used if the speaker intends the hearer to draw a scalar inference. This condition on the use of *even* can be thought of as a conventional but non-truthconditional aspect of its meaning, in much the same way that part of the conventional meaning of *but* is to draw a contrast between the two conjuncts. Thus, the fact that the speaker uses *even* in [(38)] presupposes that the asserted propositions [that John arrived] is the least likely of the alternative propositions, but also justifies the hearer in drawing the conclusion that the other (more likely) propositions in the set of alternatives are also true. In this way what used to be called the [additive] presupposition can be derived form the combination of the assertion and the scalar presupposition.

This characterization by itself is enough to derive the additive entailment in (38). But it requires (40) to have an illicit additive inference as well. To eliminate this, Rullmann (1997:61) assumes that for the hearer to be justified to draw an additive inference, some kind of 'pragmatic entailment' needs to obtain between it and the prejacent:

> [In (40)], the alternatives (assistant, associate, and full professor) are mutually exclusive, and hence there is no entailment relation between them, not even a pragmatic one. As a result, neither "Claire is an associate professor" nor "Claire is a full professor" can be inferred from the asserted proposition "Claire is an associate professor" in combination with the scalar presupposition of the sentence.

The pragmatic explanation is thus simply that the use of *even* justifies the hearer in concluding that whatever alternative is 'pragmatically entailed' by the prejacent (and thus compatible with it) and more likely than it is presupposed.

To summarize: To account for the empirical generalization in (42), the standard approaches to *even* in positive episodic sentences either assume that *even* triggers an additive presupposition that may be systematically cancelled (Karrtunen and Peters' and Rooth's approach) or they assume that *even* triggers no additive presupposition and that an additive inference is derived post-compositionally by some kind of pragmatic reasoning (Rullmann's approach).

6.4.3 Derivation

As before, we propose that *even* in the sentences in (42-a) is the spell-out of the two focus-sensitive operators introduced above – the additive particle ADD and the scalar particle EVEN (42-b). Since the semantics that we put forward for ADD incorporates Rullmann's (1997) consistency requirement, we make the same prediction for (42-a) as he does.

(42) a. Claire is even an ASSOCIATE professor
b. **[EVEN C_9] [ADD C_8] [Claire is an associate$_F$ professor]**

Namely, the additive presupposition of (42-b) is the one given in (43). Since it holds that the proposition that Claire is an associate professor is incompatible with all the alternatives – that Claire is an assistant professor, that Claire is a full professor – no alternative satisfies the restrictor of the universal quantifier in (43) and so no alternative is presupposed.

(43) $[\![$ (42-b) $]\!]^{g,c}$(w) is defined only if $\forall$q $\in$ {that Claire is an x professor | x is assistant, associate, full}: (that Claire is an associate professor $\lhd_c$ q) $\wedge$ (that Claire is an associate professor $\cap$ q $\neq \emptyset$) $\rightarrow$ q(w) = 1

The structure in (42-b) also triggers a scalar presupposition that there is an alternative that is more likely than that Claire is an associate professor. The presupposition is verified by the proposition that Claire is an assistant professor.

6.5 Exclusive and other types of associates

6.5.1 Description of the data

The first puzzle concerning exclusive associates relates to modal environments: When the sister of *even* in its base position is such that its alternatives are mutually exclusive, the meaning of the sentential complement of a desire predicate containing a weak *even* is distinct from the meaning of its counterpart without *even*. This contrast is illustrated in (44).

(44) a. Mary hopes that her daughter will win even a BRONZE medal
b. $\not\Rightarrow$ Mary hopes that her daughter will win a bronze medal
c. $\Rightarrow$ Mary hopes that her daughter will win at least a bronze medal

The sentence in (44-a) conveys that Mary hopes for her daughter to win a bronze or a silver or a gold medal (44-c). This is distinct from the meaning conveyed by (44-b) that Mary hopes for her daughter to win a bronze medal.

The second puzzle concerning exclusive (and other) associates relates to DE environments: the sentence in (45-a) entails (45-b). That is, it is not possible to utter (45-a) in a context in which it holds that I won some medal other than bronze.

(45) a. I didn't win even a BRONZE medal
b. ⇒ I didn't win any medal

6.5.2 Previous approaches and the decompositional approach

All previous approaches to *even* that are discussed above make the wrong prediction for (44-a). Namely, they all assume that *even* is truth-conditionally vacuous. So, the sentence should have the meaning conveyed by (46). Furthermore, the sentence in (44-a) does not entail that Mary hopes for her daughter to win some medal other than bronze nor does it entail that Mary believes that her daughter will not win bronze or that she will not win gold. That is, the additive inferences predicted by Karttunen & Peters' and Rooth's accounts, respectively, are false.

(46) Mary hopes that her daughter will win a bronze medal

All previous approaches that are discussed above make a more or less correct prediction for (45-a). For example, the scope-theoretic approach assigns the sentence the structure in (47-a) and the additive presupposition in (47-b). Rooth's approach predicts (45-a) to have the same presupposition and in Rullmann's pragmatic approach a similar inference is derived as well.

(47) a. **[even C_1] [not [I won a bronze$_F$ meda]]**
b. $[\![$ (47-a) $]\!]^{g,c}$(w) is defined only if $\exists$q $\in$ {that I didn't win an x medal | x is bronze, silver, gold}: q$\neq$ that I didn't win a bronze medal $\wedge$ q(w) = 1

The decompositional approach described above makes a wrong or inadequate prediction on both counts. It assigns the sentence (44-a) the same meaning that the sentence (46) has. Furthermore, it does not derive any additive inference for (45-a) since it allows the sentence to have the structure in (48) where ADD is in the scope of negation: the alternatives over which ADD quantifies in (48) are all incompatible with the prejacent and so no additive presupposition is triggered.

(48) **[EVEN C_1] [not [ADD C_0] [I won a bronze$_F$ meda]]**

6.5.3 Derivation: AT LEAST

We assume that there is an appropriate covert existential or disjunctive operator in the sentential complements of the above sentences (Schwarz 2005).[4] More generally, whenever EVEN scopes out of its base position, an existential operator is inserted. We define it as in (49): the operator quantifies over the alternatives determined by the focus structure of its complement and asserts that its propositional argument or a less likely alternative is true.

(49) $[\![$ **AT LEAST** $]\!]^{g,c}(\trianglelefteq_c, C, p, w) = 1$ iff $\exists r \in C\ [\ (\ r \trianglelefteq_c p\ ) \wedge (\ r(w) = 1\ )\ ]$

[4]Schwarz (2005) assigns the meaning in (49) to the scalar particle *auch nur* in German, which corresponds to weak *even*. Schwarz discusses solely the occurrences of *auch nur* in DE environments and our discussion of weak *even* in these environments mirrors his discussion of *auch nur*.

The sentence in (44-a) has the structure in (50-a) where we assume that all three covert operators associate with *bronze*.[5] The structure is assigned the assertive meaning in (50-b). Namely, the prejacent of EXH in (50-a) denotes the proposition that Mary hopes that her daughter won a bronze or a silver or a gold medal. The alternatives over which EXH quantifies include the proposition that Mary hopes that her daughter will win a silver or a gold medal. The output of the exhaustification operator is that the prejacent is true and that the latter alternative, which entails the prejacent, is false (50-b). The meaning that we obtain corresponds to the intuitions about (44-a): namely the sentence conveys that Mary hopes that her daughter will win at least a bronze medal.

(50) a. **[EVEN C_2] [EXH C_1] [Mary hopes [[AT LEAST C_0] her daughter wins a bronze$_F$ medal]]**

b. If defined, $[\![$ (50-a) $]\!]^{g,c}$(w) = 1 iff Mary hopes that her daughter will win a bronze or silver or gold medal and it is not the case that she hopes that her daughter will a silver or gold medal in w iff Mary hopes that her daughter will win a medal and she is okay with her daughter winning a bronze medal in w

The negative sentence in (45-a) has the structure in (51-a) where EVEN scopes above negation and AT LEAST is inserted in the base position of EVEN. The structure has the assertive meaning in (51-b): it is the negation of the proposition that I won at least a bronze medal. This corresponds to the intuitive meaning of the sentence.

(51) a. **[EVEN C_1] [not [[AT LEAST C_0] I won a bronze$_F$ medal]]**

b. If defined, $[\![$ (51-a) $]\!]^{g,c}$(w) = 1 iff I did not win a bronze or a silver or a gold medal in w

6.5.4 Summary

We have proposed a decompositional approach to *even* according to which distinct objects bear the scalar and the additive presupposition. This allowed us to derive the correct predictions about the additive inferences accompanying *even* that associates with an element that forms an entailment scale with its alternatives. However, the analysis failed to derive the correct inferences for modal and DE examples where the associate of *even* and its alternatives do not stand in an entailment relation. This was remedied by assuming that movement of EVEN involves an insertion of AT LEAST at the base-position of EVEN.

6.6 Two puzzles

We conclude the chapter with two open problems for the analysis sketched above as well as for other approaches discussed in this chapter. They relate to the behavior of weak *even* in some environments that are not strictly DE – i.e. in non-monotone environments and in Strawson DE environments.

[5]We leave ADD out of the representations since, as we have seen above, it does not make a noticeable semantic contribution in these examples.

6.6.1 A puzzle about non-monotone quantifiers

We have pointed out in the introduction that (52-a) does not entail (52-b). The scope-theoretic approach to *even* by Karttunen & Peters, however, predicts that the entailment does hold. Namely, they assign (52-a) the structure in (53-a) where *even* scopes above the non-monotone quantifier; *even* is predicted to trigger the presupposition in (53-b).

(52) a. Exactly four people in the whole world have even OPENED that dissertation
b. $\not\Rightarrow$ Exactly four people in the whole world have read that dissertation

(53) a. **[even $\mathbf{C_2}$] [exactly 4 people ...] 1 [$\mathbf{t_1}$ opened$_{\mathbf{F}}$ that dissertation]**
b. $[\![$ (53-a) $]\!]^{g,c}$(w) is defined only if exactly four people in the whole world read that dissertation in w

The approach we advocated above predicts no entailment along the lines of (53) since we disassociate additivity from the scalar component of *even*. The structure that we assign to the sentence in (52-a) is in (54). Since AT LEAST does not effectively change the meaning of its prejacent, the structure only conveys that exactly four people in the whole world opened that dissertation and that this is less likely than a relevant alternative, say, that exactly four people in the whole world read that dissertation.

(54) **[EVEN $\mathbf{C_2}$] [exactly 4 people in the whole world 1 [[ADD $\mathbf{C_1}$] [AT LEAST $\mathbf{C_0}$] $\mathbf{t_1}$ opened$_{\mathbf{F}}$ that dissertation]]**

A switch to an exclusive associate, however, brings out a weakness in our approach: a prediction is made that is too weak. For example, the sentence in (55-a) entails both (55-b) and (55-c). We predict it to entail at most (55-c). Namely, the sentence in (55-a) is assigned the structure in (56). This structure has the assertive meaning that exactly four people in the whole world won a bronze or a silver or a gold medal. We cannot derive the inference in (55-b) in our system.

(55) a. Exactly four people in the whole country have won even a BRONZE medal
b. $\Rightarrow$ Exactly four people in the whole country have won a bronze medal
c. $\Rightarrow$ Exactly four people in the whole country have won a medal

(56) **[EVEN $\mathbf{C_2}$] [exactly 4 people in the whole world] 1 [[AT LEAST $\mathbf{C_0}$] $\mathbf{t_1}$ won a bronze$_{\mathbf{F}}$ medal]**

6.6.2 A puzzle about factive desire predicates

Schwarz (2005:164-5) noticed in his discussion of *auch nur* under *surprise* that an analysis that assumes that the meaning of *auch nur* corresponds to AT LEAST predicts a weaker factive presupposition for sentences where *auch nur* is in the scope of *surprise* than what actually obtains. His considerations naturally extend to our treatment of weak *even* under factive desire predicates. For example, it holds that (57-a) entails (57-b). We predict it to entail at most (57-c) due to the presence of an AT LEAST operator in the sentential complement of the desire predicate in (57-a).

(57) a. John is glad that he won even a BRONZE medal
b. ⇒ John won a bronze medal
c. ⇒ John won at least a bronze medal

This is in stark contrast with the behavior of weak *even* under non-factive desire predicates where, as we have observed above, the pattern in (58) obtains. It is not immediately clear how the apparent absence of an *at-least*-like import at the presuppositional level in (57) and its presence at the assertive level in (58) can be reconciled.

(58) a. John would like to win even a BRONZE medal
b. ⇏ John would like to win a bronze medal
c. ⇒ John would like to win at least a bronze medal

6.6.3 A puzzle about *at least*

There exists a class of examples that seem to suggest that the preceding issue might not be endemic to *even*. In some configurations – e.g. when it is base-generated high in the clause – the focus-sensitive particle *at least* leads to parallel inferences as *even* does in desire statements. This is illustrated in (59) and (60). (59-a) has a free choice reading described in (59-b) – that is, (59-a) does not entail that John hopes to win a bronze medal but that he hopes to win a bronze or some shinier medal. An additional inference is triggered that bronze is the least preferred medal that he wants to win.

(59) a. John hopes to at least win a BRONZE medal
b. ⇒ John hopes to win a medal & John is okay with winning the bronze medal & John is okay with winning the silver medal & John is okay with winning the gold medal

The inference is different if we replace the non-factive desire predicate with the factive *glad*. Namely, (60-a) entails (60-b), which mirrors the pattern that we have observed in (57).

(60) a. John is glad that he at least won a BRONZE medal
b. ⇒ John is glad that he won a bronze medal & John won a bronze medal

Thus, (59) and (60) seem to be another instance of a paradigm where a focus-sensitive operator appears to have a disjunctive or indefinite interpretation at the assertive level with non-factive predicates (it triggers free choice), while with factive predicates a non-disjunctive meaning is projected.

6.7 Conlcusion

We have provided an account for an asymmetry between additive entailments triggered by (i) *even* that associates with a weak element in its immediate scope and moves above appropriate operators at LF and (ii) *even* that associates with a weak element but is generated above those operators. The asymmetry is exemplified in (61)–(62).

(61) a. John is sorry that he even OPENED the book
b. Additive inference: ——

(62) a. John is even sorry that he OPENED the book
b. Additive inference: John is sorry that he read or/and understood the book

We proposed that *even* consists of an additive and a scalar component. The former may be stranded in the lower clause in (61). In the embedded clause it then fails to trigger an additive presupposition since it denotes a universal quantifier that is restricted to alternatives more likely than the prejacent of the additive component (cf. Rullmann 1997).

To deal with the cases where the associate of *even* does not form an entailment scale with its alternatives, we have assumed that there is additional existential operator AT LEAST in the clause in which EVEN is base-generated and from which it moves (cf. Schwarz 2005). We concluded the chapter by presenting two issues for such a treatment. The first issue involved entailments of sentences in which weak *even* occurs under non-monotone quantifiers, while the second issue involved entailments of sentences in which weak *even* occurs under factive desire predicates (due to Schwarz 2005). Finally, we pointed out that the peculiar behavior of *even* across factive and non-factive desire predicates might not be endemic to it but also appears to be found with at least some instances of *at least*.

CHAPTER 7

Conclusion

The three main objectives of the dissertation have been (i) to describe and explain the distribution of weak scalar particles – weak *even*, in particular – in non-downward-entailing environments, (ii) to explain the distribution of NPIs in non-downward-entailing environments, and (iii) to develop a parametric account of typological differences among scalar particles. Finally, we have tried (iv) to gain a better understanding of the additive inferences accompanying scalar particles.

Scalarity

Even that associates with a weak predicate in its immediate surface scope – weak *even* – has a restricted distribution. We have identified two (or three) previously undiscussed classes of environments where it may occur:

- Weak *even* under non-monotone quantifiers
- Weak *even* under desire predicates (non-factive, factive)
- Weak *even* in imperatives

We have shown that these occurrences of weak *even* can be properly understood only if one adopts the scope-theoretic approach to *even* (Karttunen & Peters 1979, Lahiri 1998). Namely, only this type of approach can shed light on the particular conditions that need to obtain in the context for weak *even* to be acceptable in these environments.

Polarity

The restricted distribution of weak *even* mirrors the distribution of NPIs. Linebarger (1987) and Kadmon & Landman (1993) have observed that NPIs may occur in two non-downward-entailing environments: under non-monotone quantifiers and factive desire predicates. We add imperatives and non-factive desire predicates to the list (cf. Giannakidou 2006):

- NPIs under non-monotone quantifiers
- NPIs under desire predicates (non-factive, factive)
- NPIs in imperatives

The strong correlation in the distribution and context-dependence between NPIs and weak *even* in these environments suggests that we are dealing with closely allied phenomena. Indeed, we explain these occurrences of NPIs and their context-dependence by assuming that their licensing is governed by a covert *even* (cf. Krifka 1995, Chierchia 2006).

Typology

Even is a member of a variegated family of scalar particles. We have identified two issues left unexplained in previous work on cross-linguistic distribution of scalar particles:

- Distribution and import of so-called concessive scalar particles
- A parametric account of typology of scalar particles

We propose that scalar particles are morphologically complex (following Guerzoni 2003, Lahiri 2010), they form scales and compete for insertion. We have shown that the typology of scalar particles can be captured by just two morphological parameters. Concessive scalar particles additionally spell out an existential quantifier.

Additivity

We show that weak *even* under non-monotone quantifiers, under desire predicates, in imperatives and under factive predicates provides new evidence for the following observation:

- Scoped *even* does not trigger an additive inference

We propose that this is because *even* decomposes into a scalar and an additive component. The scalar component may move at LF and strand the additive component, which triggers no additive inference if it has a weak prejacent. Some issues were discussed for the approach that originate with examples where the associate of *even* does not form an entailment scale. The solution we adapted from Schwarz (2005) effectively reduced the associates that form a non-entailment scale to ones that form an entailment scale.

APPENDIX A

(Non-)monotonicity of desire

The goal of this appendix is to evaluate some arguments that have been put forward for the non-monotonicity of desire predicates. It is shown that von Fintel's (1999) doubly-relative modal analysis of desire predicates,[1] coupled with some uncontroversial assumptions concerning the evolution of modal discourses, does better in modeling their inferential behavior than negation-related analyses (e.g. Heim 1992).

A.1 Overview of the inference patterns

There are several types of challenges related to inference patterns that an adequate semantics of desire should explain: (i) the presuppositions triggered in the scope of desire predicates like *want* need not be taken to be desirable (Good Samaritan), (ii) many inferential patterns impress one as showing that desire predicates are monotonic (Valid upwardness) and, in the same spirit, (iii) it seems that incompatibility between two propositions makes it impossible to desire both of them if the background is fixed (True conflicts). However, (iv) some desire discourses are suggestive that desire predicates are non-monotonic rather than monotonic (Weakening failure, Free choice). Finally, (v) desires do not seem to be closed under (believed) material implication (Non-closure). Most of these puzzles have their antecedents in deontic and epistemic logic where there is a long tradition in finding counterexamples to the schemata in (1). Accordingly, many of the responses that we will present to the challenges in (i)-(v) will simply be transplants of what has been proposed to deal with the violations of (1). In the following, we describe the puzzles mentioned in (i)-(v) in more detail.

(1) a. If p entails q, then *ought* p entails *ought* q
b. If p entails q, then *believe* p entails *believe* q

[1] The name 'doubly-relative modal analysis' could be applied to Heim's (1992) proposal as well – namely her semantics of desire is parametrized to a doxastic modal base and a preference relation. Nonetheless, to avoid confusion, we will call her treatment 'negation-related' rather than 'modal.'

Ad (i). Good Samaritan. The sentential complement of *want* in (2-a) triggers the presupposition that there has been a murder. The sentence as a whole does not entail (2-b) but rather (2-c). An adequate semantic theory of *want* should provide the resources to account for this pattern. The intuition reflected in (2) is that the (derived) context in which the presupposition in (2-a) needs to be satisfied is John's belief state rather than some other context. Thus, an adequate semantics of *want* should make such a context accessible.

(2) a. John wants to solve the murder
    b. $\not\Rightarrow$ John wants there to be a murder
    c. $\Rightarrow$ John believes there has been a murder

> **(D1) Good Samaritan**
> If the sentential complement of a desire predicate triggers the presupposition p, it does not have to hold that the attitude holder desires that p

Ad (ii). Valid upwardness. In many ways desire predicates exhibit the same inferential behavior as doxastic modals and attitude predicates. For example, there are many instances of intuitively valid weakening inferences, i.e. instances where desire predicates seem to exhibit a proper upward-entailing behavior. Three examples of this sort are given in (3). Moreover, von Fintel (1999:120) points out that the sequences that would violate this schema and that do not involve explicit shifts in background assumptions are infelicitous (4). This is expected on an approach that assigns doxastic and priority modal expressions a similar semantics. For an approach that does not treat them as sufficiently alike this data might be problematic.

(3) a. I want to read five books
    $\therefore$ I want to read one book
    b. I want to meet Mary and Sue
    $\therefore$ I want to meet Mary
    c. I want to buy the couch at 25% discount
    $\therefore$ I want to buy the couch

(4) a. #I don't want to buy the couch but I do want to buy it at a 25% discount
    b. #I want to buy the couch at a 25% discount but I don't want to buy it

> **(D2) Valid upwardness**
> If *want* p is true, q is not disjunctive and p entails q, then *want* q is true

Ad (iii). True conflicts. There are many discourses that appear to contradict the generalization in (D2). The first example suggestive of non-monotonicity of desire predicates that we will look at involves the apparent possibility of having conflicting desires. This clashes with upwardness, which requires that desiring a certain proposition to obtain entails that you desire any proposition that you believe is incompatible with it not to obtain. The two examples in (5) appear to contradict this theorem (cf. Levinson 2003): their felicity suggests that it is possible to have conflicting desires.

(5) a. [John knows he can only marry one of Polly and Sue:]
John wants to marry Polly and he wants to marry Sue
b. [John knows he can only accept one of the two job offers:]
John wants to accept job offer A but he also wants to accept job offer B

Although a semantic theory of desire (and desire discourses) should account for the felicity of (5), doing so can be achieved without allowing for genuinely conflicted cognitive agents (see Levinson 2003 for the same intuition). There are at least two strategies on how to achieve this. According to both of these we would not be dealing with authentic conflicts in (5) but with interpretations of the conjoined sentences with respect to different backgrounds. First strategy: it could be argued that a shift in perspective occurs between the two sentences, which is a well-known phenomenon in the study of modality (6).

(6) [John asks a friend for advice. As always, the friend is evasive:]
Given Kantian principles, you ought not lie in this situation, but given the utilitarian principles, you ought to lie in this situation

Accordingly, the first sentence of (5-a) might be interpreted with respect to a background in which wealth is accentuated (Polly but not Sue is rich), while the second sentence might be interpreted with respect to a background in which beauty is accentuated (Sue but not Polly is beautiful). Second strategy: instead of a shift in perspective, we might be dealing with a shift in what alternatives are taken into consideration when evaluating the two sentences. For example, the first sentence of (5-a) might be interpreted with respect to the Smith women, while the second sentence may be interpreted with respect to the Wilson women. In any case, both lines of thinking about (5) find support in examples like (7).

(7) a. [John knows he can only marry one of Polly and Sue:]
#John wants to marry both women
b. [John knows he can only accept one of two job offers:]
#John wants to accept both job offers

If genuinely conflicting desires may be consistent, we would expect the sentences in (7) to be licit: they may be assigned LFs along the lines of (8-a) where the problematic DP scopes out of the embedded clause and leads to the interpretation in (8-b).

(8) a. **[both job offers] 1 [John wants to accept $\mathbf{t_1}$]**
b. $\forall$x $\in$ {job offer A, job offer B}: John wants to accept x

The markedness of the sentences in (7) suggests that the felicity of the discourses in (5) might not be due to a consistency of genuinely conflicting desires but due to either a shift in perspective or alternatives under consideration. If the shift is blocked as in (8), the contradictory nature of genuinely conflicting desires surfaces. An adequate semantics of desire should be able to cash out a kind of shift discussed above – a shift in perspective or in alternatives under discussion – or something equivalent that would predict the asymmetry between (5) and (7).

(D3) True conflicts
If p is incompatible with q, then *want* p is incompatible with *want* q if the parameters are held fixed

Ad (iv). Weakening failure. Another example of a discourse that at first glance appears to violate upwardness is given in (9) (von Fintel 1999:120). At one point of the discourse it is conveyed that John does not want to buy the couch, while at another point of the discourse it is conveyed that John does want to buy the couch (at 25% discount). All else being equal, the discourse suggests, first, that John not wanting to buy the couch and John wanting to buy the couch at 25% discount are compatible, second, that *want* is non-monotonic and, third, that upwardness in (3) was illusory. However, in the same spirit as with conflicting desires, it is conceivable that (9) does not teach us anything about the monotonicity of desire predicates. Rather, (9-b) and (9-d) could be argued to be evaluated with respect to different beliefs, as argued by von Fintel. That is, there is a shift in the beliefs of the attitude holder between (9-b) and (9-d).

(9) [John is in a furniture store, looking at a couch that has a very scary price-tag. The salesman comes up to him and the following conversation takes place:]
  a. Salesman: Would you like to buy this couch?
  b. John: No
  c. Salesman: Would you like to buy it at a 25% discount?
  d. John: Yes

(D4) Weakening failure
A discourse containing *not want* p and *want* q where q entails p can be felicitous if appropriate information is introduced between the two sentences

Free choice. The final and most prominent type of examples that at first glance push the idea that desire predicates are non-monotonic involves invalid disjunctive weakening. This is illustrated in (10), which is adapted from a famous example in the literature on deontic logic due to Ross (1944) (cf. Aloni 2007).

(10) a. John wants to send this letter
  b. $\therefore$ John wants to send this letter or burn it (*invalid inference*)

Although it does not involve entailment, a parallel effect is arguably exhibited by the falsity (or perhaps infelicity) of (11), which is an adaptation of a famous "simplification of disjunctive antecedent" examples in the literature on counterfactuals (cf. Alonso-Ovalle 2009). It suggests that if an attitude holder desires one disjunct (that there is good weather), this does not mean that he also desires a disjunction where the second disjunct is clearly undesirable and impossible (that there is good weather or that the sun turns cold).

(11) ?John wants there to be good weather or the sun to turn cold

A shift in John's beliefs cannot be made responsible for the pattern in (10) and (11). Namely, if the proposition that John sends his letter is compatible with someone's beliefs, then any proposition entailed by it should also be compatible with her belief, say, that John sends or burns the letter. Tinkering with the perspective would not buy us much either. Nonetheless, it is obvious that some kind of shift occurs in (10): roughly, (10-a) is evaluated without attending to the content of the second disjunct in (10-b), while this is not the case in (10-b). Similarly, (11) feels off because the proposition expressed by the second disjunct – that the sun turns cold – is disconnected from the explicit desires and beliefs that John holds. A desire semantics should be able to provide some insight into this process.

> **(D5) Free choice**
> *Want p or q* entails *okay p* and *okay q*. *Want p* does not entail *want p or q*

Ad (v). Non-closure. The last type of inference patterns that a theory of desire predicates should account for involves non-closure of desire under believed implication. That is, it appears that the argumentation schema in (12) is invalid.

(12) a. α wants p
b. α believes that p iff q / p implies q
c. $\therefore$ α wants q

This has been discussed by Villalta (2008) on the basis of examples like (13): the premises in (13-ab) do not entail the conclusion in (13-c).

(13) a. I want to be rich
b. I believe that I will be rich iff I work hard now
c. $\therefore$ I want to work hard now $\lightning$

This schema resembles to some extent the one we have described in our discussion of conflicting desires. Two possible explanations have been suggested for conflicting desires: that we are dealing with a shift in either the perspective or the alternatives under discussion. Due to the family resemblance between the cases, it would not be far-fetched if one of the shifts were also responsible for the pattern in (13). For example, it could be argued that in evaluating (13-a) one is not sensitive to the alternative that I work hard. Indeed, such intuitions have been pursued in the debate concerning closure properties of other attitude predicates, a debate that goes back to at least Plato's *Meno*. An adequate semantics of desire should not stand in the way of a uniform resolution of the problem of (non-)closure under attitude predicates.

> **(D6) Non-closure**
> Desires are not closed under believed material implication

A.2 Good Samaritan

A.2.1 The statement of the paradox

Heim's (1992) paper on the projection behavior of presuppositions in the scope of attitudes begins by looking at projection of presuppositions in the scope of a belief operator. For example, the presupposition of the definite description *the murder* – that there is a unique murderer – is filtered: (14-a) presupposes (14-b).

(14) a. I believe that I solve the murder
b. $\Rightarrow$ I believe that there was a murder

This is intuitively due to the fact that presuppositions of a proposition have to be satisfied in the context in which the proposition occurs, whereby context is modeled as a set of possible worlds. In the case of embedding under attitude predicates, this context will not be basic but derived: each world w in the basic context is assigned a set of possible worlds compatible with my attitude in w; taken together, these sets form the derived context in which the presupposition must be satisfied (Stalnaker 1999). Thus, the derived context in (14) is the union of my belief states in all the different worlds in the basic context and the presupposition of the complement of *believe* in (14) must be satisfied in it. Equivalently, we can say that the presuppositions of the sentential complement of *believe* must be satisfied in each of my belief states in the context. In the case at hand, this amounts to me believing that a murder occurred. If we switch to desire predicates, the derived context does not involve my desire states but rather my belief states in the context:

(15) a. I want to solve the murder
b. $\not\Rightarrow$ I want there to have been a murder
c. $\Rightarrow$ I believe that there was a murder

This pattern reproduces the so-called Good Samaritan Paradox from deontic logic (Prior 1958). The original formulation of the paradox was, as noted by Portner (2009), with a non-restrictive relative clause, in the scope of *ought* (16). Non-restrictive relative clauses have a projective meaning component similar or maybe identical to that of presuppositions.

(16) a. It ought to be the case that Jones helps Smith who has been robbed
b. $\not\Rightarrow$ It ought to be the case that Smith has been robbed

Another example in the spirit of the Good Samaritan Paradox discussed by Heim involves invalid inferences of the kind given in (17).

(17) a. I want to teach on Tuesdays and Thursdays next semester
b. $\not\Rightarrow$ I want to teach next semester

The parallelism to the preceding examples is clear once we recognize that in examples like (17-a) the modification with *on Tuesdays and Thursdays* can be accompanied by the projective inference that I will be teaching. This is either due to an inherent focus on the modifier (Geurts & van der Sandt 2004) or to some other mechanism (cf. Simons 2001, Schlenker

2008 on quasi-presuppositions). In any case, the facts in (17) fall under the Good Samaritan Paradox: although the sentential complement in (17-a) triggers the projective inference that I teach, it does not hold that I want to teach. Importantly, if it is not taken for granted that I will teach, i.e. the quasi-presupposition of the modification is suspended, the entailment between the sentences in (17) does go through, as we will see in the discussion of parallel examples instancing the puzzles of Valid upwardness and Weakening failure.

A.2.2 Resolution in negation-related analysis (Heim 1992)

In Heim's (1992) system, a meaning of a clause is its context change potential (ccp), where contexts are treated as sets of worlds. A clause may trigger a presupposition, making its ccp a partial function, i.e. a function that is defined only for contexts that satisfy a particular property. Transposing the non-dynamic characterization in (38) from chapter 3 into ccp notation, we get the meaning in (18) (Heim 1992:197).

(18) $[\![$ **want** $]\!]^{g,c}(\succeq, \text{p}, \text{i}) = \lambda\text{c}\text{: c} \subseteq \{\text{w} \mid [\text{Dox(i,w)} + \text{p} \notin \{\emptyset, \text{Dox(i,w)}\}\}. \{\text{w} \in \text{c} \mid \text{for every w'} \in \text{Dox(i,w)}\text{: } \textsc{sim}(\text{w', Dox(i, w)} + \text{p}) \succ_{\text{i,w}} \textsc{sim}(\text{w', Dox(i,w)} + \neg\text{p}))\}$

The immediate context in which the presupposition of p has to be satisfied is the belief state of the agent, Dox(i,w). The basic context, c, must accordingly satisfy the condition that every world in it is such that the belief state of the agent is such that the presupposition of p is satisfied in it. This is illustrated on the prototypical example of the Good Samaritan in the following. The sentence in (19-a) entails that I believe that there was a murder (19-d).

(19) a. **[I want [PRO to solve the murder]]**
b. If defined, $[\![$ (19-a) $]\!]$(c) = $\{\text{w} \in \text{c: for every w'} \in \text{Dox(I,w)}$:
$\textsc{sim}(\text{w', Dox(I,w)} + [\![$ **I solve the murder** $]\!]) \succ_{\text{I,w}}$
$\textsc{sim}(\text{w', Dox(I,w)} + \neg[\![$ **I solve the murder** $]\!]))\}$
c. Dox(I,w) + $[\![$ **I solve the murder** $]\!]$ is defined only if Dox(I,w) $\subseteq$ {w | there is a unique murder in w}
d. c + $[\![$ **I want [PRO to solve the murder]** $]\!]$ is defined only if c $\subseteq$ {w | Dox(I,w) $\subseteq$ {w' | there is a unique murder in w'}}

Since in any context in which (19-a) is true it holds that there has been a murder (19-d), the consequent proposition in (20) will be undefined. Namely, the independence presupposition of *want* requires it to be open whether there has been a murder or not.

(20) $[\![$ **I want there to have been a murder** $]\!]$(c) is defined only if
c $\subseteq$ {w | [Dox(I,w) + $[\![$ **There was a murder** $]\!]$ $\notin$ {$\emptyset$, Dox(i,w)}}

This explains the invalidity of the inferential pattern in (21): if the premise is defined (and true), the conclusion will necessarily be undefined.

(21) a. I want to solve the murder
b. $\not\Rightarrow$ I want there to have been a murder

The same reasoning applies to the example with adverbial modification (22). Namely, it follows from the innocuous assumption that adverbial modification exhibits presupposition-like behavior (Simons 2001, Schlenker 2008) that (22-a) is only defined for contexts in which I teach, as is shown in (22-d).

(22) a. **[I want [PRO to teach on Tuesdays and Thursdays]]**
b. If defined, $[\![$ (22-a) $]\!]$(c) = {w ∈ c: for every w' ∈ Dox(I,w):
$\textsc{sim}$(w', Dox(I,w) + $[\![$ **I teach on Tuesdays and Thursdays** $]\!]$) $\succ_{I,w}$
$\textsc{sim}$(w', Dox(I,w) + ¬$[\![$ **I teach on Tuesdays and Thursdays** $]\!]$))}
c. Dox(I,w) + $[\![$ **I teach on Tuesdays and Thursdays** $]\!]$ is defined only if Dox(I,w) ⊆ {w | I teach in w}
d. c + $[\![$ **I want [PRO to teach on Tuesdays and Thursdays]** $]\!]$ is defined only if c ⊆ {w | Dox(I,w) ⊆ {w | I teach in w}}

In a context in which (22-a) is defined, the proposition that I want to teach is undefined since it presupposes that it is not the case that I believe that I will teach (23). Accordingly, the inference in (24) is correctly predicted not to go through.

(23) $[\![$ **I want to teach** $]\!]$(c) is defined only if c ⊆ {w | [Dox(I,w) + $[\![$ **I teach** $]\!]$ $\notin$ {∅, Dox(i,w)}}

(24) a. I want to teach on Tuesdays and Thursdays
b. $\nRightarrow$ I want to teach

To summarize: Presuppositions of sentential complements of desire predicates must be satisfied in the belief states of the attitude holder in Heim's system. Since desire predicates trigger an independence presupposition – the beliefs of the attitude holder must be independent of the propositional argument of the desire predicate – the Good Samaritan Paradox does not arise: if you desire something that presupposes that p, you in fact cannot desire that p (with respect to the same modal parameters).

A.2.3 Resolution in doubly-relative modal analysis (von Fintel 1999)

Desire predicates are relativized to two conversational backgrounds (von Fintel 1999). As in the standard modal semantics (Kratzer 1991), the first conversational background – the modal base – delivers a set of doxastically accessible worlds of the attitude holder, while the second conversational background – the ordering source – provides the propositions that are used in ordering this set. The ordering of worlds proceeds in the following manner: the ordering source g assigns the agent i and the evaluation world w a set of propositions g(i,w). These propositions are used to define a partial ordering among worlds along the lines of (25); a strict partial order is derived in the standard way.

(25) a. w' $\leq_{g(i,w)}$ w" $\equiv_{df}$ for all p ∈ g(i,w): if w" ∈ p, then w' ∈ p
b. w' $<_{g(i,w)}$ w" $\equiv_{df}$ w' $\leq_{g(i,w)}$ w" and ¬(w" $\leq_{g(i,w)}$ w')

In the case of desire predicates, the set delivered by the ordering source corresponds to the set of desires that the agent has at the evaluation world (26-a). For perspicuity, we assume that among doxastically accessible worlds one can always find a set of worlds that are not worse (with respect to the given ordering source) than other doxastically accessible worlds (limit assumption). These worlds constitute the set of best worlds according to the desires of the agent, which we will call desire-best worlds (26-b). The desire statement α *want p* then states that all the desire-best worlds for α, which are determined by the doxastic modal base f and the bouletic ordering source g, are such that p is true in them (26-c).

(26)
a. $g(i,w) = \{p \mid p \text{ is a desire of i in w}\}$
b. $\textsc{best}(<,X,Y) = \{w \mid w \in X \text{ and there is no } w' \in X \text{ such that } w' <_Y w\}$
c. If defined, $[\![\textbf{ want }]\!]^{g,c}(f, g, p, i, w) = \forall w' \in \textsc{best}(\cap f(i,w), g(i,w)) \, [\, p(w') = 1 \,]$

Similar to the negation-related analysis, the modal analysis of *want* in (26-c) contains a belief component and an ordering component. The derived context in which the presupposition of the sentential complement of the desire predicate must obtain can thus be set to the belief context of the speaker. This can be done in different ways. Perhaps the most intuitive way of achieving this is via the independence presupposition of *want* (27). Namely, the independence presupposition of *want* is satisfied – and defined – only if the propositional argument of *want* is independent of the belief context of the attitude holder – and thus defined in the belief context of the attitude holder (27).

(27) $[\![\textbf{ want }]\!]^{g,c}(f, g, p, i, c)$ is defined only if $c \subseteq \{w \mid \cap f(i,w)+p \text{ defined and } \notin \{\cap f(i,w), \emptyset\}\}$. If defined, $[\![\textbf{ want }]\!]^{g,c}(f, g, p, i, c) = \{w \in c \mid \textsc{best}(\cap f(i,w), g(i,w)) \subseteq p\}$

Since this will have as a consequence that all the best worlds will be such that the presuppositions of the desired proposition will be true in them, the explanation of the inferential patterns in (28) proceeds in the same fashion as in Heim's proposal, as emphasized by von Fintel (1999:117): *want* presupposes that the proposition denoted by its sentential complement is independent from the belief state of the attitude holder – i.e. it is neither entailed nor incompatible with the attitude holder's belief state. As a result, the propositions denoted by the sentences on the right in (28) are undefined in the contexts in which the propositions denoted by the sentences on the left are defined.

(28)
a. I want to solve the murder $\not\Rightarrow$ I want there to be a murder
b. I want to teach on Tuesdays and Thursdays $\not\Rightarrow$ I want to teach

A.3 Conflicting desires

The prototypical example of conflicting desires is the following (Levinson 2003):

(29) [John knows he can and will only visit one European city this summer:]
John would like to visit Paris and John would like to visit Rome

Both analyses entertained above predict the discourse in (29) to be infelicitous if the modal parameters are fixed and going to Paris and going to Rome are the only alternatives possible. Namely, on von Fintel's analysis both sentences in (29) involve quantification over the same set of worlds. Since none of John's belief worlds (and accordingly none of his desire-best worlds) is such that both propositions hold of it, the discourse is inconsistent. On Heim's analysis, if the attitude holder takes it to be possible to go to Rome and to be possible to go Paris, the sentence has a contradictory meaning – it cannot be that all the closest worlds worlds in which John goes to Paris are better than the closest worlds in which John goes to Rome and *vice versa*. However, this changes if we add a third alternative into the mix – that John goes to Geneva. It still holds that von Fintel's analysis predicts a contradiction; the negation-related analysis, however, does not anymore. Let us explicate this. First: assume that all the closest worlds to John visiting Paris worlds in which he doesn't visit Paris are John visiting Geneva worlds and that all the closest worlds to John visiting Rome worlds in which he doesn't visit Rome are John visiting Geneva worlds as well. An inference of the discourse is then that John visiting Paris and John visiting Rome worlds are better than John visiting Geneva worlds. Second: without loss of generality, assume that the closest world to any John visiting Rome world in which John visits Paris is a specific John visiting Paris world. The first sentence predicates of this world that it is better than the respective John visiting Rome worlds. In the same vein, assume that the closest world to any John visiting Paris world in which John visits Rome is a specific John visiting Rome world. The second sentence predicates of this world that it is better than the respective John visiting Paris worlds. All these inferences are mutually consistent. They are all true in a 'grass is greener on the other side' type of scenario described in (30).

(30) If John is in Rome, he would prefer to be in Paris (though he prefers Rome to Geneva). If John is in Paris, he would prefer to be in Rome (though he prefers Paris to Geneva)

Thus, the negation related analysis predicts that it is possible to have conflicting desires in appropriate contexts (under an appropriate similarity relation). So, at first sight, it seems that the negation related analysis has an upper-hand.

Since von Fintel's approach predicts the sequence in (29) to be illicit, something extra needs to be said to capture its felicity. And a natural explanation is at hand: the discourse is felicitous because the sentences are consistent. And the sentences are consistent because we interpret them with respect to different conversational backgrounds, in particular with respect to different ordering sources. The first sentence is interpreted with respect to a background in which the visit of Paris is privileged (and the visit of Rome is disprivileged), while the second sentence is interpreted with respect to a background in which the visit of Rome is privileged (and the visit of Paris is disprivileged). Two baby backgrounds, which differ only in whether they contain the proposition that John practices French or that John practices Italian, are schematized in (31); the two sentences in (30) can be true with respect to their backgrounds.

(31) a. **[John [wants f_1 g_2] PRO to visit Paris] and [John [wants f_1 g_3] PRO to visit Rome]**
b. g_2(J, w*) = {that John visits a European city, that John practices French, ...}
c. g_3(J, w*) = {that John visits a European city, that John practices Italian, ...}

A prediction of the modal account is that if the backgrounds cannot vary, the appearance of consistency of conflicting desires should disappear. This is borne out in (32).

(32) [John knows he can and will only visit one European city this summer. The candidates under discussion are Paris and Rome:]
#John wants to visit both cities this summer

The sentence in (32) may in principle have the structure in (33). The quantifier phrase *both cities* takes matrix scope but the ordering source remains fixed. As predicted, the sentence has a distinct flavor of contradictoriness in the given scenario. The modal analysis thereby regains the upper-hand: the negation-related analysis predicts that the structure in (33) may have a consistent interpretation (see the Geneva scenario above).

(33) **[both cities] 9 [John [wants $\mathbf{f_2}$ $\mathbf{g_4}$] [PRO to visit $\mathbf{t_9}$ this summer]**

A.4 Valid upwardness

Another strength of the modal analysis is that it can straightforwardly explain valid upward inferences. The validity of inferences in (34) follows in the modal semantics from the fact that if a set of desire-best worlds is a subset of a given set, it is also a subset of any superset of that set.

(3) a. I want to read five books
∴ I want to read one book
b. I want to meet Mary and Sue
∴ I want to meet Mary

On the other hand, the negation-related analysis does not predict these facts. The easiest way to show this is to illustrate it on a concrete example. Imagine that the situation in (34) obtains. It is an empirical fact that both sentences in (35) are evaluated as true in this situation. That is, even such an elaborate contextual setup as (34) does not mitigate against the intuition that desire predicates license upward-monotone inferences.

(34) John is playing a game of dice. He bets his entire fortune that the sum of the two dice that are thrown will be either less than four, in which case he gets his fortune back, or more than eight, in which case he doubles his fortune. In case the sum of the dices is between four and eight he loses everything

(35) a. John wants the dice to sum up to more than eight
b. John wants the dice to sum up to more than three

The contextual setup may be re-described in the following way: John prefers for the sum to be more than eight to it being less than four; he prefers the sum to be less than four to it being between four and eight. The negation-related analysis predicts (35-a) to be true in the given context – namely, the worlds in which dice sum up to more than eight are better than all the other worlds – and (35-b) to be false in the given context – namely, the worlds in which the dice sum up to exactly two are better than worlds in which the dice sum up to exactly four.

(36) a. $\forall$w' $\in$ Dox(J,w): $\textsc{sim}$(w', Dox(J,w)$\cap$$[\![$ **the dice sums up to more than eight** $]\!]^{g,c}$)
$\succ_{\mathrm{J,w}}$ $\textsc{sim}$(w', Dox(J,w)$\setminus$$[\![$ **the dice sums up to more than eight** $]\!]^{g,c}$)

b. $\forall$w' $\in$ Dox(J,w): $\textsc{sim}$(w', Dox(J,w)$\cap$$[\![$ **the dice sums up to more than three** $]\!]^{g,c}$)
$\succ_{\mathrm{J,w}}$ $\textsc{sim}$(w', Dox(J,w)$\setminus$$[\![$ **the dice sums up to more than three** $]\!]^{g,c}$)

A.5 Weakening failure

The next few puzzles are transferred from the literature on sequences of counterfactuals and deontic logic. Following von Fintel (1999), we show that instead of being arguments for non-monotonicity, they instance parameter-shifting, comparable to what we have encountered in our discussion of True conflicts.

A.5.1 Procrastinate

We begin by reproducing a well-known puzzle from the literature on deontic logic – the so-called Procrastinate puzzle. The puzzle has been prominently discussed by Jackson (1985) and Jackson & Pargetter (1986) and concerns the intuitive failure to treat *ought p and q* as equivalent to *ought p and ought q*, as the axioms of standard deontic logic demand (37) (cf. Williams 1965).

(37) ought p & ought q $\leftrightarrow$ ought (p & q)

Jackson (1985:195) and Jackson & Pargetter (1986:235) illustrate this failure on the backdrop of the context in (38). They report that in such a situation (39) holds: it is false that Prof Procrastinate ought to accept the invitation (39-a) but it is true that Prof Procrastinate ought accept the invitation and write the review (38-b).

(38) Professor Procrastinate receives an invitation to review a book. He is the best person to do the review, has the time, and so on. The best thing that can happen is that he says yes, and then writes the review when the book arrives. However, suppose it is further the case that were Procrastinate to say yes, he would not in fact get around to writing the review. Not because of incapacity or outside interference or anything like that, but because he would keep on putting the task off. (This has been known to happen.) Thus, although the best that can happen is for Procrastinate to say yes and then write, and he can do exactly this, what would in fact happen were he to say yes is that he would not write the review. Moreover, we may suppose, this latter is the worst that can happen. It would lead to the book not being reviewed at all, or at least to a review being seriously delayed

(39) a. Prof Procrastinate ought not to accept the invitation

b. Prof Procrastinate ought to accept the invitation and write the review

We can transpose the Procrastinate puzzle to bouletic modals (cf. Lassiter 2011). Assume that I am informed about Prof Procrastinate's habits as they are described in (38) and I am asked about what I would like Prof Procrastinate to do: I can truthfully reply that I do not want Prof Procrastinate to accept the invitation (because I suspect that no review would be forthcoming) but, after some insistent further prodding, I can also truthfully claim that I want him to accept and write the review (40).

(40) a. I don't want Prof Procrastinate to accept the invitation
b. I want Prof Procrastinate to accept the invitation and write the review

All else being equal, this is unexpected on the modal analysis that we have introduced above. If (40-a) is true, it holds that all of my desire-best possibilities are such that Prof Procrastinate does not accept the invitation to review in them (due to neg-raising). This conflicts with the assertion of the (40-b) that all of my desire-best possibilities are such that Prof Procrastinate accepts the invitation (and reviews). We are at a modal impasse. However, we have been at similar impasses before, as we will argue below.

A.5.2 Order in the sequence

Related facts that seem to contradict the predictions of the modal analysis but not the predictions of the negation-related analysis are discussed by von Fintel (1999). The starting point of his discussion is an example by Asher (1987), which was picked up by Heim (1992) and which purports to show that Nicholas not wanting a ride on the Concorde does not preclude that he wants a free ride on the Concorde. Heim (1992:194) describes the situation in the following way:

> Imagine that Nicholas is not willing to pay the $3,000 that he believes it would cost him if he flew to Paris on the Concorde, but he would love to fly on the Concorde if he could get the trip for free. Under these circumstances [(41-a)] is true, yet [(41-b)] is false, despite the fact that taking a free trip on the Concorde, of course, implies taking a trip on the Concorde.

(41) a. Nicholas wants a free trip on the Concorde
b. Nicholas wants a trip on the Concorde

If the described judgments are correct, this is a problem for the modal analysis in the same way that the Procrastinate example is a problem: (41-a) asserts that all of Nicholas's desire-best possibilities are possibilities in which Nicholas has a free trip on the Concorde. If (41-b) is false, this means that some of Nicholas's desire-best possibilities are such that it does not hold of them that Nicholas has a (free or any other kind of) trip on the Concorde. The modal analysis predicts that (41-a) cannot be true if (41-b) is false, contrary to the reported judgments.

In the discussion of (41) and its ilk, von Fintel notes that the order of the two sentences in the discourse and the information introduced in between plays a crucial role in getting at the reported intuitions. For example, the judgments for (41) are indeed uncontroversial once we put them into a more explicit discourse (42) (modeled after von Fintel 1999:120). If such a discourse is absent, i.e. if the sentences in (41) are produced (and evaluated) in "one breath," it does not seem to be reasonable to affirm (41-a) but to contradict (41-b). This is evidenced by the infelicitous discourses in (43), which mirrors (4).

(42) [A ticket salesman is talking to Nicholas:]

a. Salesman: Do you want a trip on the Concorde?
b. Nicholas: No, I don't want a trip on the Concorde
c. Salesman: What about a free trip on the Concore?
d. Nicholas: Yes, I do want a free trip on the Concorde

(43) a. #Nicholas wants a free trip on the Concorde but he doesn't want a trip on the Concorde
b. #Nicholas doesn't want a trip on the Concorde but he wants a free trip on the Concorde

Since, all else being equal, the order of the sequence should not matter for the (in)consistency of the two modal statements, something special must be going on in (42)-(43) – all else <u>cannot</u> be equal. Accordingly, von Fintel argues that what might have initially seemed to be an argument for a non-monotonic analysis of desire predicates can on the basis of the contrast between (42) and (43) be used against it. This argument goes through to the extent that he shows that the modal but not the negation-related analysis has a handle on the asymmetry in (42)-(43).

So, how does von Fintel explain the felicity of (42) while sticking to a modal treatment of *want*? The underlying intuition of his approach is that the doxastic alternatives in (42-b) and (42-d) are not the same. More precisely, in uttering (42-b) Nicholas is in a belief state according to which flying with the Concorde entails paying for the flight, which is natural considering how airlines tend to operate. And paying for the flight with the Concorde is something that is *ex hypothesi* undesirable for Nicholas. However, as it is common in discourse, Nicholas's doxastic alternatives change upon hearing (42-c). After this indication of a pleasant turn of events, he utters (42-d) with the background belief that he may get a free flight. Since a free flight with the Concorde is a highly desirable event for John, he is being truthful in uttering (42-d). Furthermore, he does not contradict his previous statement in (42-b) – the two sentences involve quantification over distinct desire-best possibilities. To conclude, the crucial difference between (42) and (43) is that in the former but not in the latter case the two sentences are evaluated with respect to distinct modal bases, e.g. in (42) but not (43) new information is introduced that changes Nicholas's state of mind. As a consequence, the latter discourse is felicitous while the former is not.

Returning to our starting point, Jackson's Procrastinate puzzle, the same reasoning can be applied. In the description of the scenario, it is highlighted that Procrastinate would <u>not</u>, all else being equal, accept the invitation and write a review, "were Procrastinate to say yes [accept to review], he would not in fact get around to writing the review." This fits the profile of von Fintel's (42). Accordingly, the discourse in (44) is licit: (44-b) is uttered to the backdrop of a belief state in which accepting (= not writing) is evaluated negatively. A new possibility is introduced by the question in (44-c) that has not been considered before (that accepting does not preclude writing) and that required us to revise my belief state. In this new state, (44-d) can be evaluated as true.

(44) a. Co-editor: As a co-editor, do you want Prof Procrastinate to accept the invitation?
b. Me: No, I don't want him to accept the invitation
c. Co-editor: Do you want him to accept the invitation and write the review?
d. Me: Yes I want him to accept the invitation and write

Parallel to (43), if the intermediate step of introducing a new possibility is eliminated the sequence becomes illicit. As before, this is either because accept-and-write worlds are not among doxastic alternatives or, if they are, because the two sentences express contradictory propositions.

(45) a. #Prof Procrastinate ought not to accept the invitation but he ought to accept the invitation and write the review
b. #Prof Procrastinate ought to accept the invitation and write the review but he ought not to accept the invitation

We have seen above that the negation-related theory does not predict any entailment relations to obtain between the sentences in (44) and the conjuncts in (45) due to their non-monotonic character. This holds also for (42) and (43). Accordingly, the described contrasts are unexpected on this approach: all the sequences should be licit.[2]

A.6 Non-closure

This subsection looks at a puzzling pattern that suggests that desire is not closed under believed implication. We propose that the puzzle can be resolved in a way that parallels the resolution of similar puzzles in the domain of epistemic modality – an agent may have access to different conversational backgrounds and these can shift between sentences.

A.6.1 Statement of the puzzle

Villalta (2008) introduces the so-called puzzle of practical inferences, which can be categorized as a cousin of other closure puzzles in the literature on modality. In accordance, we call it the puzzle of non-closure (under believed material implication or equivalence). An instance of the puzzle is given in (46) (cf. Villalta 2008:478). The argument in (46) is intuitively invalid and shows that I may have desires that are insensitive to some aspects of what I believe might be required to realize those desires. For example, in (46-b) we see that to be rich, it is – according to my beliefs – necessary to work hard now; but I don't want to work hard now (or ever) (46-c). On the other hand, she points out that I should work hard now is entailed (46-d) (notice the teleological flavor of the modal). She takes this asymmetry to be indicative that *want* does not have a modal semantics along the lines advocated by von Fintel (1999), though *should* might have one.

[2] It can be shown that the neg-raising property of *want* does not suffice to derive an inconsistency of the sequences in (43) and (45).

(46) a. I want to be rich
b. I believe that I will be rich iff I work hard now
c. ∴ I want to work hard now (*invalid consequence*)
d. ∴ I should work hard now (*valid consequence*)

A similar argument can be provided that shows that I may have desires that are insensitive to some aspects of what I believe might result from realizing those desires (47).

(47) a. I want to be rich
b. I believe that if I am rich, I won't have much free time
c. ∴ I don't want to have much free time (*invalid consequence*)

The two patterns are schematically represented in (12), repeated below. In the following we first show how the two approaches discussed in the preceding appear to incorrectly predict the argument to be valid.[3]

(12) a. α wants p
b. α believes that p iff q / p implies q
c. ∴ α wants q

A.6.2 Apparent predictions of the two accounts

The modal analysis of desire predicts the argument in (47) to be valid: the two premises entail the conclusion. The reason for this is that all my belief worlds where I am rich are worlds in which I work hard now. Accordingly, since all my desire-best belief worlds are worlds where I am rich (premise 1), all my desire-best belief worlds are worlds where I work hard now. This entails that I want to work hard now. This reasoning, which is laid out more explicitly in (48), gives us a result that contradicts our intuitions.

(48) a. Premise 1: $\textsc{best}(\cap f(I,w^*), g(I,w^*)) \subseteq [\![\textbf{I am rich}]\!]^{g,c}$
$\Leftrightarrow \textsc{best}(\cap f(I,w^*), g(I,w^*)) \subseteq \cap f(I,w^*) \cap [\![\textbf{I am rich}]\!]^{g,c}$
b. Premise 2: $\cap f(I,w^*) \cap [\![\textbf{I am rich}]\!]^{g,c} = \cap f(I,w^*) \cap [\![\textbf{I work hard now}]\!]^{g,c}$
c. Conclusion: $\textsc{best}(\cap f(I,w^*), g(I,w^*)) \subseteq [\![\textbf{I work hard now}]\!]^{g,c}$

The negation-related analysis of desire predicates is in no better position. The root of the problem for that account is that the similarity selection function applies to the same set when it applies to the subset of my belief state where I am (not) rich and when it applies

[3] The same type of puzzle has been observed to obtain also with intentions – agents need not intend all the expected side-effects of their intentions (Cohen & Levesque 1990:218):

> For example, imagine a situation not too long ago in which an agent has a toothache. Although dreading the process, the agent decides that he needs desperately to get his tooth filled. Being uninformed about anesthetics, the agent believes that the process of having his tooth filled will necessarily cause him much pain. Although the agent intends to ask the dentist to fill his tooth, and, believing what he does, he is willing to put up with pain, the agent could surely deny that he thereby intends to be in pain.

to the subset of my belief state where I (do not) work hard now. There is then no way to distinguish between the preferences among these sets. Less concisely, assume that the belief worlds where I am rich are just the belief worlds where I work hard now and that the belief worlds where I am not rich are just the worlds where I do not work hard now (49-b). It then trivially holds that the closest worlds where I am rich to an anchor belief world are just the same as the closest worlds where I work hard now to that anchor world. And the same holds for the closest worlds where I am not rich (49-b'). Thus, if the closest worlds where I am rich are preferred to the closest worlds where I am not, then the closest worlds where I work hard are preferred to the closest worlds where I do not (49-c). Unfortunately, this is just the conclusion in (46).

(49) a. Premise 1: $[\![\ \textbf{want}\ ]\!]^{g,c}(\text{f}, \succeq, \text{I}, [\![\ \textbf{I am rich}\ ]\!]^{g,c}, \text{w}) = 1$ iff
$$\forall \text{w'} \in \cap\text{f(I,w)}: \textsc{sim}(\text{w'}, \cap\text{f(I,w)}\cap[\![\ \textbf{I am rich}\ ]\!]^{g,c}) \succ_{\text{I,w}} \textsc{sim}(\text{w'}, \cap\text{f(I,w)}\setminus[\![\ \textbf{I am rich}\ ]\!]^{g,c})$$

b. Premise 2: $\cap\text{f(I,w)} \cap [\![\ \textbf{I am rich}\ ]\!]^{g,c} = \cap\text{f(I,w)} \cap [\![\ \textbf{I work hard now}\ ]\!]^{g,c}$

b' $\Rightarrow \forall \text{w'} \in \cap\text{f(I,w)}: \textsc{sim}(\text{w'}, \cap\text{f(I,w)}\cap[\![\ \textbf{I am rich}\ ]\!]^{g,c}) = \textsc{sim}(\text{w'}, \cap\text{f(I,w)}\cap[\![\ \textbf{I work hard now}\ ]\!]^{g,c}) \wedge \textsc{sim}(\text{w'}, \cap\text{f(I,w)}\setminus[\![\ \textbf{I am rich}\ ]\!]^{g,c}) = \textsc{sim}(\text{w'}, \cap\text{f(I,w)}\setminus[\![\ \textbf{I work hard now}\ ]\!]^{g,c})$

c. Conclusion: $[\![\ \textbf{want}\ ]\!]^{g,c}(\text{I},[\![\ \textbf{I work hard now}\ ]\!]^{g,c},\text{w}) = 1$ iff
$$\forall \text{w'} \in \cap\text{f(I,w)}: \textsc{sim}(\text{w'}, \cap\text{f(I,w)}\cap[\![\ \textbf{I work hard now}\ ]\!]^{g,c}) \succ_{\text{I,w}} \textsc{sim}(\text{w'}, \cap\text{f(I,w)}\setminus[\![\ \textbf{I work hard now}\ ]\!]^{g,c})$$

A.6.3 Non-closure of belief

The non-closure of desire bears some resemblance to the puzzles concerning (non-)closure of belief and knowledge. It has often been argued that certain logical properties of the standard modal accounts of attitude ascriptions do not do justice to modeling the behavior of actual cognitive agents. The most common example discussed in this respect is the failure of modal logic to account for the sensibility of deductive inquiry – e.g. the standard modal logic predicts that I should know all mathematical truths and that Socrates's students were wasting their time in dialoguing with Socrates. The theorem of modal logic that is relevant for us and that is often taken as the starting point of investigating (non-)closure in the logic of belief and knowledge is provided in (50). It does not appear to be aligned with the actual behavior of cognitive agents (cf. Chapter 3 in Yalcin 2008, Yalcin 2011 and many others).

(50) Closure of belief under believed material implication (version 1 of 2)
If α believes that p and α believes that if p then q, then α believes that q

The often voiced intuition of what lies behind the failure of the closure principle in (50) is that our belief systems are compartmentalized (Stalnaker 1984). Accordingly, what goes awry in (50) is that a belief system in which p holds need not be attuned to whether q holds. Yalcin (2008:104) provides the following paragraph of Braddon-Mitchell and Jackson as one illustration of this line of thinking: if two propositions hold in different belief systems, nothing may be concluded about whether they both hold in a single belief system; if they both hold in the same belief system, agglomeration goes through (51).

> Jones may believe that Mary lives in New York, that Fred lives in Boston, and that Boston is north of New York, but fail to put all this together and form the belief that Mary will have to travel north to visit Fred. ... [However] Jones may, consistently with the theory, have a system of belief according to which P and a different system of belief according to which Q, and so fail to believe that P&Q by virtue of not having a system of belief according to which P&Q. Indeed, it makes good sense that subjects should have different systems of belief, just as travelers often have a number of maps that they use on their travels. (Braddon-Mitchell & Jackson 1996:199)

(51) Belief systems and agglomeration principle
If α believes that p wrt a belief system π and α believes that q wrt a belief system π, then α believes that p&q wrt a belief system π

Thus, cognitive agents may be treated as having different belief systems – i.e. sets of propositions that they actively believe – which are isolated from each other. And beliefs are closed only with respect to their individual compartments. This allows us to formulate a more plausible condition concerning closure under believed material implication:

(52) Closure of belief under believed material implication (version 2 of 2)
If α believes that p wrt a belief system π and α believes that if p then q wrt the belief system π, then α believes that q wrt the belief system π

Having different belief systems may be modeled by there being different modal bases that are accessible to the cognitive agent. And if ordering sources are involved in epistemic modality as well, the cognitive agent may also have access to a variety of these.

A.6.4 Resolution of the puzzle

We suggest that the pattern in (46) only apparently violates the principle of closure under believed implication. What is going on is rather a shift in the conversational background between the premises and the conclusion. That is, we are dealing with the pattern in (53). The fact that the conclusion in (53-c) does not hold if the premises (53-ab) hold is not in violation of the closure principle in (54). The same step is available for Heim's negation-related analysis: there is a shift in the preference relation between (53-a) and (53-c). If the respective parameters are held fixed, the entailment does go through.

(53) a. I want to be rich (wrt desire background ψ)
b. I believe that I will be rich iff I work hard now
c. $\therefore$ I want to work hard now (wrt desire background ψ')

(54) <u>Closure of desire under believed material implication</u>

If α desires that p wrt a belief system π and desire background ψ and α believes that if p then q wrt the belief system π, then α desires that q wrt the belief system π and desire background ψ

Villalta pointed out that the argument in (46) goes through more readily with *should*. And indeed our consultants more easily accept the inference pattern with *should*. The reason for this is the following: Given the premises in (46), the conclusion that I should work hard now is indeed true – but it is true given the goal that I become rich, which is made salient by the first premise. That is, the ordering source in (55-d) contains a goal proposition introduced in the premises.

(46) a. I want to be rich
b. I believe that I will be rich iff I work hard now
c. $\therefore$ I want to work hard now (*invalid consequence*)
d. $\therefore$ I should work hard now (*valid consequence*)

A.7 Free choice

This subsection tackles the puzzle of the failure of disjunctive weakening under desire predicates. The data in this section does not adjudicate between the two approaches to desire semantics: neither the negation-related analysis nor the doubly-relative modal analysis predicts the respective data without further ado.

A.7.1 Two puzzles related to free choice

Our characterization of the free choice desideratum in the introductory section consisted of two parts. The first part relates to the validity of the argument schema in (10), repeated below. It reproduces an old puzzle from deontic logic due to Alf Ross (Ross 1944; cf. Aloni 2007). The second part relates to sentences like the one in (11) that are judged false in the actual context, which needs to be derived by an adequate semantics of desire.

(10) a. John wants to send this letter
b. $\therefore$ John wants to send this letter or burn it (*invalid inference*)

(11) ?John wants there to be good weather or the sun to turn cold (*false*)

Ross's paradox and the doubly-relative modal analysis

An unmodified standard modal analysis of desire leaves the invalidity of the inferential pattern in (10) unexplained. John wants the proposition p to obtain iff p is true in his desire-best worlds. If a proposition p is true in a world, then any disjunctive weakening of the proposition p $\vee$ q is true in the world. Thus, John wants the proposition p $\vee$ q to obtain. This is invalid, as (54) suggests.

Ross's paradox and the negation-related analysis

Heim's theory is in a better position than the modal analysis in situations where it holds that both John sending the letter and John burning the letter are live options, i.e. compatible with the beliefs of John. Namely, assume that the worlds in which John does not burn and does not send the letter are better than the worlds in which John burns the letter, which seems reasonable enough. We know that due to our live option assumption, there exists a doxastic alternative w of John's in which he burns the letter. The closest send-or-burn worlds to w will then include the burn world w itself. Since it holds *ex hypothesi* that the burn world w is worse than any of the closest non-burn/non-send worlds to w, the conclusion of the argument is false – i.e. I do not want to send or burn this letter –, while the premise is true – i.e. I want to send this letter.[4] More generally, the following description is true of the negation-related analysis:

(55) If p and q are compatible with α's beliefs and if α wants p or q, then α prefers the closest p worlds to the closest not-p-and-not-q worlds to her doxastic alternatives, and α prefers the closest q worlds to the closest not-p-and-not-q worlds to her doxastic alternatives. That is, it is not the case that α wants not p and it is not the case that α wants not q

The crucial ingredient in the derivation of the invalidity in (10) in Heim's system is the existence of contexts in which both disjuncts are live options for the attitude holder. In contexts where this does not obtain, (10) does go through as a contextual entailment, i.e. the premise together with appropriate contextual assumptions implies the conclusion.

Simplification of disjunction

The above discussion of the negation-related theory leads us to expect (11) to be felicitous and true. Namely, if none of John's belief worlds is such that the sun turns cold, all the relevant good-weather-or-cold-sun worlds will be good-weather worlds and they are preferred to all the relevant bad-weather worlds. This example reproduces a well-known "simplification of disjunctive antecedents" puzzle in literature on conditionals (cf. Nute 1975, Alonso-Ovalle 2009 and others).

(11) ?John wants there to be good weather or the sun to turn cold (*false*)

The doubly-relative modal analysis is in the same position as in the discussion of Ross's paradox. It predicts the sentence in (55) to be true in any context in which John wants there to be good weather.

To summarize: We have seen that a doubly-relative modal analysis predicts the inference in (10) to be valid and the sentence in (11) to be true in contexts in which John wants there to be good weather, contrary to fact. On the other hand, (10) is invalidated according to the negation-related analysis by contexts in which each disjunct is considered to be possible

[4]Notice that the two disjuncts being live options does not help the modal analysis: the desire-best possibilities would still contain send worlds and *ipso facto* send-or-burn worlds.

by the attitude holder. This does not help the analysis with explaining the falsity of (11) – the sentence is predicted to be true by the negation-related analysis in any context in which John wants there to be good weather.

A.7.2 Negation-related analysis: free choice presupposition

The most inviting modification of Heim's theory that would capture both Ross's paradox and Simplification of Disjunction is to impose a requirement that all disjuncts under *want* must be compatible with the beliefs of the attitude holder. This would allow us to subsume both Simplification of Disjunction and Ross's paradox under the theorem in (54). Now, this modification could be derived from the existential modal presupposition, the so-called independence presupposition, triggered by desire predicates (56).

(56) a. α **wants p**
b. Presupposition: $\lambda w.\Diamond_{Dox(\alpha,w)}p$

Namely, in our examples, the presupposition is that the proposition denoted by the disjunctive complement of *want* is compatible with the beliefs of the attitude holder (57-b). If this presupposition would involve a free choice interpretation of disjunction (57-c) the desired result would be achieved – both of the disjuncts would have to be compatible with the beliefs of the attitude holder and (10)/(11) would be subsumed by the theorem in (55). The step from (57-b) to (57-c) is not trivial.

(57) a. α **wants p or q**
b. Presupposition: $\lambda w.\Diamond_{Dox(\alpha,w)}(p \vee q)$
c. Free choice presupposition: $\lambda w.\Diamond_{Dox(\alpha,w)}p \wedge \Diamond_{Dox(\alpha,w)}q$

A.7.3 Modal analysis: free choice assertion

The negation-related analysis can deal with the free choice desideratum if the disjuncts occurring in the scope of desire predicates are required to be compatible with the beliefs of the attitude holder. The same strategy does not help the modal analysis. Some of the following discussion features in chapters 3 and 4 of the dissertation.

Free choice disjunction

It is well-known that disjunction in modal environments may lead to inferences different from what the standard modal logic predicts. These inferences are illustrated in (58) where $\Box$ stands for the universal modal and $\Diamond$ stands for an existential modal.

(58) a. You must have cake or soup $\rightsquigarrow$ You may have cake and you may have soup
a'. $\Box(p \vee q) \rightsquigarrow \Diamond p \wedge \Diamond q$
b. You may have cake or soup $\rightsquigarrow$ You may have cake and you may have soup
b'. $\Diamond(p \vee q) \rightsquigarrow \Diamond p \wedge \Diamond q$

The predictions by the standard modal analysis are given in (59). The difference is that in (58) a conjunctive modal inference is generated, while the inference predicted by modal logic in (59) is weaker – it is disjunctive. For illustration, assume that in all the best accessible worlds you eat cake or soup ($\Box(p \vee q)$). This is logically compatible with the proposition that in all the best accessible worlds you eat cake and that there are no best accessible worlds in which you eat soup ($\Box p \wedge \neg\Diamond q$). This shows that you must have cake or soup ($\Box(p \vee q)$) does not imply that you may have cake and you may have soup ($\Diamond p \wedge \Diamond q$). In the same spirit, assume that there is a best accessible world in which you have cake ($\Diamond p$) and thus a best accessible world in which you have cake or soup ($\Diamond(p \vee q)$), but no best accessible world in which you have soup ($\neg\Diamond q$). This is consistent and shows that you may have cake or soup ($\Diamond(p \vee q)$) does not imply that you may have cake and you may have soup ($\Diamond p \wedge \Diamond q$). Thus, the inferences in (58) are unexpected on the modal analysis, which gives us only the weaker inferences in (59).

(59) a. You must have cake or soup → You may have cake or you may have soup
b'. $\Box(p \vee q) \rightarrow \Diamond p \vee \Diamond q$ (if domain of $\Box$ is non-empty)
b. You may have cake or soup → You may have cake or you may have soup
c. $\Diamond(p \vee q) \leftrightarrow \Diamond p \vee \Diamond q$

The pertinent question is what is responsible for this discrepancy between the inferences accompanying disjunction in natural language (58) and the predictions of the modal analysis (59). At this point, there are at least three vantage points on the issue: (i) the modals (alone) are the culprit, (ii) the disjunction (alone) is the culprit, and (iii) the interaction of modals and disjunction is the culprit. The alternative described in (i) is trivially out of the running. The alternative described in (ii) is more resilient and has been argued for in some form or another (Zimmermann 2000, Geurts 2005). The idea is that an assertion of a disjunction of two propositions amounts to an assertion of a conjunction of the possibility of the two propositions.

(60) $p \vee q \rightsquigarrow \Diamond p \wedge \Diamond q$

In some cases at hand, this leads us to obtain a sequence of possibility modals (61-b). These can be reduced to a single possibility modal on the basis of the intuitive principle that if I am an authority in the context and it is compatible with my beliefs that you may have cake, then (I believe that) you may have cake (cf. Zimmermann 2000, Geurts 2005 for discussion).

(61) a. You may have cake or soup ⇝ You may have cake and you may have soup
b. $\Diamond(p \vee q) \leftrightarrow \Diamond p \vee \Diamond q \rightsquigarrow \Diamond\Diamond p \wedge \Diamond\Diamond q \rightsquigarrow (\Box)\Diamond p \wedge (\Box)\Diamond q$

However, it is not immediately clear how to extend such an analysis to the (a)-example in (58) that would fall short of stipulating that we are dealing with a wide-scope disjunction. And even in that case, the theory would have to be further complicated to arrive at the inferences in (58) (see Geurts 2005 for details). Instead of pursuing this line of thought in greater detail here, let us look at the alternative gestured at in (iii).

This alternative, which assumes that the inferences in (58) come about from the interaction of modals and disjunction, has an easier task than the two preceding alternatives – if nothing else, more ingredients are at its disposal. There are now different ways of fleshing out the dependency between the modals and disjunction: either there is something specific about the semantics of modal operators that is sensitive to disjunction in their scope (e.g. Aloni 2007) or there is a more general mechanism that governs the behavior of disjunction in the scope of a variety of quantificational operators (e.g. Fox 2007). The latter option seems more attractive in light of the following data:

(62) a. Everyone had cake or soup $\rightsquigarrow$ Someone had cake and someone had soup
b. Some people had cake or soup $\rightsquigarrow$ Someone had cake and someone had soup

This more general strategy abstracts away from the type of quantifier involved – i.e. whether its domain contains individuals or worlds (63). The rest of the section is devoted to an instance of it.

(63) a. $\forall x(px \vee qx) \rightsquigarrow \exists x(px) \wedge \exists x(qx)$
b. $\exists x(px \vee qx) \rightsquigarrow \exists x(px) \wedge \exists x(qx)$

Pragmatic strengthening in grammar

The inferences in (58) have been argued by some to be conditioned by a general pragmatic enrichment mechanism operative in grammar that is responsible i.a. for generation of scalar implicatures (Fox 2007 among others). The mechanism consists of an exhaustification operator EXH, whose meaning corresponds to that of the focus-sensitive operator *only*. It applies at the clausal level, whereby the respective clause may also be embedded. The meaning of the operator and the auxiliary definitions are in (64) and (65) (Fox 2007).

(64) $[\![\textbf{EXH}]\!]^{g,c} = \lambda C_{(st)t}.\ \lambda p_{(st)}.\ \lambda w_s.\ p(w) = 1 \wedge \forall q \in IE(C,p)\ [\ q(w) = 0\ ]$

(65) a. $IE(C,p) = \cap\{A' \subseteq A\text{: A' is a maximal set in A s.t. } A'^{\neg} \cup \{p\} \text{ is consistent}\}$
b. $A^{\neg} = \{\neg p\text{: } p \in A\ \}$

A derivation of scalar implicatures triggered by scalar items *some* and *or* are given in (66) and (67). The domain of EXH is thereby resolved to the set of scalar alternatives to the sister of EXH, as sketched in (66-c) and (67-c) (see chapter 4 for discussion of (67)). In (66), there is one scalar alternative that is innocently excludable – that you read all the books. The import of strengthening is that it is false.

(66) a. You read some books
b. **[EXH C_1] [you read some books]**
c. $C_1 = \{[\![\textbf{you read some books}]\!]^{g,c}, [\![\textbf{you read all books}]\!]^{g,c}\}$
d. $[\![\text{(66-b)}]\!]^{g,c}(w) = 1$ iff $[\![\textbf{you read some books}]\!]^{g,c}(w) = 1$
$\wedge \forall\ q \in \{[\![\textbf{you read all books}]\!]^{g,c}\}\ [\ q(w) = 0\ ]$

In (67), the scalar alternative that you had cake and soup is innocently excludable. The meaning of the sentence is that you had cake or soup and that it is false that you had both.

(67) a. You had cake or soup
b. **[EXH C_1] [you had cake or soup]**
c. $C_1 = \{[\![\textbf{you had cake or soup}]\!]^{g,c}, [\![\textbf{you had cake}]\!]^{g,c},$
$[\![\textbf{you had soup}]\!]^{g,c}, [\![\textbf{you had cake and soup}]\!]^{g,c}\}$

d. $[\![$ (67-b) $]\!]^{g,c}$(w) = 1 iff $[\![$ **you had cake or soup** $]\!]^{g,c}$(w) = 1
$\wedge\ \forall$ q $\in$ {$[\![$ **you had cake and soup** $]\!]^{g,c}$} [q(w) = 0]

Pragmatic strengthening and free choice

There are two relevant positions at which EXH may be inserted in sentences with modal operators – above and below the modal. If the operator is inserted above the universal modal, a free choice inference is generated. This is shown in (68): every alternative to the sister of EXH that is not identical to the prejacent is innocently excludable and is asserted to be false. This is equivalent to the proposition that you must have cake or soup and that you may have either.

(68) a. You must have cake or soup
b. **[EXH C_1] [must [you have cake or soup]]**
c. C_1 = {$\Box$(you have cake or soup), $\Box$(you have cake), $\Box$(you have soup), $\Box$(you have cake and soup)}
d. $[\![$ (68-b) $]\!]^{g,c}$(w) = 1 iff $\Box$(you have cake or soup)(w) = 1 $\wedge\ \forall$ q $\in$ {$\Box$(you have cake), $\Box$(you have soup), $\Box$(you have cake and soup)} [q(w) = 0]
iff $\Box$(you have cake or soup)(w) = 1 and $\Box$(you have cake)(w) = 0 and $\Box$(you have soup)(w) = 0 and $\Box$(you have cake and soup)(w) = 0
iff $\Box$(you have cake or soup)(w) = 1 and $\Diamond$(you have cake)(w) = 1 and $\Diamond$(you have soup)(w) = 1

Derivation of Ross's paradox and Simplification of Disjunction

If we apply the exhaustification mechanism introduced above to the conclusion of (10), as we do in (70), we get the inferences that do not follow from the premise of (10), given in (70-b). This accords with the reported judgments.

(69) a. John wants to send this letter
b. **[EXH C_1] [John wants to send this letter]**
c. $\Rightarrow$ John is okay with sending this letter

(70) a. John wants to send this letter or burn it
b. **[EXH C_1] [John wants to send this letter or burn it]**
c. $\Rightarrow$ John is okay with sending this letter & he is okay with burning this letter

Unfortunately, simply having the ability to insert EXH into the structure is not sufficient to account for the non-entailment in (10). In a way, the account sketched above begs the question: why is the insertion of EXH required? This is particularly vexing because the the insertion of EXH is generally considered to be an optional maneuver. For example, positive sentences that contain scalar items but that do not trigger scalar implicatures arguably do not trigger them because of the absence of EXH. To derive Ross's paradox and Simplification of Disjunction, a principle along the lines of (71) has to be postulated. For the derivation to be explanatory, the postulate should be derived from a more basic property of desire predicates.

(71) Obligatory exhaustification

A disjunctive operator in the scope of a desire predicate obligatorily associates with an exhaustification operator

The characterization in (71) also leaves it open what the exact scope of the exhaustification operator has to be: if the desire predicate occurs under a downward-entailing operator, EXH could either scope right above the desire predicates or above the downward-entailing operator. The different scopes would result in different readings.

(72) <> I doubt that John wants to get an A or a B. He probably wants to get an A

A further comparison that should be explored is with other types of modality – i.e. whether Ross's paradox and Simplification of Disjunction can be reproduced with doxastic predicates.

A.8 Summary

We have reviewed six arguments for and against treating desire predicates as upward-monotonic operators. On all counts, we have seen that a doubly-relative modal analysis has at least as good of a grip on the data as the non-monotonic analysis; on three counts it does better. This is summarized in the following paragraph. The tentative conclusion relevant for the purposes of the dissertation is that desire predicates are not non-monotone but rather upward-monotone operators.

1. Good Samaritan: Both the negation-related analysis as well as the modal analysis assume that there is a doxastic component to desire in which the presuppositions of the sentential complement of the desire predicate need to be satisfied. **2. Valid upwardness:** The modal analysis was able to explain the apparent validity of inference patterns indicative of upward-monotonicity of desire predicates. The negation-related analysis predicts these patterns to be invalid. **3. True conflicts:** The modal analysis explained the apparent felicity of conflicting desires by relying on a shift in modal parameters – namely, on a shift in the ordering source. The negation-related analysis predicts true conflicts to be possible. This was shown to yield wrong results in examples where a modal parameter-shift was blocked. **4. Weakening failures:** The apparent cases of weakening failure were shown to obtain only in appropriate discourses. They were explained in the modal analysis as further cases of parameter-shift – namely, as a shift in the modal base. The negation-related analysis incorrectly predicts weakening failure to be possible outside the respective discourses. **5. Non-closure:** The apparent cases of non-closure of desire under believed implication were argued to come about due to a shift in the modal parameters. **6. Free choice:** Neither the modal nor the negation-related analysis have a ready-made explanation of the puzzling transpositions of Ross's paradox and Simplification of Disjunction puzzle to desire statements. An account of them was provided that treats them as cases of obligatory free choice. In the modal analysis free choice was derived in grammar by inserting a covert exhaustification operator into the structure. This operator played a significant role in the preceding chapters.

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