# *Any*: Logic, Likelihood, and Context*

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### Abstract

*Any* has a more restricted distribution than other determiners. While it is uncontroversial that providing an adequate description of this distribution requires recourse to semantics, a full description has remained elusive. This holds, in particular, due to the intricate behavior of *any* in modal and non-monotone environments, where sensitivity to extra-grammatical factors is sometimes attested (esp., Linebarger 1987). Drawing on the insights of Kadmon and Landman (1993), and on independently-motivated mechanisms in grammar, we show that such descriptive challenges can be answered without abandoning a uniform treatment of *any* across the different environments. The resulting picture falls naturally out of an approach that takes *any* to be accompanied by covert *even* (cf. Lahiri 1998).

There are two parts to this review. Part I attends to the distribution of *any* in entailment-reversing and modal environments. Part II turns to an explanation of this distribution, its predictions about the distribution of *any* in non-monotone environments, and to differences between *any* and some allied expressions. The review concludes by pointing out several open questions left for future research.

## Contents

# Part I

# 1   The *Any* Condition

*Any* has a more restricted distribution than other determiners, a distribution that cannot be adequately captured by reference to syntax alone. This is exemplified by the contrast in (1): *any* is acceptable only if it is appropriately embedded – this is the case if it occurs in the scope of *only John*, as in (1-a), but not if it occurs in the scope of *even John*, as in (1-b). Since at least Klima (1964), a goal of linguistic theory has been to describe this distribution, and to provide an explanation of it.

(1)    a.   Only John read any book.
       b. #Even John read any book.

**Strawson Entailment.** Our point of departure is an influential description of the distribution of *any* (the *Any* Condition, henceforth) that relies on the notion of Strawson entailment (see von Fintel 1999 for a detailed discussion and motivation). The notion is defined for various conjoinable categories, that is, categories whose type ends in *t*, in (2). (We will say that an expression Strawson entails another expressions if and only if the meaning of the former expression Strawson entails the meaning of the latter one.)

(2)    **Strawson Entailment ($\Rightarrow_s$):**
    a.   For any p, q of type t: p $\Rightarrow_s$ q iff p = 0 or q = 1.
    b.   For any f, g of type ($\sigma\tau$), f $\Rightarrow_s$ g iff for every x of type $\sigma$ such that g(x) is defined, f(x) $\Rightarrow_s$ g(x).

Accordingly, a sentence Strawson entails another sentence if and only if whenever the former is true and the latter is defined (that is, the presuppositions of the latter sentence are satisfied), the latter is true as well. For illustration, consider sentence *Only John read a book*. It conveys that no one other than John read a book and that John read a book. The latter inference is a presupposition of the sentence (Horn 1972; see Ippolito 2007 for a recent

re-evaluation). In light of this, sentence *Only John read a book* Strawson entails sentence *Only John read two books*: if John and no one else read a book, Pr in (3), and if John read two books, Str in (3) (Strawson premise, that is, the presupposition of the conclusion), it holds that John and no one else read two books, the conclusion in (3).

(3)    Pr   Only John read <u>a book</u>             [= John and no one else read a book]
       Str   John read two books
       ⇒    Only John read <u>two books</u>       [= John and no one else read two books]

**Back to (1).**    The sentence in (1-a), *Only John read any book*, conveys a meaning equivalent to that of *Only John read a book*, that is, it conveys that John read a book and that no one else did. Unsurprisingly, then, the sentence enters into the same Strawson entailment relations, such as the one exemplified in (3). These facts provide strong support for analyzing *any book* as having the same meaning as *a book*, which we adopt as well (see, e.g., Ladusaw 1979, Gajewski 2008, Chierchia 2013 for further arguments).

(4)    **Meaning of *any*-DPs**
       *Any NP* denotes an existential quantifier identical to that denoted by *an NP*.

Turning now to sentence *Even John read a book*, we observe that no similar Strawson entailment obtains, as stated in (5). To see this, consider the following scenario in which *Even John read a book* is true: John read exactly one book; he is less likely to have read a book than every other relevant individual; and someone other than him read a book. Furthermore, assume that the presuppositions of *Even John read two books* hold as well: John is less likely to read two books than every other relevant individual; and someone other than him read two books (see, e.g., Karttunen and Peters 1979 for the presuppositions of *even*). *Even John read two books* is false in this scenario since John read just one book. This demonstrates the lack of entailment in (5).

(5)    Pr   Even John read <u>a book</u>
       Str   John is less likely to have read two books than everyone else
       Str   Someone other than John read two books
       ⇏    Even John read <u>two books</u>

**Strawson Entailment-Reversal.**    The arguments in (4) and (5) are representative of a more general pattern: if you replace *a(ny) book* in *Only John read a(ny) book* with a DP that Strawson entails it – *two books* is an example of such a DP, *a(ny) long book, exactly one book, every book* are some others – you obtain a sentence that is Strawson entailed by the original sentence. This holds because replacing *a book* with a stronger expression results in a stronger argument of *only John*; and if no individual other than John is such that the weaker property holds of them – which is the meaning of Pr – then no individual other than John is such that the stronger property holds of them either – which is the meaning of the conclusion (see Wagner 2006 for further discussion).

(6)    For every QP such that QP $\Rightarrow_s$ a(ny) book:
       Pr   Only John read <u>a(ny) book</u>       [= John and no one else read a book]
       Str   John read QP                                   [e.g., John read every book]
       ⇒    Only John read <u>QP</u>                    [e.g., John and no one else read every book]

We say that a sentence, S, is Strawson Entailment-Reversing with respect to a DP when

replacing the DP with one that Strawson entails it, DP', leads to the resulting sentence, S[DP/DP'], being Strawson entailed by S (cf. Gajewski 2011). Strawson entailment-reversing property can be characterized more generally as in (7).

(7) **Strawson Entailment-Reversal**

A constituent C is Strawson Entailment-Reversing with respect to a sub-constituent X iff for every X' such that X' $\Rightarrow_s$ X, it holds that C $\Rightarrow_s$ C[X/X'] (where C[X/X'] is identical to C except that X' replaces X).

Thus, sentence *Only John read any book* is Strawson Entailment-Reversing (SER, henceforth) with respect to *any book*. In contrast, the fact that argument (5) is invalid evidences that *Even John read a(ny) book* is not SER with respect to *a(ny) book* – that is, not every replacement of *a(ny) book* in that sentence with a stronger expression, such as *two books*, yields a Strawson stronger meaning.

**The *Any* Condition.** The difference between sentences (1-a) and (1-b) just described – namely, that there is a constituent that is SER with respect to *any book* in (1-a) but not in (1-b) – can be raised to a more general constraint on the distribution of *any*-DPs, provided in (8) (cf. Homer 2010, Gajewski 2011).

(8) **The *Any* Condition** (to be revised)

A DP headed by *any* is acceptable only if it is dominated by a constituent that is Strawson Entailment-Reversing with respect to this DP.

This constraint does not only capture the contrast in (1), but also a host of other facts. For illustration, on the one hand, the matrix sentences in (9) are all SER with respect to the occurrences of *any book* in them, which thus satisfy the *Any* Condition. One representative entailment pattern supporting this conclusion is in (10).

(9) a. Every student who read any book passed the exam.
    b. Mary doubts that John read any book.
    c. It is surprising that John read any book.

(10) Pr  Every student who read a(ny) book passed the exam
     Str There are students who read two books
     ⇒  Every student who read two books passed the exam

On the other hand, no constituents in (11) are SER with respect to the occurrences of *any book*, which thus violate the *Any* Condition. One illustration of this is in (12).

(11) a. #Every student passed any exam.
     b. #Mary thinks that John read any book.
     c. #It is unsurprising that John read any book.

(12) Pr  Every student passed an(y) exam
     Str There are students
     ⇏  Every student passed two exams

**Preview.** Although its coverage is impressive, the *Any* Condition faces several serious challenges. Two main ones involve the distribution of *any* in modal sentences (e.g., Ladusaw 1979, Dayal 1998, among others) and in sentences containing non-monotone quantifiers (esp., Linebarger 1987). In such sentences, an *any*-DP may be acceptable, even though it does not

occur in a constituent that would be SER with respect to it. This is further compounded by *any* exhibiting sensitivity to contextual factors in some of these sentences, sensitivity that has been difficult to pin down precisely.

Instead of deflating these challenges, we will argue that they bring out properties of *any* that cannot be detected by looking at occurrences of *any* outside of these environments. Two main consequences emerge from our discussion. The first consequence pertains to the formulation of the *Any* Condition. We show that the distribution of *any*-DPs can be captured by an appropriately revised *Any* Condition even in light of their occurrence in modal and non-monotone environments (Sections 2 and 6). This is possible, however, only if the *Any* Condition is stated as above – in terms of constituents dominating *any* (that is, environments) having a specific property (cf. Homer 2008, Gajewski 2011). It is not possible if the *Any* Condition is stated in terms of operators c-commanding *any* having a specific property (esp., Fauconnier 1975, Ladusaw 1979, von Fintel 1999).

(13)     **Environments vs. operators**

         To state a significant generalization about the distribution of *any*, one must make reference to constituents dominating *any* (not operators c-commanding it).

The second consequence pertains to the explanation of the *Any* Condition. The picture that we converge on follows straightforwardly from the assumption that the distribution of *any* is governed by a covert *even* operator that associates with the domain of *any* (Section 5; cf. Krifka 1995, Lahiri 1998). While several arguments have been brought up against such an analysis, we show that they do not survive closer scrutiny (Section 7).

(14)     **The *Even* Approach to *any*-DPs**

         An approach that takes the distribution of *any* to be governed by *even* that associates with the domain of *any* can provide an explanation of the *Any* Condition.

# 2   Modals

Consider the sentence in (15).

(15)     John is allowed to read any book.

The sentence is acceptable and has an interpretation that can be paraphrased as in (16) (see Menéndez-Benito 2010, Chierchia 2013 for a more thorough description). We will call occurrences of *any* in existential modal sentences 'free choice' occurrences of *any* in light of them giving rise to inferences like these (see already Vendler 1967).

(16)     Every book is such that John is allowed to read it.

**DP headed by *any*.**   The sentence in (15) does not intuitively entail one in which *any book* is replaced by a stronger expression, say, *two books*, as given in (17). This is supported by the felicity of sequence (18). Accordingly, given that the there are no obvious other constituents in (15) in which such a replacement would result in a weaker meaning, the sentence violates the *Any* Condition, and so the occurrence of *any* should be unacceptable.

(17)     a.   John is allowed to read <u>any book</u>

         b.   $\not\Rightarrow_s$ John is allowed to read <u>two books</u>

(18)     John is allowed to read any book, but he is not allowed to read two books.

**Domain of the DP headed by *any*.** While the entailment in (17) does not hold, the entailment in (19) does appear to. This is supported by the infelicity of sequence (20). The difference between the arguments in (17) and (19) is that solely the NP complement of *any*, namely, *book*, is replaced with a stronger expression, *long book*, rather than the entire DP headed by *any* (as indicated by the underlining):

(19)     a.   John is allowed to read any <u>book</u>

       b.   $\Rightarrow_s$ John is allowed to read any <u>long book</u>

(20)   #John is allowed to read any book, but he is not allowed to read any long book.

In light of this, a specific revision of the Condition suggests itself (esp., Kadmon and Landman 1993): it is not that a constituent must be SER with respect to the *any*-DP, rather it must be SER with respect to its NP complement. On the assumption that *any* and other quantifiers have a covert resource domain that together with the NP complement determines their domain of quantification (e.g., von Fintel 1994), this statement is equivalent to the requirement that an *any*-DP must be dominated by a sentence that is SER with respect to its (covert resource) domain. (Note that if a clause is SER with respect to an *any*-DP, it is also SER with respect to its domain, given that *any* denotes an existential quantifier. Thus, the revision in (21) is a proper weakening of the *Any* Condition in (8).)

(21)     **The *Any* Condition** (revised)
       A DP headed by *any* is acceptable only if it is dominated by a constituent that is Strawson Entailment-Reversing with respect to <u>its domain</u>.

In the following, we show how a uniform analysis of *any* as an existential quantifier can be maintained for free choice occurrences of *any* that allows them to satisfy (21).

## 2.1   Free choice inferences

Free choice inferences that resemble those described in (16) can be observed in sentences in which disjunction occurs in the scope of an existential modal, as exemplified in (22).

(22)     John is allowed to read *Anna Karenina* or *Madame Bovary*
       a.   $\Rightarrow$ John is allowed to read *Anna Karenina*
       b.   $\Rightarrow$ John is allowed to read *Madame Bovary*

**Exhaustification.** Various approaches to deriving free choice inferences accompanying disjunction have been put forward (e.g., Zimmermann 2000, Kratzer and Shimoyama 2002, Aloni 2007, Fox 2007, Bar-Lev and Fox 2017, among others). One approach to them that can be naturally extended to free choice inferences accompanying *any* is the exhaustification approach of Fox (2007) (see, esp., Chierchia 2013). On this approach, free choice inferences are derived by a recursive application of the exhaustification operator, *exh*, an operator that has been argued to be responsible for generating scalar implicatures more generally. A syncategorematic characterization of the operator is provided in (23): it applies to the meaning of its sister and returns the meaning of its sister conjoined with the negation of the meanings of all relevant excludable alternatives to its sister.

(23)     $\llbracket \text{exh}_{\mathcal{C}} \text{ S} \rrbracket = 1$ iff $\llbracket S \rrbracket = 1 \wedge \forall S' \in \text{EXCL(S)} \cap \mathcal{C}: \llbracket S' \rrbracket = 0$

The definition of excludable alternatives is provided in (24). It relies on the notion of

formal alternatives to a sentence, ALT(S), which are derived from the sentence by replacing its lexical items with other lexical items, and by replacing its constituents with their sub-constituents (see Katzir 2007 for a full definition and discussion).

(24)     ExcL(S) = {S' | S' is in the intersection of all the maximal subsets X of ALT(S) such that the negation of all the alternatives in X is consistent with S}

The excludable alternatives can be further restricted in the application of *exh* to include only relevant alternatives, which is captured by equipping *exh* with a resource domain, $\mathcal{C}$ in (23). What alternatives may count as not relevant is tightly constrained (see, e.g., Fox and Katzir 2011, Katzir 2014, Crnič et al. 2015, Bar-Lev 2018 for discussion).

**Disjunction.**   We can now derive step wise the free choice inferences for sentence (22). The structure of the sentence is provided in (25), where there are two nested *exh* operators that quantify over the alternatives induced by disjunction.

(25)     [exh$_{\mathcal{C}'}$ [exh$_{\mathcal{C}}$ [$\Diamond$ [John read A or B]]]]

If we assume that the only relevant alternatives to disjunction in (25) are the disjunct alternatives – that is, [$\Diamond$ [John read A]], [$\Diamond$ [John read B]] – then no alternative is excludable for the embedded *exh*.[1,2] Accordingly, the application of the lower *exh* does not affect the meaning of the sister of the higher *exh*, as given in (27). ('$\Diamond$(A $\vee$ B)' stands for there being a possible world in which John read *Anna Karenina* or *Madame Bovary*.)

(26)     ExcL([$\Diamond$ [John read A or B]]) $\cap \mathcal{C} = \emptyset$

(27)     [[exh$_{\mathcal{C}}$ [$\Diamond$ [John read A or B]]]] = 1 iff $\Diamond$(A $\vee$ B)

In the case of the higher *exh*, if we continue to assume that only the disjunct alternatives are relevant,[3] we obtain the set of relevant excludable alternatives in (28).

(28)     ExcL([exh$_{\mathcal{C}}$ [$\Diamond$ [John read A or B]]]) $\cap \mathcal{C}'$

= {[exh$_{\mathcal{C}}$ [$\Diamond$ [John read A]]], [exh$_{\mathcal{C}}$ [$\Diamond$ [John read B]]]}

The fact that both of these alternatives are excludable is witnessed by their negations being jointly consistent with the sister of the higher *exh*, as computed in (29): it being false that John is allowed to read *Anna Karenina* and not allowed to read *Madame Bovary* (= the negation of the first alternative in (28)), and *vice versa* (= the negation of the second alternative in (28)), entails, together with him being allowed to read one of them, that he is allowed to read *Anna Karenina* and that he is allowed to read *Madame Bovary*. This meaning corresponds to the free choice inferences described in (22). (Analogous results are obtained in cases with more than two disjuncts, as discussed in Fox 2007.)

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[1]The assumption that the conjunctive alternative, [$\Diamond$ [John read A and B]], is not relevant is admitted on the proposals of Fox 2007, Fox and Katzir 2011, Katzir 2014, Crnič et al. 2015, Bar-Lev 2018. For example, the assumption leads to a properly weaker meaning of [exh$_{\mathcal{C}}$ [$\Diamond$ [John read A or B]]], thus satisfying the requirement of weakening in Crnič et al. 2015. See also Simons 2005 for discussion.

[2]It holds that every disjunct alternative of [$\Diamond$ [John read A or B]] – say, [$\Diamond$ [John read A]] – constitutes a maximal set of alternatives that can be negated consistently with [$\Diamond$ [John read A or B]]. Accordingly, the intersection of the maximal sets is empty, leaving no excludable alternatives for the embedded *exh*.

[3]This assumption is again admitted on the above-cited proposals. For example, if the alternative were relevant, we would obtain a stronger meaning for the sentence, namely, one that would entail $\neg\Diamond$(A$\wedge$B).

(29)    $[\![[\text{exh}_{\mathcal{C}'} [\text{exh}_{\mathcal{C}} [\Diamond [\text{John read A or B}]]]]\!] = 1$ iff

$[\![[\text{exh}_{\mathcal{C}} [\Diamond [\text{John read A or B}]]]\!] = 1 \land \forall \text{S}' \in (28): [\![\text{S}']\!] = 0$ iff

$\Diamond(\text{A} \lor \text{B}) \land \neg(\Diamond\text{A} \land \neg\Diamond\text{B}) \land \neg(\Diamond\text{B} \land \neg\Diamond\text{A})$ iff

$\Diamond(\text{A} \lor \text{B}) \land \Diamond\text{A} \land \Diamond\text{B}$

**Existential quantifiers.** Since *any* denotes an existential quantifier, its interpretation corresponds to that of disjunction that ranges over the elements in the restrictor of *any*, a restrictor that is obtained by intersecting the meaning of the NP complement of *any* with the resource domain of *any* (represented with D below):

(30)    $[\![\text{any}]\!](\text{D})(\text{P})(\text{Q}) = 1$ iff $\exists \text{x} [\text{D(x)} \land \text{P(x)} \land \text{Q(x)}]$ iff $\bigvee_{x:D(x) \land P(x)} \text{Q(x)}$

Given this equivalence, the mechanism responsible for generating the free choice inferences of disjunction, *exh*, can be used to generate the free choice inferences of *any* in a parallel way (as proposed by Chierchia 2013, though implemented differently). For example, sentence *John is allowed to read any book* may be assigned the structure in (31). The two *exh* operators quantify over the alternatives introduced by the domain of *any*.

(31)    a.    John is allowed to read any book.
        b.    $[\text{exh}_{\mathcal{C}'} [\text{exh}_{\mathcal{C}} [\Diamond [\text{any D book}_x [\text{John read x}]]]]]$

If the relevant alternatives over which *exh*s quantify are built exclusively on the subsets of the domain of *any* – the so-called subdomain alternatives (Chierchia 2013) – they match the disjunct alternatives to disjunction.[4] And since the meaning of an *any*-DP corresponds to a disjunction ranging over the elements in the domain of *any*, the interpretation of (31) corresponds to the conjunction of the free choice inferences, as provided in (32). For instance, if there are only three relevant books, *Anna Karenina, Madame Bovary*, and *Catch-22*, we get the meaning that John is allowed to read at least one of them $(= \Diamond(\text{A} \lor \text{B} \lor \text{C}))$ and that each is such that he is allowed to read it $(= \Diamond\text{A} \land \Diamond\text{B} \land \Diamond\text{C})$.

(32)    $[\![[\text{exh}_{\mathcal{C}'} [\text{exh}_{\mathcal{C}} [\Diamond [\text{any D book}_x [\text{John read x}]]]]]\!] = 1$ iff

$\Diamond(\bigvee_{x:D(x) \land book(x)} \text{John read x}) \land \bigwedge_{x:D(x) \land book(x)} \Diamond(\text{John read x})$ iff    *(approx.)*

every book in D is such that John is allowed to read it

## 2.2   Missing ingredient

Let us take stock. We derived free choice inferences accompanying *any* by means of recursive exhaustification. The meanings that we obtained seem to correspond to the paraphrases with *every* from the introduction to this section. However, this correspondence is only partial – we do not actually generate the inference that the domain of *any* is not empty that the paraphrases with *every* have. Yet this inference is necessary for the sentences with free

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[4]This assumption can be shown to be compatible with a general theory of alternatives and pruning (e.g., Katzir 2007, 2014). It is stated more formally in (i), and is adopted for expository reasons.

(i)    For every D, ALT([any D]) = {[any D'] | $[\![\text{D}']\!] \subseteq [\![\text{D}]\!]$}.

A universal quantifier is also an alternative to an *any*-DP, but it can be systematically pruned in the examples under discussion. See footnote 1 for a related discussion and Crnič 2017a, 2019 for details.

choice occurrences of *any* to be able to satisfy the *Any* Condition in (21) – that is, the structure in (33) is not yet SER with respect to the domain of *any*.

(33)     [exh$_{\mathcal{C}'}$ [exh$_{\mathcal{C}}$ [$\Diamond$ [any D book$_x$ [John read x]]]]]

In order to appreciate this, take a subdomain (D') of the domain of *any* (D) that consists solely of 10,000 year-old objects. Given such a domain, *any* that quantifies over books cannot return a true meaning (at least assuming that there are no 10,000 year-old books). Accordingly, sentence (34-a) may be true on the construal in (33) without sentence (34-b) also being true on such a construal. This demonstrates that (33) is not SER with respect to the domain of *any*.

(34)     a.   John is allowed to read any book.
         b.   John is allowed to read any 10,000 year-old book.

Should the *Any* Condition in (21) be abandoned in light of this? That would be too hasty. Note that if we add a premise that the domain of quantification of *any* in (34-b) is not empty – which is a presupposition of our paraphrases of free choice inferences with *every* (e.g., Barwise and Cooper 1981) –, the pertinent entailment does go through:

(35)     Pr   John is allowed to read any <u>book</u>
              There are 10,000 year-old books
         ⇒   John is allowed to read any <u>10,000 year-old book</u>

What status should be assigned to the second premise in the above argument? There are two options: (i) the *Any* Condition in (21) should be modified by restricting the replacements of the domain of *any* with domains that have a non-empty intersection with its NP complement; or (ii) the *Any* Condition should be kept in its current form, but the sentences with free choice occurrences of *any* must be construed as triggering a presupposition that the domain of *any* is not empty (and thus obtaining Strawson entailment-reversal, as illustrated in (35)). We show in the following that there is empirical support for option (ii): it yields new predictions, all of which are borne out.

## 2.3   Existence presupposition

In order for a free choice occurrence of *any* to satisfy the *Any* Condition in (21), its host sentence must presuppose that the quantificational domain of *any* is not empty:

(36)     [[exh$_{\mathcal{C}'}$ [exh$_{\mathcal{C}}$ [$\Diamond$ [any D book$_x$ [John read x]]]]]]
              is defined only if there are books in D.

**Existential quantifiers and existence presuppositions.**   Such a construal of sentences with existential quantifiers is not exceptional – existential quantifiers have been argued to allow for a construal presupposing existence more generally, sometimes necessarily so (see, e.g., Milsark 1974, Diesing 1992, von Fintel 1998, Reinhart 2006 for discussion). We provide two arguments corroborating that sentences with free choice occurrences of *any* indeed give rise to existence presuppositions: (i) they trigger existence inferences that project like presuppositions, and (ii) free choice occurrences of *any*-DPs are unacceptable in positions

in which presuppositional quantifiers are unacceptable.[5]

**Projection.** If free choice occurrences of *any* are accompanied by an existence presupposition, we expect it to behave like other presuppositions, for example, it should project out of questions and antecedents of conditionals (see von Fintel 1998 for other indefinites). Consider first the polar question in (37). If the question is interpreted as asking whether every mistake is such that I can fix it, that is, if we parse it as containing a free choice occurrence of *any*, it requires there to be mistakes in this manuscript. Given that presuppositions project out of polar questions, this is expected if free choice occurrences of *any* are necessarily accompanied by an existence presupposition.

(37)    Am I allowed to fix any mistake in this manuscript?
           ⇒ There are mistakes in this manuscript
           *(on the free choice construal of any)*

Second, consider the sequence in (38). The first sentence of the sequence ensures that it is not part of the common ground that there are mistakes in this manuscript. Given this context, the second sentence is perceived as infelicitous on the free choice construal of *any* in the antecedent clause, that is, if the antecedent clause is taken to mean that every mistake is such that I am allowed to fix it. Again, given that presuppositions project from the antecedent clauses of conditionals, this is expected if free choice occurrences of *any* are necessarily accompanied by an existence presupposition: the presupposition that would project in (38) is that there are mistakes in this manuscript, which clashes with the first sentence. (Note that in both (37) and (38), the *Any* Condition may be satisfied without a free choice construal of *any*; see Section 8 for a brief discussion of questions. Accordingly, absent this construal, no existence presupposition is required.)

(38)    #I am not sure whether there are any mistakes in this manuscript, but if I am allowed to fix any mistake, it doesn't matter.

**Definiteness restriction.** One well known fact about quantifiers that give rise to existence presuppositions is that they cannot occur in the postcopular position of a *there*-insertion sentence (the 'pivot' position) (e.g., Milsark 1974, Barwise and Cooper 1981):

(39)    a.    There are boys in the garden.
        b.    #There is every boy in the garden.
        c.    #There were some$_F$ boys in the garden, but not others.

Accordingly, we expect free choice occurrences of *any* not to be able to occupy the pivot position of a *there*-insertion sentence either, though they may occur in the predicate following the pivot. (40) shows that this expectation is borne out.

(40)    a.    #There may be any boy in the garden.
        b.    There may be a boy in any garden.

**Other occcurrences of *any*.** In contrast, if a free choice construal of *any* is unnecessary, as in (41), an existence presupposition need not be generated, and an occurrence of an

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[5]Another property that free choice occurrences of *any* have in common with other existential quantifiers that trigger existence presuppositions is that they cannot be phonologically reduced (cf. Postal 1966, Milsark 1974).

*any*-DP is acceptable in the pivot position of a *there*-insertion sentence.

(41)   There may not be any boy in the garden.

We conclude that the assumption that free choice occurrences of *any* are accompanied by an existence presupposition is both compatible with them being existential quantifiers and well supported empirically. A host of proposals have been put forward about how these presuppositions are generated (see, e.g., Diesing 1992, Büring 1998 for two examples). We remain agnostic about the nature of the mechanism responsible for these presuppositions in the following, and merely mark structures that induce the existence presupposition with a 'str' diacritic on *any* for concreteness.

## 2.4   Summary: Exhaustification and existence

Free choice occurrences of *any* are predicted to be unacceptable on the initial formulation of the *Any* Condition in (8). Consequently, the condition was minimally revised, requiring *any* to be contained in a constituent that is SER with respect to its domain. We showed that on this revised *Any* Condition, *any* may be acceptable in existential modal sentences if these are appropriately construed, as summarized in (42). Thus, free choice occurrences of *any* are compatible with the assumption that *any* is uniformly an existential quantifier.

(42)   **Free choice occurrences of *any***
       An existential modal sentence may be SER with respect to the domain of *any* that it dominates if and only if
       (i)   free choice inferences involving the domain of *any* are generated, and
       (ii)  a presupposition is triggered that the domain of *any* is not empty.

We derived the inferences in (42) by drawing on two independently argued-for mechanisms in grammar: one responsible for free choice inferences (Section 2.1), and one responsible for existence presuppositions (Section 2.3). Accordingly, sentence *John is allowed to read any book* has to be parsed as in (43); its meaning is paraphrased in (44).

(43)   a.   John is allowed to read any book.
       b.   [exh$_{\mathcal{C'}}$ [exh$_{\mathcal{C}}$ [$\Diamond$ [any$_{str}$ D book$_x$ [John read x]]]]]

(44)   a.   Every book in D is such that John is allowed to read it.
       b.   Presupposition: There are books in D.

On this parse, sentence (43) is SER with respect to the domain of *any*: if every book is such that John is allowed to read it, Pr in (45), and if there are books in some specific set, Str in (45), then every book in this set is such that John is allowed to read it, the conclusion in (45).

(45)   For every D' such that D' $\Rightarrow_s$ D:
       Pr   Every book <u>in D</u> is such that John is allowed to read it
       Str  There are books in D'
       $\Rightarrow$   Every book <u>in D'</u> is such that John is allowed to read it

**Environments vs. operators.**   The analysis of free choice occurrences of *any*-DPs described above does not provide a foothold for a statement of the *Any* Condition in terms

of operators c-commanding *any* (Ladusaw 1979 and others): neither (existential) modals nor the exhaustification operator have a property that could classify them in a meaningful way with other operators in the scope of which *any*-DPs are acceptable (e.g., *exh* does not rescue *any*-DPs in plain episodic sentences). Accordingly, free choice occurrences of *any* have often been assumed to be occurrences of a lexical item distinct from *any* discussed in Section 1 (e.g., Ladusaw 1979, Dayal 1998, among others). In addition to giving up on a uniform analysis of *any*, this gambit brings with it a host of new descriptive and explanatory challenges, challenges that are avoided on the above analysis of free choice occurrences of *any* and the environment-based statement of the *Any* Condition in (21).

# 3 Predictions and extensions

There are two aspects of the above treatment of free choice occurrences of *any* that can be mined for further predictions: (i) How does exhaustification interact with expressions other than existential modals (say, universal modals)? (ii) What are the consequences of the scoping requirement on *any* (namely, that it must scope below an existential modal)? After discussing these questions, we turn to some other occurrences of *any* and the question of how to extend the above analysis to them (see, esp., Dayal 1998, 2004).

## 3.1 Universal modals

In contrast to existential modals, *any* is unacceptable in the scope of universal modals, as exemplified in (46). This is predicted on the analysis developed above – that is, exhaustification cannot rescue occurrences of *any* in the scope of universal modals.

(46)   #John is required to read any book.

**Free choice and universal modals.**   Free choice inferences obtain also in universal modal sentences, similarly to existential modal ones:

(47)   John is required to read *Anna Karenina* or *Madame Bovary*
     a.   $\Rightarrow$ John is allowed to read *Anna Karenina*
     b.   $\Rightarrow$ John is allowed to read *Madame Bovary*

As in the case of existential modal sentences, these inferences can be derived by exhaustification, though in this case an application of a single exhaustification operator suffices. The LF of (47) is in (48); the relevant excludable alternatives are in (49).

(48)   [exh$_{\mathcal{C}}$ [□ [John read A or B]]]

(49)   Excl([□ [John read A or B]]) $\cap$ $\mathcal{C}$ = {[□ [John read A]], [□ [John read B]]}

Given the alternatives in (49), the meaning of (48) is that John is required to read one of the two books and that each of the two books is such that he is not required to read it, as given in (50). This meaning entails the free choice inferences that he is allowed to read *Anna Karenina*, and that he is allowed to read *Madame Bovary* (see Crnič et al. 2015, Bar-Lev and Fox 2017 for potential alternative derivations).

(50)   $\Box(A \lor B) \land \neg\Box A \land \neg\Box B$ $\hspace{3cm}$ $(\Rightarrow \Box(A \lor B) \land \Diamond A \land \Diamond B)$

**Any and universal modals.** As discussed above, free choice inferences can be generated in a parallel way for existential quantifiers like *any* in the scope of universal modals. For example, (46) can be parsed as in (51), where *exh* associates with the domain of *any*. If, as above, we exhaustify only over the subdomain alternatives, we obtain the meaning in (52). This entails that every book is such that John is allowed to read it.

(51)     $[\text{exh}_{\mathcal{C}} \ [\Box \ [\text{any}_{str} \ D \ book_x \ [\text{John read x}]]]]$

(52)     $\Box(\bigvee_{x:D(x)\wedge book(x)}\text{John read x}) \wedge \bigwedge_{X:X \subset D(x)\cap book}\neg\Box(\bigvee_{x:X(x)}\text{John read x})$

$\left(\Rightarrow \Box(\bigvee_{x:D(x)\wedge book(x)}\text{John read x}) \wedge \bigwedge_{x:D(x)\wedge book(x)}\Diamond(\text{John read x})\right)$

On the construal in (51), however, the sentence is not SER with respect to the domain of *any*. For example, the meaning of (51) entails that John is <u>not</u> required to read a long book (see the latter conjuncts in (52), which convey that every proper subset of books is such that John is not required to read a book in them). Accordingly, (51) fails to Strawson entail the structures derived from (51) by replacing its domain of *any* with a stronger domain.[6] This means that the proposal above correctly predicts that *any* will not be acceptable in the scope of a universal modal unless it is appropriately further embedded.

## 3.2   Reconstruction

In order for the free choice inferences accompanying *any* to be generated, an existential modal must intervene between *any* and two *exh* operators (Fox 2007; see Bar-Lev 2018 for further discussion). This means that if *any*-DP is forced to scope above the existential modal, it should be unacceptable unless it is appropriately further embedded.

It is well known that the subject of a raising predicate like *be allowed/permitted* can in principle be interpreted in its surface position, or in a position in the scope of the modal (e.g., May 1985). According to the above proposal, when an *any*-DP occurs in the subject position of *be permitted* at surface form, it must be interpreted in a position in the scope of the modal, as given in (53).

(53)     a.   Any defendant was permitted by the court to be late once.
          b.   $[\text{exh}_{\mathcal{C}'} \ [\text{exh}_{\mathcal{C}} \ [\text{be permitted by the court} \ [\text{any}_{str} \ D \ \text{defendant to be late once}]]]]$

If such a structure is ruled out, for example, by requiring *any*-DP to bind a variable from the matrix subject position, as given in (54), the expectation is that the sentence will be unacceptable: since *any*-DP cannot occur in the scope of the modal, no free choice inferences can be generated – so the sentence cannot be SER with respect to the domain of *any*. (54) shows that this prediction is borne out.[7]

(54)     a. #Any defendant$_i$ was permitted by her$_i$ attorney to be late once.

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[6] A comparable state of affairs obtains for other potential derivations of the free choice inferences, for example, for a derivation that does not involve negated universal inferences (see Crnič et al. 2015, Bar-Lev and Fox 2017 for a discussion of the availability of such a derivation). The main reason for this is that a universal modal statement containing a weaker nominal quantifier (corresponding to the first conjunct in (52)) is entailed by a universal modal statement containing a stronger nominal quantifier.

[7] Another type of configuration in which *any*-DP may be forced to occur outside the scope of the modal at LF involves extraposition. The data turns out to be equivocal, however. Fox and Nissenbaum (1999) argue that adjunct extraposition involves covert movement of the host DP to the scope position at which the adjunct occurs. Accordingly, the expectation is that if an adjunct is extraposed from *any*-DP, and attaches above the respective modal, *any*-DP will have to scope above the modal as well, and thus violate the *Any* Condition. This is indeed what Fox and Nissenbaum observe:

b. #[exh$_{\mathcal{C}'}$ [exh$_{\mathcal{C}}$ [any$_{str}$ D defendant$_x$ [permitted by x's attorney [x to be late]]]]]

To summarize, we described two consequences of the above proposal. They were derived from independent facts about the nature of the exhaustification mechanism that we adopted, specifically, from the facts about how it interacts with universal modal operators and in what types of configurations it can give rise to the desired free choice inferences. We showed that they are in agreement with the data.

## 3.3   Extensions

*Any* may occur in modal(-like) environments other than those discussed above (see, esp., Dayal 2004, 2009, 2013, Chierchia 2013 for a more comprehensive discussion). In the following, we briefly touch on the occurrences of *any* in generic and imperative sentences:

(55)    a.   Any owl hunts mice.
        b.   Go ahead, take any apple.

**Intuitive satisfaction of the Condition.**   Before we proceed, it is worth highlighting that *any* in generic sentence (55-a) intuitively satisfies the *Any* Condition:

(56)    a.   Any <u>owl</u> hunts mice
        b.   $\Rightarrow_s$ Any <u>barn owl</u> hunts mice

Similar intuitions hold for *any* in imperative sentence (55-b). While one cannot easily talk about entailment between imperatives, one can infer from the permission conveyed by (57-a) that the permission conveyed by (57-b) is also in place.

(57)    a.   Go ahead, take any <u>apple</u>
        b.   $\hookrightarrow_s$ Go ahead, take any <u>red apple</u>

Given that the distribution of *any* in generic and imperative sentences is intuitively in line with the *Any* Condition in (21), the outstanding task is to determine how the above sentences get to intuitively satisfy the *Any* Condition. We must limit ourselves to merely outlining some assumptions that would allow for this and are compatible with the framework developed above. We hope that assumptions of this sort can be defended (see Crnič 2017b for some further discussion and support).

**Generics and free choice.**   Disjunctive generic senentences give rise to inferences akin to those that we observe with existential modals (e.g., Nickel 2010 for discussion):

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(i)     a.   I [$_{VP}$ looked <u>very intensely</u> for anything that would help me with my thesis].
        b.   #I [$_{VP}$ looked for anything <u>very intensely</u>] that will/would help me with my thesis.

An issue arises with Antecedent-Contained Deletion, where the facts appear to go the opposite way: since a DP that hosts an elided VP that is contained within its antecedent must move out of that antecedent (e.g., Sag 1976), we expect that, all else equal, *any*-DP will not be able to host an elided VP whose antecedent is the matrix modal VP: namely, in order to resolve ellipsis, *any*-DP would have to scope above the matrix modal. Such a configuration is acceptable, however, as in (ii). If there is another construal of (ii) that makes *any* acceptable in this configuration (see 'subtrigging' in Section 3.4), it is not immediately clear why it should be unavailable in (i). We have to leave this puzzle for future work.

(ii)    I was allowed to read any book that Mary was.

(58)    A barn or a gray owl hunts mice
     a.   $\Rightarrow_s$ A barn owl hunts mice
     b.   $\Rightarrow_s$ A gray owl hunts mice

Nickel (2010) argues that these inferences should be derived just like the free choice inferences with existential modals. More concretely, he assumes that generic sentences involve layered quantification with the topmost quantifier being an existential one (see also Menéndez-Benito 2005, 2012 for existential modal semantics of at least some generic sentences; cf., e.g., Rullmann et al. 2008, Bassi and Bar-Lev 2016 for further analytic options). Accordingly, a sentence like (59) may be assigned a structure that parallels those of sentences with free choice occurrences of *any* under existential modals. Employing Nickel's (2010) assumptions, its meaning is paraphrased in (60).

(59)    a.   Any owl hunts mice.
     b.   $[\text{exh}_{\mathcal{C}'} \, [\text{exh}_{\mathcal{C}} \, [\text{Gn} \, [\text{any}_{str} \, \text{D owl hunts mice}]]]]$

(60)    Every natural way of being an owl in D is such that every relevant situation with an individual that is an owl in that way is such that it hunts mice in it.

In parallel to existential modal sentences, sentence (59) is SER with respect to the domain of the *any*-DP it dominates (see Menéndez-Benito 2012 for a similar derivation). Accordingly, the sentence is correctly predicted to satisfy the *Any* Condition.[8]

**Imperatives and free choice.**   Dayal (2013) observes that imperatives that contain *any*-DPs are subject to a very intricate constraint (see also Aloni 2007). On the one hand, imperatives with *any*-DPs are marked when used unmodified out of the blue.

(61)    Write down any word ?(you don't know).          (Dayal 2013)
     ($\approx$ You must write down every word.)

On the other hand, if an imperative with *any*-DP conveys a permission or advice, it is easily perceived to be acceptable even in the absence of further post-nominal modification.

(62)    A:  Can I have an apple?
     B:  Go ahead, take any apple.
         ($\approx$ You may take any apple.)

Imperatives that convey permissions have been analyzed as existential modal sentences that trigger presuppositions that make them performative (Kaufmann 2011). In parallel to existential modal sentences, *any*-DPs may be analyzed in such imperatives as giving rise to free choice inferences by means of recursive exhaustification, as in (63). On this analysis,

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[8]While *any* is acceptable in generic sentences if it gives rise to inferences akin to free choice, it tends to be unacceptable in sentences with overt adverbial quantifiers. For example, Dayal (1998) points out that sentence (i-a) does not allow for a quantificational variability construal on which it would convey the meaning in (i-b). In this respect, *any owl* behaves differently than *an owl*.

(i)     a.   Any owl always hunts mice.
     b.   $\neq$ Every owl hunts mice. (rather: = Every owl hunts mice all the time.)

These facts suggest that analyses that do not rely on quantificational variability to account for the acceptability of generic sentences with *any* – including the one put forward in the main text – may be on the right track. Why *any*-DPs do not allow for quantificational variability remains to be explained.

*any*-DPs are contained in a structure that is SER with respect to their domain, and thus correctly predicted to be acceptable.

(63)    a.    (Go ahead,) take any apple.
        b.    [exh$_{C'}$ [exh$_C$ [$\Diamond_{IMP}$ [any$_{str}$ D apple$_x$ [you take x]]]]]

Imperatives that convey commands have been analyzed as akin to universal modal sentences. Given the conclusions of Section 3.1, they are not expected to be able to host *any*-DPs, all else equal. If *any*-DPs turn out to be acceptable in them, such imperatives would have to be analyzed differently than universal modal sentences discussed above.

## 3.4   Open issues

We briefly mention three types of occurrences of *any* that are *prima facie* unexpected on the *Any* Condition. (i) The first type involves *any*-DPs with a prenominal numeral. Dayal (2004) notes that their distribution is broader than that of *any*-DPs discussed above in that they may occur in universal modal sentences, as exemplified in (64-a), though they are still unacceptable in episodic sentences, as exemplified in (64-b). As it stands, this is unexpected on the proposal outlined above.

(64)    a.    John is required to read any two books.
        b.    #John read any two books.

(ii) The second type involves occurrences of so-called supplementary *any*, which has the same distribution as *any* with a prenominal numeral, as exemplified in (65) (Dayal 2004). In these examples, an *any*-DP follows a plain indefinite that has the same NP complement as the *any*-DP. Such configurations raise non-trivial semantic and syntactic questions that go beyond the scope of this review. (See Dayal 2004, 2009, 2013, Chierchia 2013 for suggestions on how (i) and (ii) could be approached.)

(65)    a.    John is required to read a book, any book.
        b.    #John read a book, any book.

(iii) Finally, the third type of occurrences involves so-called subtrigged *any*, which is acceptable even in apparently episodic sentences (LeGrand 1975). While in most cases such occurrences of *any* require post-nominal modification, as in (66-a), this is not always the case, as in (66-b) (see, e.g., Dayal 2013 for discussion). Such sentences have sometimes been analyzed as involving a covert modal (cf. von Fintel 1996, Menéndez-Benito 2010; Chierchia 2013, Dayal 2013 for objections), which may allow us to subsume them under the analysis described above. The properties and the distribution of this modal remain ill-understood, however (for example, unlike in imperatives and generics, we cannot get a free choice interpretation of disjunction in the scope of this modal).

(66)    a.    John talked to any student who came to his office hours.
        b.    Mary confidently answered any objections.

## 4   Interim conclusion

We conclude that the revised *Any* Condition successfully captures the core facts involving the distribution of *any* in (Strawson) entailment-reversing and modal environments. In the

remainder of the review, we direct our attention to two questions. The first question is theoretical: Why should the *Any* Condition hold? Does it, or something akin to it, follow from some inherent property of *any*? The second question is descriptive: Can the *Any* Condition, or something akin to it, capture other vexing occurrences of *any*, such as those in non-monotone environments? In Part II, we first present an answer to the theoretical question, and then discuss its implications for the descriptive one.

# Part II

## 5   Explanation

We turn to the question of what explains the *Any* Condition. By way of prologue, we discuss Hindi NPIs, whose distribution is remarkably similar to that of *any*-DPs. Just like *any*-DPs, Hindi NPIs, which are underlined in the following, are acceptable in the scope of negation and in other environments that are SER with respect to them, as exemplified in (67), and unacceptable when unembedded, as in (68) (Lahiri 1998:60).

(67)    maiN-ne kisii-ko bhii  nahiiN dekhaa
        I       any     even not    saw
        'I didn't see anyone'

(68)    #maiN-ne kisii-ko bhii  dekhaa
        I       any     even saw
        '#I saw anyone.'

Furthermore, they are acceptable in existential modal sentences, as in (69), in which they give rise to free choice inferences, but not in universal modal sentences, as in (70) (Lahiri 1998:76). Again, this parallels the distribution of *any*-DPs. (The same observations hold for the modal-like environments discussed in Section 3.3.)

(69)    koii bhii  aadmii is   mez-ko uThaa saktaa hai
        any even man    this table  lift       can
        'Anyone can lift this table.'

(70)    #kisii-ko bhii ghar  jaanaa caahiye
        any even    home go       must
        '#Anyone must go home'

What makes these expressions a promising vantage point for approaching the *Any* Condition is their complex morphology – namely, they consist of an indefinite determiner *koii/kisii-ko* 'some(one)' (etc.) and a scalar particle *bhii* 'even' – which can be capitalized on to explain their behavior (Lahiri 1998). We adopt Lahiri's hypothesis that *any*-DPs and Hindi NPIs are closely related – specifically, the morphology of *any*-DPs is identical to that of Hindi NPIs, with *even* being unpronounced in English:

(71)    **Assumption about *any*-DPs**
        *Any*-DPs and Hindi NPIs have the same underlying morphology.

In the remainder of the section, we spell out a variant of Lahiri's analysis, and show how it accounts for the data discussed so far. A consequence of the analysis is a condition that coincides with the *Any* Condition in all but one class of environments. We study

three instances of this class in the following section. (While the analysis below covers both *any*-DPs and Hindi NPIs, we discuss only *any*-DPs explicitly for brevity.)

## 5.1   The *Even* Approach

We describe (i) the baseline syntax and semantics for *even* and (ii) the assumptions about what it associates with in configurations with *any*-DPs. These ingredients make up what we will call 'the *Even* Approach' to *any*-DPs (cf. Krifka 1995, Lahiri 1998; see Heim 1984, Guerzoni 2004, among others, for criticism, to which we turn in Section 7).

**Meaning of *even*.**   As discussed in Section 1, *even* is an operator that gives rise to two inferences, a scalar and an additive presupposition (e.g., Karttunen and Peters 1979). The content of these inferences depends on the placement of focus. For example, consider sentence (72), in which *even* associates with focused *Syntactic Structures*. The scalar presupposition of the sentence is that every book other than *Syntactic Structures* is such that it is less likely in the context that John understood *Syntactic Structures* than that he understood that book, as given in (73-a). The additive presupposition is that there is a book other than *Syntactic Structures* that John understood, as given in (73-b).[9],[10]

(72)    John understood even *Syntactic Structures$_F$*.

(73)    a.    $\forall$x: x $\neq$ SS $\rightarrow$ ^(John understood SS) $<_c$ ^(John understood x)

      b.    $\exists$x: x $\neq$ SS $\wedge$ John understood x

We follow the convention of attaching *even* at a clausal level at LF and letting it quantify over the alternatives induced by focus in its sister (e.g., Rooth 1992). The lexical entry for *even* is provided in (74): it presupposes that (i) all the focus alternatives that are not equivalent to the sister of *even* are more likely in the context than it, which delivers (73-a) above; and that (ii) a focus alternative to the sister of *even* that is not equivalent to it is true, which delivers (73-b) above. Its assertive contribution is that the meaning of its sister is true. (The set of alternatives over which *even* quantifies may be further constrained in the context; e.g., von Fintel 1994. We continue to employ simplified representations in which instead of quantifying over sentential alternatives, we quantify directly over the alternatives to the focused element.)

(74)    ⟦even S⟧ is defined only if
    (i)    $\forall$S'$\in$F(S): S $\not\Leftrightarrow$ S' $\rightarrow$ ^⟦S⟧ $<_c$ ^⟦S'⟧, and
    (ii)   $\exists$S'$\in$F(S): S $\not\Leftrightarrow$ S' $\wedge$ ⟦S'⟧ = 1.
    If defined, ⟦even S⟧ = 1 iff ⟦S⟧ = 1.

**Scope of *even*.**   *Even* exhibits ambiguous behavior in certain environments. For example, Karttunen and Peters (1979) discuss sentence (75) (slightly simplified here), which has two readings. On its first reading, it conveys that I believe that John understood some book other than *Syntactic Structures*, and that every book other than *Syntactic Structures* is

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[9]We cannot do justice to the extensive literature on *even*, whose behavior is more complex than suggested here. See, e.g., Greenberg 2018, Francis 2018 for a recent discussion.

[10]There may be reasons for weakening the additive presupposition of *even*, in particular for cases in which *even* appears to take wider scope than the clause in which it occurs at surface form (Crnič 2011, 2014b, though see Francis 2018). None of our conclusions would be affected if we assumed a weaker additive presupposition, say, that at least one alternative must be compatible with the sister of *even*.

such that it is less likely for John to understand *Syntactic Structures* than it is for him to understand that book (that is, *Syntactic Structures* is difficult to understand). This is expected on the discussion of (72) above if the sentence has the LF in (76).

(75)    It is hard for me to believe that John understood even *Syntactic Structures$_F$*.

(76)    [it is hard for me to believe [even [John understood *Syntactic Structures$_F$*]]]

On its second reading, the sentence conveys that there is another book such that it is hard for me to believe that John understood it, and that every book other than *Syntactic Structures* is such that it is less likely that it is hard for me to believe that John understood *Syntactic Structures* than that it is hard for me to believe that John understood that book (that is, *Syntactic Structures* is easy to understand). Karttunen and Peters propose to capture this second reading by assigning *even* matrix scope, along the lines of (77). The presuppositions of the structure are provided in (78).

(77)    [even [it is hard to believe [John understood *Syntactic Structures$_F$*]]]

(78)    a.    $\forall$x: x$\neq$SS $\rightarrow$ ˆ(it is hard to believe that John understood SS) $<_c$
                    ˆ(it is hard to believe that John understood x)
        b.    $\exists$x: x$\neq$SS $\wedge$ it is hard to believe that John understood x

We adopt Karttunen and Peters's assumption that the ambiguity described is a structural one: *even* may take scope that differs from its scope at surface form (see, e.g., Nakanishi 2012, Erlewine 2018 for a recent discussion of covert movement of *even*).

(79)    **Assumption about the scope of *even***
        The scope of *even* may be higher than the clause in which it occurs at surface.

**Alternatives.**    Turning back to *any*-DPs, we still need to specify what the associate of *even* is in them. We assume that it is the covert resource domain of *any*, following similar proposals of Krifka (1995) and Chierchia (2004, 2013) in other frameworks (see Section 8 for a brief comparison).[11] In line with hypothesis (71), we implement this by assigning *any*-DPs the structure in (80). Since *even* is uninterpretable in this configuration, it must scope out.

(80)    [[any D$_F$] even] NP]

The alternatives to the domain of *any* are limited to its subdomains, that is, domains that correspond to subsets of the domain of *any*, as stated in (81-a). In this we again follow the suggestions of Krifka and Chierchia (recall also our assumption about exhaustification over subdomain alternatives in Section 2, see Crnič 2019 for an elaboration). Thus, all the alternatives to *any*-DPs entail them, as stated in (81-b).

(81)    **Alternatives and entailment**
        a.    F([any D$_F$]) = {[any D'] | ⟦D'⟧ $\subseteq$ ⟦D⟧}
        b.    $\forall$X $\in$ F([any D$_F$]): ⟦X⟧ $\Rightarrow$ ⟦any D$_F$⟧

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[11]Lahiri 1998 assumes that the associate of *even* is the indefinite determiner. This choice would prevent us to account for the acceptability of *any*-DPs in modal sentences on the approach described in the main text. Nothing in Lahiri's proposal, however, hinges on his choice of the associate.

Given this characterization of the alternatives of *any*-DPs, and the assumption that *even* attaches at a clausal level at LF, the meanings of sentences with *any*-DPs can be schematically represented as in (82): *even* quantifies over the subdomain alternatives that are not equivalent to the sister of *even* – these are precisely the alternatives in which the quantificational domain of *any* is a proper subset of that of *any* in the sister of *even*.

(82)  ⟦even [$_S$ ... [any D$_F$ NP] ...]⟧ is defined only if

  i.  $\forall$D'$\subset$⟦D⟧$\cap$⟦NP⟧: ˆ⟦S⟧ $<_c$ ˆ⟦S⟧$^{D\rightarrow D'}$

  ii.  $\exists$D'$\subset$⟦D⟧$\cap$⟦NP⟧: ⟦S⟧$^{D\rightarrow D'}$ = 1.

  If defined, ⟦even [$_S$ ... [any D$_F$ NP] ...]⟧ = 1 iff ⟦S⟧ = 1.

## 5.2 Derivations

We follow out the ramifications of the above assumptions. We first look at occurrences of *any*-DPs in the environments discussed so far. We then compare the predictions of the *Even* Approach with an approach that would take the *Any* Condition as primitive.

**Entailment-preserving environments.**  *Any*-DPs are unacceptable if every constituent in which they occur is entailment-preserving with respect to their domain. Consider (83-a), which has the representation in (83-b).

(83)  a. #John read any book.

  b.  [even [[any D$_F$ book]$_x$ [John read x]]]

In (83), *even* triggers the presuppositions in (84): (a) all the subdomain alternatives not equivalent to the sister of *even* are more likely than it, and (b) at least one of them is true. These presuppositions are problematic.

(84)  a.  $\forall$D'$\subset$D$\cap$book: ˆ(John read a book in D) $<_c$ ˆ(John read a book in D')

  b.  $\exists$D'$\subset$D$\cap$book: John read a book in D'

In particular, the scalar presupposition in (84-a) is inconsistent: all the subdomain alternatives entail the sister of *even*, (85-a), and are thus at most as likely as it, (85-b). This is a consequence of a more general property of likelihood, namely, that every proposition is at least as likely as all the propositions that entail it, (86).[12]

(85)  a.  $\forall$D'$\subset$D$\cap$book: ˆ(John read a book in D') $\Rightarrow$ ˆ(John read a book in D)

  b.  $\forall$D'$\subset$D$\cap$book: ˆ(John read a book in D') $\leq_c$ ˆ(John read a book in D)

(86)  **Likelihood-ordering and entailment**

  For any propositions p, q, and any context c, if p $\Rightarrow$ q, then p $\leq_c$ q.

Now, the ungrammaticality of sentence (83) is intimately linked to the inconsistent presupposition it triggers. Following Barwise and Cooper (1981), von Fintel (1993), Gajewski (2002), Fox and Hackl (2006), Chierchia (2013), among others, we assume that semantic

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[12]The additive presupposition in (84-b) entails the assertive meaning of the sentence, which would make the latter redundant in conversation. Accordingly, even if *bhii* in Hindi could be construed as merely an additive particle, which may sometimes be possible, it would yield a pathological meaning.

pathologies can result in ungrammaticality. More to the point, sentences that trigger pre-suppositions that would be inconsistent no matter what non-logical vocabulary would be used in them, as is the case for (83), are ungrammatical.[13]

**Entailment-reversing environments.** If an *any*-DP occurs in a clause that is entailment-reversing with respect to its domain, the presuppositions of *even* are almost tautologous if *even* takes scope that is as high as that clause. Consider (87), where *even* can be assigned scope above negation.

(87)  a.  John didn't read any book.
      b.  [even [neg [[any D$_F$ book]$_x$ [John read x]]]]

In (87), *even* triggers the presuppositions in (88): all the subdomain alternatives distinct from John not reading a book in D are more likely than it, (88-a), and at least one of them is true, (88-b). The assertive meaning of (87) is that John didn't read a book in D.

(88)  a.  $\forall$D'$\subset$D$\cap$book: ˆ($\neg$(John read a book in D))$<_c$ˆ($\neg$(John read a book in D'))
      b.  $\exists$D'$\subset$D$\cap$book: $\neg$(John read a book in D')

The scalar presupposition in (88-a) is almost tautologous because the subdomain alternatives entail the sister of *even*, as stated in (89-a), and may thus well be more likely than it. They are, in fact, more likely than it in any context in which they are not con-textually equivalent with it – which is every context in which the sister of *even* or any of its alternatives may be used (see Spector 2014b for an independent generalization to this effect). Moreover, since the sister of *even* entails the additive presupposition in (88-b), this is innocuous as well.

(89)  a.  $\forall$D'$\subset$D$\cap$book: ˆ($\neg$(John read a book in D))$\Rightarrow$ˆ($\neg$(John read a book in D'))
      b.  $\forall$D'$\subset$D$\cap$book: ˆ($\neg$(John read a book in D'))$\leq_c$ˆ($\neg$(John read a book in D))

**Strawson environments.** If an *any*-DP occurs in a sentence that is SER, but not strictly entailment-reversing, with respect to its domain, then the presupposition of *even* will relate partial propositions if *even* attaches to that sentence. For instance, the first example in this review is of this kind. It has the representation in (90).

(90)  a.  Only John read any book.
      b.  [even [[only John$_F$]$_x$ [any D$_F$ book]$_y$ [x read y]]]]

The scalar presupposition of (90) is in (91): it relates the partial proposition that only John read a book in D to the subdomain alternatives, which presuppose that John read a book in the respective subdomain (see Section 1 on the presupposition of *only*).

(91)  $\forall$D'$\subset$D$\cap$book: ˆ(only John read a book in D) $<_c$ ˆ(only John read a book in D')

One natural assumption about ordering partial propositions according to their likelihood is that they must be evaluated relative to a context in which their presuppositions are satisfied. This yields the same outcome as when the ordering is based on the likelihood of

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[13]The inconsistency of (83) can be distinguished from other contradictions expressible by grammatical sentences such as *John is here and isn't here*. Namely, in this latter case, there is a replacement of the non-logical vocabulary that yields a consistent meaning: *John is here and isn't there*. See Gajewski 2002.

the partial propositions being true or undefined in the context, as given in (92) (see Cremers et al. 2017, and references therein, for related discussion). (Note that (92) coincides with (86) for cases in which the propositions are total.)

(92)     For any context c, $\hat{}[\![S]\!] <_c \hat{}[\![S']\!]$ iff $\{w \mid \hat{}[\![S]\!](w) \neq 0\} <_c \{w \mid \hat{}[\![S']\!](w) \neq 0\}$.

Importantly, it follows from this assumption that a proposition that Strawson entails another proposition will be at most as likely as it, as stated in (93).

(93)     **Likelihood-ordering and Strawson entailment**
         For any propositions p, q and any context c, if $p \Rightarrow_s q$, then $p \leq_c q$.

Accordingly, the scalar presupposition in (91) is almost tautologous, and will be satisfied in any context in which the alternatives are not contextually (Strawson) equivalent with the sister of *even*. In contrast, if an *any-DP* occurs in a sentence that is SEP with respect to its domain, the presupposition of *even* will be inconsistent – all the alternatives will be at most as likely as the sister of *even* – and the *any*-DP will be unacceptable.

**Existential modal environments.**  Further instances of sentences that are SER with respect to the domain of *any*, but not strictly entailment-reversing, are existential modal sentences. A sentence like (94-a) can be assigned a representation in which there are two *exh* operators that associate with the domain of *any* (which requires a strong construal, as discussed in Section 2), and in which *even* takes matrix scope (Crnič 2017a).

(94)     a.    John is allowed to read any book.
         b.    [even [exh [exh [$\Diamond$ [[any$_{str}$ D$_F$ book]$_x$ [John read x]]]]]]

The assertive meaning of the sentence is provided in a simplified form in (95): the sentence conveys a free choice inference for every book in the domain of *any*.

(95)     Every book in D is such that John may read it.

*Even* triggers the scalar and the additive presuppositions in (96). Since the sister of *even* in (94) is SER with respect to the domain of *any*, the scalar presupposition is almost tautologous. The additive presupposition is also innocuous: if the sister of *even* is true, it holds that some other alternative is defined and true.

(96)     a.    $\forall$D'$\subseteq$D$\cap$book: $\hat{}$(every book in D is such that John may read it)
                          $<_c \hat{}$(every book in D' is such that John may read it)
         b.    $\exists$D'$\subset$D$\cap$book: every book in D' is such that John may read it

**Universal modal environments.**  *Any*-DPs are unacceptable in universal modal sentences like (97-a). In line with the discussion in Section 3.1, the sentence in (97-a) may be assigned the structure in (97-b), where *even* takes matrix scope, and both *even* and *exh* associate with the domain of *any*. (Absent exhaustification, the sentence is SEP with respect to the domain of *any*, and so the presupposition of *even* is contradictory.)

(97)     a. #John is required to read any book.
         b.    [even [exh [$\Box$ [[any$_{str}$ D$_F$ book]$_x$ [John read x]]]]]

The assertive meaning of the sentence is provided in (98): the sentence conveys that John is required to read a book in D, but he is not required to read a book in any of the proper subsets of books in D. Together, this gives us the free choice inference: every book is such that John is allowed to read it (as discussed in Section 3.1).

(98)    $\square$(John read a book in D) $\wedge$ $\forall$D'$\subset$D$\cap$book: $\neg\square$(John read a book in D')

The alternatives over which *even* quantifies in (97) are incompatible with the sister of *even* – specifically, the sister of *even* entails the negation of each subdomain alternative that is not equivalent to it. This means that the additive presupposition of *even*, provided in (99), cannot be satisfied – namely, it contradicts the assertive meaning of the sentence. Accordingly, the occurrence of *any* is correctly predicted to be unacceptable.

(99)    $\exists$D'$\subset$D$\cap$book: $\square$(John read a book in D')

Thus, all the core data is explained handily on the *Even* Approach.

## 5.3    Relation to the *Any* Condition

The approach to *any*-DPs described above has as a consequence a condition that is slightly weaker than the *Any* Condition. It requires an *any*-DP to occur in a clause that has the following property: if the domain of *any* is replaced with a subdomain, and this yields a distinct meaning of the clause, this meaning must be more likely than the meaning of the initial clause. In other words, *any*-DPs must occur in clauses that are 'likelihood-reversing' with respect to their domains.

(100)    A clause S is likelihood-reversing with respect to a sub-constituent X in a context c iff for every X' such that X'$\Rightarrow_s$X, it holds that $\hat{\ }[\![S]\!] <_c \hat{\ }[\![S[X/X']]\!]$ if S $\not\Leftrightarrow_s$ S[X/X'] (where S[X/X'] is identical to S except that X' replaces X).

(101)    **Consequence of the *Even* Approach**

A DP headed by *any* is acceptable only if it is dominated by a clause that is likelihood-reversing with respect to its domain.

Given that the ordering imposed by *even* respects Strawson entailment, the predictions of the condition in (100) coincide with the *Any* Condition when it comes to sentences that are SER but not SEP (and *vice versa*) with respect to the domain of *any*, as we illustrated in the preceding subsection. They come apart from it in two respects. First: When sentences are both SER and SEP with respect to the domain of *any*, the *Even* Approach predicts unacceptability, but the *Any* Condition does not (though see, e.g., Guerzoni and Sharvit 2007, Gajewski and Hsieh 2014 for required revisions). Second: When sentences are neither SER nor SEP with respect to the domain of *any*, the *Any* Condition predicts unacceptability, but the *Even* Approach does not (though it does predict that the felicity of *any* should track the plausibility of the scalar presuppositions triggered by *even* in them, as we explain in detail in Section 6). This is summarized in Table 1.

In the following section, we zoom in on three areas in which the predictions of the *Even* Approach and the *Any* Condition differ: (i) in singular definite descriptions, (ii) in the scope of non-monotone nominal quantifiers, and (iii) in the scope of desire predicates.

| | SEP | ¬SEP |
|---|---|---|
| SER | ✗ | ✓ |
| ¬SER | ✗ | ✓(context) |

Table 1: The predictions of the *Even* Approach. The rows/columns represent whether the pertinent sentences are SER/SEP with respect to the domain of *any*. The cells in which the predictions of the *Any* Condition differ are marked with gray.

# 6 Non-monotonicity

We discuss three types of sentences that are neither SER nor SEP with respect to the domain of *any*-DPs that they dominate. In all of them, *even* accompanying *any* triggers contingent presuppositions, resulting in *any*-DPs exhibiting context-sensitivity.

## 6.1 Singular definite descriptions

**Episodic sentences.** Lahiri (1998) observed that *any*-DPs are unacceptable in unembedded singular definite descriptions. This is unexpected on the *Any* Condition. For illustration, (102) is SER with respect to the domain of *any*: the unique student who read a book in D is the same individual as the unique student who read a book in a subset D' of D if there is such an individual (Strawson premise).

(102)     a. #The student who read any book passed the exam.
          b. [even [the student$_x$ [any D$_F$ book]$_y$ [x read y]]] passed the exam]]

In contrast, the unacceptability of (102) is predicted on the *Even* Approach. Namely, a sentence like (102) is not merely SER but also SEP with respect to the domain of *any*, as stated in (103): the unique student who read a book in a subset D' of D is the same individual as the unique student who read a book in D if there is such an individual (see, e.g., Lahiri 1998, Guerzoni and Sharvit 2007, Gajewski and Hsieh 2014).

(103)     ∀D'⊂D∩book: ˆ(the student who read a book in D passed the exam)

                    ⇔$_s$ ˆ(the student who read a book in D' passed the exam)

Accordingly, the scalar presupposition that *even* triggers in (102), given in (104), is inconsistent: it requires the alternatives that Strawson entail the sister of *even* to be more likely than it, in violation of the fact that these may be at most as likely as it.

(104)   #∀D'⊂D∩book: ˆ(the student who read a book in D passed the exam)

                    <$_c$ ˆ(the student who read a book in D' passed the exam)

**Generic sentences.** If Strawson entailment between the alternatives and the sister of *even* is suspended, however, the *Even* Approach may admit an occurrence of an *any*-DP, in contrast to the *Any* Condition. One example of such a state of affairs comes from Rothschild (2006) (see Gajewski and Hsieh 2014, and references therein, for further examples):

(105)     The mayor with any sense controls the school board.

The *Even* Approach predicts this sentence to be acceptable on the assumption that the presupposition of the singular definite description is accommodated in the scope of the generic operator, as indicated in (106), where $\mathcal{A}$ indicates the scope of accommodation (see,

e.g., Beaver and Krahmer 2001 on the nature of $\mathcal{A}$). The sentence has the assertive meaning in (107): every relevant situation (every municipality) in which there is a unique mayor with some amount of sense is such that they control the school board.

(106)  [even [Gn [$\mathcal{A}$ [the mayor with any $D_F$ sense] [control the school board]]]]

(107)  $\forall s \in \mathcal{C}$ (there is a unique mayor with D sense in s
$\rightarrow$ the mayor with D sense in s controls the school board in s)

The scalar presupposition of (106), given in (108), is contingent. It is satisfied in contexts in which municipalities have a single mayor, as well as in contexts in which there may be more than one mayor, with more sensible mayors being likely to control the school board. Given that such contexts are natural, the sentence is judged to be felicitous.[14,15]

(108)  $\forall D' \subset D \cap \text{sense}$:
$\hat{}(\forall s \in \mathcal{C}$ (there is a unique mayor with D sense in s
$\rightarrow$ the mayor with D sense in s controls the school board in s)
$<_c$   $\hat{}(\forall s \in \mathcal{C}$ (there is a unique mayor with D' sense in s
$\rightarrow$ the mayor with D' sense in s controls the school board in s))

## 6.2   Non-monotone nominal quantifiers

Linebarger (1980, 1987) observed that *any*-DPs may be acceptable in the scope of non-monotone quantifiers like *exactly two students* (see also Rothschild 2006, Gajewski 2008, among others). The acceptability of *any*-DPs in such sentences may vary with the content expressed by the sentence, with the context, and across speakers. This state of affairs has sometimes been taken to argue that the behavior of *any*-DPs and other NPIs does not fall fully into the purview of grammar (see, esp., Linebarger 1987). Consider sentences (109-a), which is perceived as felicitous, and (109-b), which is perceived as marked.

(109)  [There are 12 students in the graduate program:]
a.   Exactly two students read any book this semester.
b.   ?Exactly ten students read any book this semester.

The acceptability of the *any*-DP in (109-a) is unexpected on the *Any* Condition: the sentence is not SER with respect to the domain of *any*. For example, it may be that exactly

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[14]Sentence (105) is not SER with respect to the domain of *any* on the parse in (106) (and is SEP with respect to it absent accommodation). For example, it is conceivable that all municipalities that have a single mayor are such that the mayor controls the school board (thus, sentence S would be true), but in at least one municipality in which there are two mayors, the mayor with more sense does not control the school board (thus, sentence S[D/D'] would be false for some subset D' of D). Accordingly, the sentence is predicted to be unacceptable on the *Any* Condition.

[15]A similar analysis can be provided for the occurrence of *bhii* 'even' in the first clause of the following example from a reviewer. In this example, *bhii* occurs in a constituent standardly presupposing uniqueness; this is further embedded in the scope of a modal (see Dayal 1995). A more detailed study of *bhii* in correlatives cannot be attempted here (see Dayal 1995, Lahiri 1998).

(i)   jo     bhii kitaab vo paRh      rahaa hai, vo        kitaab tum-ko bhii paRhna cahiyee
which bhii book   he is-reading, that   book you-DAT that    book   bhii should   read
"Whichever book he is reading, you should be reading as well."

two students read a book in D, but no student read a book in a certain subset D' of D. In contrast, the acceptability of sentence (109-a), as well as the infelicity of sentence (109-b), can be explained on the *Even* Approach (Crnič 2014b). Specifically, if sentence (109-a) is parsed as in (110), the scalar presupposition of *even*, given in (111), is contingent: the fact that no Strawson entailment holds between the alternatives means that no ordering with respect to likelihood is inherently imposed on the alternatives.

(110)    [even [[exactly 2 students]$_x$ [any D$_F$ book]$_y$ [x said y]]]

(111)    $\forall$ D'$\subset$D$\cap$book: ˆ(exactly 2 students read a book in D this semester)
$<_c$ ˆ(exactly 2 students read a book in D' this semester)

The presupposition is satisfied in contexts in which the expectation is that a large group of students would read some book or other, and that smaller groups of students would read something more specific (say, a book on the first topic taught). Accordingly, in such a setup, it is unlikely that (only) exactly two students read some book or other, and somewhat more likely that exactly two students read some specific book, that exactly two students read some other book, etc. Finally, the additive presupposition of *even* can be easily accommodated in such a context (say, that exactly two people read a book in the set of all books except the longest one, see also footnote 10). In contrast, the scalar presupposition triggered in sentence (109-b), given in (112), cannot be easily accommodated: it is at least as likely that exactly 10 students read some book or other as that exactly 10 students read some specific book. The implausibility of this presupposition is then responsible for the markedness of (109-b).

(112)    ?$\forall$D'$\subset$D$\cap$book: ˆ(exactly 10 students read a book in D this semester)
$<_c$ ˆ(exactly 10 students read a book in D' this semester)

The contingent nature of the scalar presupposition of *even* allows us to get at the variation in acceptability of the respective sentence across contexts and speakers: different assumptions about what is expected in the context may lead to different likelihood-orderings of the alternatives (see Crnič 2014b for more details). The distribution of *any*-DPs in the scope of non-monotone nominal quantifiers thus does not warrant a departure from the assumption that the distribution of *any*-DPs is determined in grammar.

## 6.3    Desire predicates

*Any* may occur in desire statements (e.g., Kadmon and Landman 1993, Giannakidou 1999):

(113)    a.    Mary is glad that she got any tickets.
         b.    I hope there is any food left.
         c.    They would like to reach any consensus at all.
         d.    Mary wishes anyone had talked to her about this.

Similarly to other occurrences of *any* discussed in this section, the occurrences of *any* in desire statements are acceptable only in specific contexts. These have two properties in common: (i) the attitude holder must find the proposition expressed by the complement of the desire predicate, as well as all those expressed by its alternatives, desirable, but (ii) unlikely to obtain (Kadmon and Landman 1993).

**Desire statements.** While the semantics of desire predicates is controversial (see, e.g., Heim 1992, von Fintel 1999, Villalta 2008, Lassiter 2011, Rubinstein 2017, among others), and its detailed discussion goes beyond the scope of this review, it is commonly agreed that it is non-monotone. This agreement is motivated by the lack of intuitive entailment between desire statements like those in (114), in contrast to analogous belief statements in (115) (see, esp., Heim 1992, von Fintel 1999).

(114)  a.  I want to teach Tuesdays and Thursdays next semester.
　　　  b.  $\Rightarrow\!\!\!/_{\nLeftarrow}$ I want to teach next semester.

(115)  a.  I think that I teach Tuesdays and Thursdays next semester.
　　　  b.  $\Rightarrow/_{\nLeftarrow}$ I think that I teach next semester.

For expository reasons, we adopt the assumption that this non-monotonicity springs from (Strawson) non-monotone comparative semantics of desire predicates, as proposed by Heim (1992). In particular, Heim suggests that desire statements like (116) convey approximately the meaning in (117) (we are ignoring the presuppositions of the sentence): every one of Mary's belief worlds is such that the closest worlds to it in which Mary got some tickets are preferred by Mary ($\prec$) to the closest worlds to it in which she did not.

(116)  Mary is glad that she got some tickets.

(117)  For every one of Mary's belief worlds $w$:
$$\text{sim(w)}(\hat{\ }(\text{Mary got some tickets in D})) \prec_{w,Mary}$$
$$\text{sim(w)}(\hat{\ }(\neg\text{Mary got some tickets in D}))$$

The sentence in (116) is neither SER nor SEP with respect to the domain of the existential quantifier on this construal. For example, the meaning in (117) may be true, while it is false that Mary would be glad if she got bad (D') tickets.

***Any* in desire statements.** Turning now to the felicitous occurrences of *any* in (113), the sentences may be assigned structures along the lines of (118), in which *even* takes matrix scope. Its scalar presupposition is provided in (119).

(118)  [even [Mary is glad [[any D$_F$ tickets]$_x$ [she got x]]

(119)  $\forall$D'$\subset$D$\cap$tickets: $\hat{\ }$(Mary is glad she got tickets in D)
$$<_c \ \hat{\ }(\text{Mary is glad she got tickets in D'})$$

Given that structure (118) is neither SER nor SEP with respect to the domain of *any*, the scalar presupposition in (119) is contingent. It is satisfied in contexts in which (i) getting any ticket is at least as desirable for Mary as getting the tickets she actually got, and in which (ii) it is more likely, according to her, not to get any ticket than getting one. In such a context, sentence (118) contextually (Strawson) entails its subdomain alternatives: if getting a ticket in D is more desirable than getting no ticket in D (the meaning of sentence S), and getting a ticket in D' for D'$\subset$D is at least as desirable as getting a ticket in D, which corresponds to (i), then of course it is more desirable to get a ticket in D' than to get no ticket in D (the meaning of sentence S[D/D'], on the assumption in (ii)). Moreover, the contextual entailment is asymmetric: if one finds getting a ticket in a specific set of tickets desirable, this does not mean that one finds getting a ticket in a superset of those tickets desirable. Accordingly, the scalar presupposition in (119) is satisfied in such a context.

Due to the sister of *even* contextually (Strawson) entailing the subdomain alternatives, the additive presupposition is innocuous as well.

## 6.4 Summary: Non-monotonicity and context

We discussed three areas in which the predictions of the *Any* Condition and the *Even* Approach come apart – in singular definite descriptions, in the scope of non-monotone nominal quantifiers, and in the scope of desire predicates. We observed that the *Even* Approach not only allows for *any*-DPs to be acceptable in these environments but can also adequately capture their context-dependent behavior in them.

(120)    **Non-monotonicity and context**

A DP headed by *any* may be acceptable in a sentence that is neither SER nor SEP with respect to the domain of *any*. It is acceptable if such a sentence is likelihood-reversing with respect to the domain of *any* in the context.

The environments that are (Strawson) non-monotone with respect to the domain of *any* are the only ones in which the *Even* Approach predicts context-dependent distribution of *any*-DPs – only in such configurations is the presupposition of *even* contingent. In (Strawson) monotone environments, the presupposition of *even* accompanying *any*-DPs is either contradictory (in case all the constituents dominating them are SEP with respect to their domain) or (almost) tautologous (in case a constituent dominating them is SER, but not SEP, with respect to their domain).

# 7    Variation

There are expressions in English whose distribution resembles that of *any*. These include so-called minimizers like *(even) lift a finger* and *give a damn*, and expressions consisting of *even* and a focused weak element, like *even one$_F$ book* (see, e.g., Heim 1984, Guerzoni 2004, Eckardt 2009, Chierchia 2013 for further discussion). The combination of these expressions behaving differently than *any*-DPs, on the one hand, and them being accompanied by an overt *even*, on the other hand, has been put forward as a challenge for the *Even* Approach to *any*-DPs (e.g., Heim 1984). The differences between these expressions and *any*-DPs can, however, be derived from how their different properties mesh with the system described above (Crnič 2014a). We focus only on *even one* expressions for brevity.

## 7.1 Distributional parallels

The distribution of *even one* expressions is to a large extent identical to that of *any*-DPs. For example, both types of expressions are acceptable in the scope of negation, and unacceptable when they occur in sentences that are SEP with respect to them:

(121)    John #(didn't) read even one$_F$ book.

Furthermore, both *any* and *even one* expressions exhibit the same type of context-dependency in the scope of non-monotone nominal quantifiers and desire predicates. For example, an *even one* expression is judged to be acceptable in a sentence of the form *exactly n NP VP* to the extent that the number of expected individuals that are in the denotation of *NP* and *VP* is appropriately larger than n. This corresponds to the requirements imposed on the context by occurrences of *any*-DPs in such sentences.

(122)    [There are 12 students in the graduate program:]
   a.   Exactly two students read even one$_F$ book this semester.
   b.   ?Exactly ten students read even one$_F$ book this semester.

**Monotonicity.**   The parallelism described above is expected on the *Even* Approach. Consider first the sentence in (123), in which *even* is assigned matrix scope.

(123)    a.   John didn't read even one$_F$ book.
   b.   [even [neg [[one$_F$ book]$_x$ [John read x]]]]

The scalar presupposition of *even* in (123) is provided in (124), where we are assuming that *one* has *two, three,* etc., as alternatives. The presupposition is almost a tautology since John not reading one book entails John not reading $n$ books for $n > 1$. It is satisfied in any context in which the sister of *even* can be used (see Section 5).

(124)    $\forall n > 1$: ˆ($\neg$(John read 1 book)) $<_c$ ˆ($\neg$(John read n books))

The situation is the opposite if *even one* expression occurs only in constituents that are SEP with respect to it. In this case, *even* triggers a contradictory scalar presupposition.

**Non-monotonicity.**   If an *even one* expression occurs in a sentence that is neither SER nor SEP with respect to *one*, such as (125), and *even* takes scope over that sentence, as in (125), the scalar presupposition it triggers is contingent, as given in (126), and will be satisfied in contexts in which the expectation is that many students read at least one book, and that fewer students read at least two books (see Crnič 2014b for details).

(125)    a.   Exactly two students read even one$_F$ book in my course.
   b.   [even [exactly 2 students$_x$ [one$_F$ book$_y$ [x read y]]]]

(126)    $\forall n > 1$: ˆ(exactly 2 students read 1 book) $<_c$ ˆ(exactly 2 students read n books)

If the sentence is modified, say, if the numeral in the non-monotone quantifier is replaced with a higher one, the presupposition of the sentence changes, as given in (127). This is not satisfied in natural contexts described above: given that many of the 12 students may be expected to read a book, it is quite likely that exactly 10 (out of 12) students read a book, at least more likely than that exactly 10 students read two or more books. Thus, *any*-DPs and *even one* expressions are correctly predicted to exhibit the same kind of context-dependence. Parallel reasoning extends to occurrences of *even one* expressions in the scope of desire predicates.

(127)    ?$\forall n > 1$: ˆ(exactly 10 students read 1 book)$<_c$ˆ(exactly 10 students read n books)

## 7.2   Distributional divergences

The distributions of *any*-DPs and *even one* expressions come apart in certain areas, as documented by Linebarger (1980) and Heim (1984). One such area involves sentences in which *even one* expressions and *any*-DPs occur in restrictors of quantifiers and definite descriptions, and in antecedents of conditionals: while *any*-DPs occurring in these environments do not exhibit sensitivity with respect to the properties of the remainder of the sentence, *even one* expressions do. This is exemplified in (128) and (129) (adapted from Heim 1984): if

an *even one* expression occurs in the restrictor of *every*, the sentence is felicitous only if an appropriate connection can be established in the context between the main predicate and the predicate in the restrictor of *every* – this is the case for passing the exam and reading books, as illustrated by the felicity of (129-a), but not for wearing blue jeans and reading books, as illustrated by the markedness of (129-b).

(128)  a.  Everyone who read any book passed the exam.
       b.  Everyone who read any book wore blue jeans.

(129)  a.  Everyone who read even one$_F$ book passed the exam.
       b.  ?Everyone who read even one$_F$ book wore blue jeans.

**Puzzle.**   The proposed treatment of *even one* expressions gives rise to the expectation that they should <u>not</u> show sensitivity to the nature of the main predicate when they occur in the restrictor of *every*, just like *any*-DPs do not. Consider (130).

(130)  a.  ?Every student who read even one$_F$ book wore blue jeans.

       b.  [even [every student$_x$ [one$_F$ book]$_y$ [x read y]] wore blue jeans]

   The presupposition triggered by *even* in (130) is in (131). It is almost tautologous given that the alternatives Strawson entail the sister of *even*, as stated in (132) – namely, it is satisfied in any context in which the alternatives are not contextually equivalent. The occurrence of *even one book* should thus be felicitous in (130), contrary to fact.

(131)  ∀n>1: ˆ(every student who read 1 book wore blue jeans)
              $<_c$ ˆ(every student who read n books wore blue jeans)

(132)  ∀n>1: ˆ(every student who read 1 book wore blue jeans)
              $\Rightarrow_s$ ˆ(every student who read n books wore blue jeans)

**Exhaustification.**   What is the source of this unexpected sensitivity of *even one* expressions? Descriptively, if the associate of *even* is exhaustified in the restrictor of *every* obligatorily, the distribution of *even one* expressions is correctly predicted. Consider the structure in (133), where *even* and embedded *exh* associate with *one*.

(133)  [even [every student$_x$ [[exh$_C$ [[one$_F$ book]$_y$ [x read y]]] wore blue jeans]]

   The presupposition that we obtain for (133) is provided in (134). Since the alternatives are not Strawson entailed by the sister of *even* on this construal, due to embedded exhaustification, the presupposition is not almost tautologous anymore. It can only be satisfied in contexts in which every student who read exactly one book wearing blue jeans is less likely than every student who read exactly two books wearing blue jeans is, etc. This is the case if it holds in the context that the more one reads, the more likely one is to wear blue jeans. Since such contexts are not natural, the sentence is perceived as marked.

(134)  ?∀n>1: ˆ(every student who read exactly 1 book wore blue jeans)
               $<_c$ ˆ(every student who read exactly n books wore blue jeans)

   The state of affairs changes if we replace the main predicate in (133) with *pass the exam*. In this case the presupposition that we obtain, given in (135), is plausible: every student who read exactly one book passing the exam is indeed less likely than every student who

read exactly two books passing the exam is, etc. – at least in natural contexts in which the more you read, the better you do in exams.

(135)    $\forall n>1$: ˆ(every student who read exactly 1 book passed the exam)

$<_c$ ˆ(every student who read exactly n books passed the exam)

Although the assumption of embedded exhaustification, as stated in (136), captures the observed context-sensitivity, the question of why it should be obligatory has to be left open here (see Crnič 2014a). Furthermore, the question is compounded by the fact that exhaustification does not appear to apply, say, when *even one* expressions occur in the scope of negation as in (123) above (recall that no contingent inferences are generated in these cases). The obligatoriness of embedded exhaustification of weak associates of *even* thus seems to track where *exh* may be embedded (in the restrictors of certain quantifiers and definite descriptions, and in the antecedents of conditionals, but not in the scope of negation; see, e.g., Levinson 2000, Crnič 2013, Spector 2014a).

(136)    **Assumption about exhaustification**

If the associate of *even* can be exhaustified, it must be exhaustified.

**Exhaustification and *any*.**    The associate of *even* in *any*-DPs is the domain of *any*. If *exh* is embedded in the restrictor of *every*, and associates with the domain of *any*, exhaustification will be vacuous given that no alternatives are excludable (Section 2).[16]

(137)    a.    Every student who read even any book wore blue jeans.
         b.    [even [every student$_x$ [exh$_C$ [any D$_F$ book]$_y$ [x read y]]]] wore bj]]

Thus, the presupposition triggered by *even* in such configurations remains almost tautologous even on the assumption of embedded exhaustification. *Any* not exhibiting context-sensitivity is thus compatible with the assumption in (136).

## 7.3   Summary: Alternatives and variation

The account of the differences in the distribution and semantic import of *any*-DPs and *even one* expressions crucially drew on the different kinds of alternatives that these expressions induce (see Krifka 1995, Chierchia 2013). The properties of the different alternatives were shown to conspire with the proposed system to yield different presuppositions of *even*. Specifically, we observed that while the two types of expressions may have comparable LFs, schematically represented in (138), the application of an intervening *exh* operator (where it can apply) leads to noticeably different results.

(138)    [even [... [(exh$_C$) [... weak element ...]]]]

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[16]If the exhaustification were also over the *every*-alternative to *any*, there would be no disruption in Strawson entailment between the subdomain alternatives either (namely, for every subset D' of D, reading some but not every book in D' entails reading some but not every book in D).

# 8 Conclusion and outlook

The *Even* Approach provides an explanation of the behavior of *any* described in this review. Specifically, the descriptive condition on the distribution of *any*-DPs that follows from it, while practically indistinguishable from the *Any* Condition when it comes to Strawson monotone environments (including modal environments), was shown to be superior to it when it comes to Strawson non-monotone environments: it admits *any*-DPs in these environments and captures their context-sensitive behavior. There are many aspects of the behavior of *any*-DPs that we could not attend to here, however. We conclude the review by pointing to some of them.

**Questions.** *Any*-DPs are acceptable in questions. Two recent approaches to questions assume that they may contain a clausal constituent that is SER with respect to *any*-DPs (a negated phrase in Guerzoni and Sharvit 2014 and an *only*-prefixed phrase in Nicolae 2015). Accordingly, if *even* that accompanies *any* were to attach to these constituents, it would trigger a presupposition that would be almost tautologous. While this may be promising, advances in our understanding of questions may require a more radical rethinking of the distribution of *any*-DPs in them (see, e.g., Krifka 1995, van Rooy 2003, Schwarz 2017 for discussion). Finally, unlike *any*-DPs, minimizers and *even one* expressions are acceptable only in rhetorical questions unless appropriately further embedded (e.g., Ladusaw 1979, Heim 1984, Guerzoni 2004; but see Han and Siegel 1997 for *any*-DPs). As in the case of restrictors of quantifiers and antecedents of conditionals, discussed in Section 7, this is unexpected, all else equal, and requires further study.

**Intervention.** Linebarger (1980, 1987) observed that *any*-DPs are unacceptable in sentences that are SER with respect to them (and thus their domains) if they occur in the immediate scope of certain quantifiers like *every*-DPs. This is exemplified in (139), where binding is used to force low scope of the *any*-DP.

(139)    #John doubts that every girl$_i$ read any of her$_i$ books.

Homer (2008, 2010) adds to this the observation that analogous facts hold for certain presupposition triggers, such as *too*. This is exemplified in (140): *anything* is unacceptable in the scope of *too*, which associates with *John* and occurs below negation.

(140)    Mary read some books. #I don't think John$_F$ read anything too.

The unacceptability of the sentences in (139) and (140) is unexpected in light of the preceding discussion: in both cases, the domain of *any* is contained in a sentence that is SER, but not SEP, with respect to it. One way to approach data like (139) is to follow Chierchia (2013) in assuming that the operator associating with the domain of *any* – *even* on the *Even* Approach – must also associate with all the intervening scalar items. This would provide a handle on (139): the alternative conveying that John doubts that <u>some</u> girl read a book of hers entails that John doubts that <u>every</u> girl read a book of hers, and thus cannot be more likely than it. This means that *even* would trigger an inconsistent presupposition, yielding the unacceptability of the sentence. This assumption, however, does not cover examples like (140), which would have to be approached differently (see Chierchia 2013, Ch. 7, for discussion).

**More on variation.**   Besides *any*-DPs and *even one* expressions, there exists a host of other expressions whose behavior parallels that of *any*-DPs in some but not all respects (e.g., Gajewski 2011, Chierchia 2013 for discussion). It remains to be determined whether the *Even* Approach could, and should, be extended to cover these expressions. This question notwithstanding, there is an expectation that if the distribution of an expression is governed by *even*, then the properties of the alternatives the expression induces, and how these interact with *even* and exhaustification, may lead to distributional patterns different from those of *any*-DPs, as we observed for minimizers and *even one* expressions in Section 7 (see Chierchia 2013 for some further discussion).

**Theory comparison.**   The *Even* Approach is a variant of the analysis put forward by Lahiri (1998) for Hindi NPIs. It differs from it in assuming that *even* associates with the domain of NPIs and, consequently, in the alternatives *even* quantifies over (cf. Krifka 1995). This assumption was motivated by the distribution of *any*-DPs in modal environments, and has been previously supported by Kadmon and Landman (1993), Krifka (1995) and, especially, Chierchia (2004, 2013). While an adequate comparison with these and other approaches is beyond the scope of this review, not least because many of them are much more ambitious than the proposal described above (esp., Chierchia 2013), we point to two areas discussed above in which the *Even* Approach can be empirically distinguished from the exhaustification-only approach to *any*-DPs put forward by Chierchia. First: While both approaches predict acceptability of *any*-DPs in existential modal sentences and their un-acceptability in universal modal sentences, they arrive at these predictions in significantly different ways. The *Even* Approach relies on the exhaustification of the domain of *any* across a modal, and on the inferences triggered by *even*; the exhaustification-only approach requires movement of *any*-DPs to scope above the modals, and exhaustification local to them (see also Dayal 2013). The structures of the sentences thus differ in the scope of *any*-DPs on the two approaches (see Section 3.2 for a preliminary discussion). Second: The *Even* Approach systematically admits *any*-DPs in non-monotone environments, in which their felicity depends on the plausibility of the presuppositions triggered by *even*; the exhaustification-only approach either rules out such occurrences of *any*-DPs, or predicts them to give rise to somewhat different inferences.

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