

Emphatic vs. Exclusive Modification by *Single*: A Unified Approach

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1 Introduction

This paper addresses the English emphatic modifier *single*, as it occurs in indefinite noun phrases. Such uses of *single* may give rise to two different sorts of interpretations, which I will refer to as its pure emphatic, or PE, use, and its exclusive emphatic, or EE, use. The PE use of *single* is illustrated in (1a):

(1) Pure emphatic (PE) use

- a. None of my students has failed a single homework assignment yet.
- b. None of my students has failed a homework assignment yet.

Under its pure emphatic use, *single* appears not to affect its sentence's overall truth-conditional meaning, in that both (1a) and (1b) without *single* will be true in exactly the same circumstances. Rather, PE *single*'s presence in (1a) serves to create a more emphatically negative statement, by explicitly highlighting that even the weakest positive claim, that one student failed one assignment, is false.

The exclusive emphatic use of *single* is illustrated in (2a):

(2) Exclusive emphatic (EE) use

- a. A single student came to my office hours. (#Several of them, in fact.)
- b. A student came to my office hours. (Several of them, in fact.)

EE *single* does reliably have an effect on its sentence's overall truth-conditional meaning, in that (2a) semantically entails that no more than one student came. In this respect, (2a) differs from (2b) without *single*, where this same inference is merely (conversationally) implicated. And so EE *single* also serves to create a more emphatic statement, this time by explicitly highlighting the upper-bounding inference that would otherwise only be implicit.

As many readers will have already noticed, PE *single* bears a close affinity to so-called minimizers such as *one bit/the least bit*, *(have) a clue*, *(sleep) a wink*, and in fact, one often finds it grouped with such expressions in the NPI literature (see, e.g., Heim 1984, Krifka 1995, Lahiri 1998, Chierchia 2013). In contrast, EE *single* has received hardly any attention apart from passing mentions by Coppock and Beaver (2011, 2013), who group it alongside such exclusives as *only*, *just*, *mere(ly)*. To my knowledge, no previous work has explicitly addressed the relationship between the two uses—when noted at all, (e.g., Heim 1984: 105), some kind of ambiguity is typically assumed, with the EE use corresponding to *single*'s literal meaning, and the PE use taken as idiomatic. But while the literal vs. idiomatic distinction is certainly relevant for many NPI minimizers, it is far

less obvious that either use of *single* should be counted as idiomatic. Whereas the NPI minimizers in (3) exist as idioms, PE *single* in (5) serves to convert an ordinary, non-idiomatic expression into a minimizer:

- (3) a. I didn't say/speak/breathe a word of what you told me to anybody.
b. I don't give a rat's ass about your cat!
- (4) a. Little Baby Jessica said a word today!
b. I gave a rat's ass to your cat.
- (5) a. I didn't give an 'A' to a single student this semester.
b. I didn't see a single student in my office hours today.
- (6) a. I ended up giving an 'A' to a single student this semester.
b. I saw a single student in my office hours today.

Apart from the differing contributions of PE vs. EE *single* themselves, there is nothing unpredictable about the meanings of (5a,b) (nor (6a,b), for that matter). So it seems that any putative distinction between literal vs. idiomatic uses of *single* eventually reduces to the claim that *single* is lexically ambiguous.

Here, I will instead propose a unified approach to *single*'s two uses, one which takes their shared emphatic character as its starting point. The idea in a nutshell is that this emphatic quality arises from *single*'s obligatory association with a covert, *even*-like operator. The interpretation of PE *single* follows immediately from this assumption, in a way familiar from the literature on NPI minimizers. Perhaps more surprisingly, it will turn out that EE *single*'s semantic upper-bounding effect can also be made to follow from its obligatory association with such an operator. In the final portion of the paper, I will explore some interesting scope interactions between EE *single* and modals, which the analysis developed here in fact predicts.

2 Some further observations about PE and EE *single*

2.1 The relative distribution of the two uses

The preceding examples have already illustrated PE *single* occurring in negative sentences and EE *single* in positive sentences. More generally, the two uses are in a near-complementary distribution—the pure emphatic use arises in those environments that typically license NPIs, e.g., the downward-entailing ones in (7), while the exclusive emphatic use emerges elsewhere, e.g., the upward-entailing environments in (8):

- (7) a. I didn't see a single student in my office hours today. (PE)
 b. I've never watched a single episode of that TV show.
 c. Few of my students attempted a single extra-credit problem.
 d. I doubt that he got a single question right on the exam.
 e. Without a single goodbye, she left him behind forever.
 f. It started raining before I could catch a single fish.
- (8) a. I saw a single student in my office hours today. (EE)
 b. I've watched a single episode of that TV show.
 c. A few of my students attempted a single extra credit problem.
 d. I think that he got a single question right on the exam.
 e. With a single wave of her hand, she left him behind forever.
 f. It started raining after I caught a single fish.

In a handful of environments, both uses are possible, such as the antecedents of conditionals, comparative clauses, and polar questions:

- (9) a. If there is (even) a single 'F' on your transcript, you won't graduate. (PE)
 b. If there is a single donut left, then you should finish it off. (EE)
- (10)a. Mary gave more presents to her secretary than she did to (even) a single one of her children. (PE)
 b. If members of a small group work well together, they can almost always resolve a problem better than a single person can. (EE)
- (11)a. Will (even) a single student pass your class? (PE)
 b. Will all of your notes fit on a single 3"x5" notecard? (EE)

The relative distribution of the two uses also depends upon the syntactic position of *single*, in a way familiar from licensing conditions on NPIs—roughly, in order for its pure emphatic use to emerge, *single* must be c-commanded by an appropriate licensing operator:

- (12)a. I didn't see a single student (PE) /any students in my office hours today.
 b. A single student (EE) /*Any student didn't come to my office hours.
- (13)a. He's given nothing to a single (PE) one /any one of us.
 b. He gave a single (EE) one /*any one of us nothing.
 c. He's given a single (EE) thing /*any thing to none of us.
 d. He's given none of us a single (PE) thing /any thing.
- (14)a. Why didn't a single student (PE) /any students pass your exam?
 b. Why did a single student (EE) /*any students not pass your exam?

Licensing of the pure emphatic use is also subject to the same sorts of intervention effects as have been observed for NPIs—when the licensing relationship is disrupted by an appropriate semantic intervener (e.g., a universal quantifier or conjunction), the exclusive emphatic use instead emerges:

- (15)a. Mary didn't wear a single necklace/any earrings to every party.
not >> a single (PE)/any >> every vs.
not >> every >> a single (EE)/*any
- b. I doubt that everyone voted for a single candidate/anyone.
not >> a single (PE)/any >> every vs.
not >> every >> a single (EE)/*any
- (16)a. Nobody ate a bagel or drank a single (PE) cup of coffee/any coffee.
b. Nobody ate a bagel and drank a single (EE) cup of coffee/*any coffee.

The above facts regarding the relative distribution of PE vs. EE *single* speak against an account in terms of lexical ambiguity. In and of itself, such an account would fail to explain why the two uses are largely confined to non-overlapping environments.

2.2 PE *single* as a minimizer

In NPI-licensing environments, pure emphatic *single* exhibits two characteristic properties of NPI minimizers (vs. non-minimizers like *any*, *ever*), namely (i) co-occurrence with *even*, with no significant effect on the overall interpretation, and (ii) a strong bias towards negative answers in polar questions. That these properties distinguish NPI minimizers from NPIs of the *any/ever*-variety is shown by the contrasts between (17) vs. (18) and (19) vs. (20), respectively:

- (17)a. No one slept (even) a wink last night.
b. The baby has barely (even) made a peep all morning.
c. Not once did he lift (even) a finger to help.
d. I pointed the gun right at him, but he didn't (even) bat an eye.
- (18)a. No one got (*even) any sleep last night.
b. I doubt that the car will (*even) ever move.
- (19)a. Did you (even) sleep a wink last night? ["No" expected]
b. Do you (even) give a damn about your CLS abstract? ["No" expected]
c. Did he (even) bat an eye when you did that? ["No" expected]
- (20)a. Did you get any sleep last night?
b. Did you ever end up revising your abstract?
c. Did he show any fear when you did that?

That PE *single* shares these properties with NPI minimizers is illustrated by (21) and (22):

- (21)a. None of my students has (even) failed a single HW assignment yet.
b. I didn't see (even) a single person during my morning walk.
- (22)a. Has John failed (even) a single assignment yet? ["No" expected]
b. Did you (even) see a single person out there? ["No" expected]

2.3 EE *single* as 'exactly one (and that's surprising!)

Turning to exclusive emphatic *single*, one possibility, following Coppock and Beaver (2011, 2013) would be to treat it on par with exclusives like *only*, *just*. This would make a noun phrase like *a single student* analogous to *only one student*. An alternative analogy would be to *exactly one student*—as shown below, these two views differ in whether the positive inference that a/one student came to my office is presupposed or asserted:

- (23){A single, Only one} student came to my office today.
Presupposition: One student came to my office today.
Assertion: No more than one student came to my office today.
DE-environment

- (24){A single, Exactly one} student came to my office today.
Assertion: One, and no more than one, student came to my office today.
non-DE-environment

Notice that under the former, but not the latter, view, NPs containing EE *single* should constitute (Strawson) downward-entailing operators. But in fact, such NPs do not show the behavior expected under the former view. For instance, whereas *only one* licenses NPIs and triggers Negative Inversion, EE *single* does neither. In this respect, EE *single* more closely patterns with *exactly one*:

- (25)NPI licensing: *only one* vs. *exactly one*, *a single*
- a. Only one student has ever managed a perfect score on the exam.
b. ?*Exactly one student has ever managed a perfect score on the exam.
c. ?*A single student has ever managed a perfect score on the exam.
- (26)Neg Inversion: *only once/one time* vs. *exactly one time*, *a single time*
- a. Only once/one time have I met such a coward!
b. *Exactly one time have I met such a coward!
c. *A single time have I met such a coward!

Apart from its semantic upper-bounding inference, EE *single* also conveys some element of surprise or unlikelihood about this inference—roughly, the fact

that ‘no more than one...’ is taken to run counter to some expected or more likely state of affairs. This can be seen from the examples in (27)-(29), which differ only in the presence or absence of EE *single*:

- (27)a. An American won a medal in this year’s Boston Marathon.
- b. A single American won a medal in this year’s Boston Marathon.
 [two or three American medalists was deemed a more likely outcome]

- (28)a. A candidate was nominated to run in the primary election.
- b. A single candidate was nominated to run in the primary election.
 [surprising that the candidate will be allowed to run unopposed]

- (29)a. A student broke down crying in my office today. [oh no!]
- b. A single student broke down crying in my office today.
 [surprising that not more of them were in emotional distress]

Consider also the following contrast:

- (30)a. Everyone else needed five minutes to solve the problem, but I solved it in a single minute. [surprising that it took me no more than a minute]
- b. #Everyone else needed twenty second to solve the problem, but I solved it in a single minute. [not surprising that it took me no more than a minute]

The difference between the two examples seems to lie in the expectations created by the first clause. In (30a), the fact that the speaker took no more than a minute to solve the problem is surprising, given the first clause’s contents, but this same fact is no longer surprising in (30b) (since no one else took more than a minute either), making *single*’s appearance here rather odd.

3 Minimizers, EVEN, and PE *single*

In this section, I sketch an analysis of *single*’s pure emphatic use, one which is directly based on recent approaches to NPI minimizers (Krifka 1995, Lahiri 1998, Chierchia 2013; see also Fauconnier 1975a,b, 1979, Heim 1984). The guiding idea will be that like NPI minimizers, PE *single* denotes a low point along its scale, namely the numeral ‘one’, and simultaneously introduces an *even*-like component of meaning to its sentence’s overall interpretation. So it is instructive to begin from a slightly different set of examples, in which *even* and *one* interact transparently:

- (31)a. Nora has failed one assignment this semester.
- b. Nora has not failed one assignment this semester.
- c. *Nora has failed even one assignment this semester.
- d. Nora has not failed even one assignment this semester.

I take the numeral *one* to denote a cardinality predicate over individuals, so that (31a,b) assert the (non-)existence of something that Nora failed, which is an assignment and of cardinality one.

$$(32) \llbracket \text{one} \rrbracket = \lambda x. \text{one}(x)$$

$$(33) \llbracket \text{Nora has (not) failed one assignment} \rrbracket \\ = (\neg) \exists x [\text{assignment}(x) \ \& \ \text{one}(x) \ \& \ \text{fail}(n, x)]$$

I further assume the baseline semantics for *even* given in (34)—as a propositional operator, *even* requires that the proposition in its scope, or its prejacent, be (i) true, and (ii) less likely than any of its (relevant) alternative propositions.¹

$$(34) \llbracket \text{even } S \rrbracket(w) = 1 \text{ iff } \llbracket S \rrbracket(w) = 1 \text{ and} \\ \forall \varphi [(\varphi \in \llbracket S \rrbracket_{\text{ALT}} \ \& \ \varphi \neq \llbracket S \rrbracket) \rightarrow \llbracket S \rrbracket <_{\mu} \varphi],$$

where μ is a contextually-given likelihood measure on propositions,
i.e., ‘ $p <_{\mu} q$ ’ \approx p is less likely/probable to be true than q , relative to μ .

An important feature of *even*’s likelihood measure μ is that it respects semantic strength, so that if p entails q , then p can be no more likely than q :

$$(35) \text{For any probability measure } \mu, \text{ if } p \subseteq q, \text{ then } p \leq_{\mu} q.$$

Informally, if p is stronger than q , then it is in some sense “harder” to make p true than it is to make q true—since Nora’s having failed two (or more) assignments requires that she have failed one (or more) assignment, the former can be no more likely than the latter.

In (31c,d), *even*’s prejacent propositions are those given above in (33). The prejacent’s alternatives are determined by the numeral *one*, and so are propositions of the form ‘Nora has (not) failed n assignments’ for any (relevant) alternative numeral n . In either case, the resulting set of propositional alternatives is totally ordered by semantic entailment.

$$(36) \llbracket \text{one} \rrbracket_{\text{ALT}} = \{ \lambda x. \text{one}(x), \lambda x. \text{two}(x), \lambda x. \text{three}(x), \dots \}$$

$$(37) \llbracket \text{Nora has (not) failed one assignment} \rrbracket_{\text{ALT}} \\ = \{ (\neg) \exists x [\text{assignment}(x) \ \& \ n(x) \ \& \ \text{fail}(n, x)] : n \geq 1 \} \\ = \{ \llbracket \text{Nora has (not) failed } n \text{ assignment(s)} \rrbracket : n \geq 1 \}$$

¹ A more satisfactory rendering of *even*’s meaning would treat its likelihood condition as a presupposition, rather than an ordinary entailment. I leave this difference aside here.

We can now explain why the positive sentence (31c) with *even one* is unacceptable. The prejacent proposition that Nora has failed one assignment is here weaker than, and thus entailed by, all of its alternatives. By (35), none of these alternatives may be more likely than the prejacent, and so the requirement that *even*'s prejacent be less likely than any of them is unsatisfiable.

$$(38) \llbracket \text{even} \llbracket \text{Nora has failed one assignment} \rrbracket \rrbracket \\ = \lambda w. \llbracket \text{N. has failed one assign.} \rrbracket(w) \ \& \\ \forall n [n > 1 \rightarrow \llbracket \text{N. has failed one assign.} \rrbracket <_{\mu} \llbracket \text{N. has failed } n \text{ assign.'s} \rrbracket]$$

Why, then, is the negative sentence (31d) with *even one* acceptable? The answer is that negation reverses the entailment relationships amongst the prejacent and its alternatives. As a result, the prejacent proposition that Nora has not failed one assignment is now stronger than, and thus entails, all of its alternatives. The requirement that *even*'s prejacent be less likely than any alternative proposition is straightforwardly satisfied.

$$(39) \llbracket \text{even} \llbracket \text{Nora has not failed one assignment} \rrbracket \rrbracket \\ = \lambda w. \llbracket \text{N. has not failed one assign.} \rrbracket(w) \ \& \\ \forall n [n > 1 \rightarrow \llbracket \text{N. has not failed one assign.} \rrbracket <_{\mu} \llbracket \text{N. has not failed } n \text{ assign.'s} \rrbracket]$$

The likelihood condition that *even* introduces in (39) (vs. (33)) accounts for its emphatic effect in (31d) (vs. (31b))—*even* explicitly highlights the prejacent's noteworthiness relative to its alternatives.

Turning now to PE *single*, observe that its effect in (40) is virtually identical to *even one*'s effect in (31d):

(40) Can you believe it? Nora hasn't failed a single assignment this semester.

To capture this, I analyze *single* as a formally-marked counterpart to the numeral *one*. In other words, *single* possesses the same cardinality-predicate denotation as does *one*, and evokes the same cardinality-predicate alternatives. As *one*'s formally-marked counterpart, however, *single* (i) obligatorily evokes its alternatives (unlike *one*, which only optionally evokes them), which in turn (ii) signal the obligatory presence of a covert counterpart to *even*.

$$(41) \llbracket \text{single} \rrbracket = \llbracket \text{one} \rrbracket = \lambda x. \text{one}(x)$$

$$(42) \llbracket \text{single} \rrbracket_{\text{ALT}} = \llbracket \text{one} \rrbracket_{\text{ALT}} = \{ \lambda x. \text{one}(x), \lambda x. \text{two}(x), \lambda x. \text{three}(x), \dots \}$$

$$(43) \llbracket \text{EVEN} \llbracket \text{N. has not failed a single assignment} \rrbracket \rrbracket$$

The logical form for (40) with PE *single* is (43), which bears on obvious resemblance to the one given in (39) with *even one*—the only essential differences lie in whether and how certain items are pronounced. Unsurprisingly, then, the interpretation that we arrive at with PE *single* is no different from that given previously for *even one*.

$$(44) \llbracket \text{EVEN} \llbracket \text{Nora has not failed a single assignment} \rrbracket \rrbracket \\ = \lambda w. \llbracket \text{N. has not failed one assign.} \rrbracket(w) \ \& \\ \forall n [n > 1 \rightarrow \llbracket \text{N. has not failed one assign.} \rrbracket <_{\mathbf{u}} \llbracket \text{N. has not failed } n \text{ assign. 's} \rrbracket]$$

Such a treatment of *even one* and PE *single* extends straightforwardly to their occurrences in other entailment-reversing environments.

4 An EVEN-based approach to EE *single*

4.1 Likelihood, (non-)entailment, and EXH

How does the above analysis fare with respect to *single*'s exclusive emphatic use? In fact, the analysis in its current form predicts that such examples as (45) should not be possible:

(45) Can you believe it? Nora failed a single assignment this semester.

$$(46) \llbracket \text{EVEN} \llbracket \text{Nora failed a single assignment} \rrbracket \rrbracket \\ = \lambda w. \llbracket \text{N. failed one assign.} \rrbracket(w) \ \& \\ \forall n [n > 1 \rightarrow \llbracket \text{N. failed one assign.} \rrbracket <_{\mathbf{u}} \llbracket \text{N. failed } n \text{ assign. 's} \rrbracket]$$

The resulting interpretation given in (46) suffers from two problems. First, EVEN's prejacent is the proposition that Nora failed one assignment, which is weaker than, and thus at least as likely as, any of its alternative propositions. Just as was the case in (38), *even*'s likelihood condition is unsatisfiable here—this is the desired result for *even one* in positive sentences (as well as for distributionally-restricted NPI minimizers like *(have) a clue*, *(sleep) a wink*), but not for EE *single*. A second problem arises from the fact that EVEN's prejacent does not impose any upper bound on the number of failed assignments, but rather is true so long as Nora failed any (positive) number of assignments.

I propose to solve both of these problems at once with the following assumption, which is that EVEN's prejacent in (45) itself contains another covert propositional operator, namely the EXH(AUST) operator. In other words, the logical form for (45) with EE *single* is not (46), but rather (47). (On EXH, see, e.g., Fox 2007, Chierchia et al. 2012, Crnic 2012. On the interpretation of logical forms like (47), see Krifka 1991, Wold 1996).

(47)[EVEN [EXH [Nora failed a single assignment]]]

The EXH operator strengthens the meaning of its prejacent in (47) by excluding all of its non-weaker propositional alternatives. The resulting proposition that Nora failed one, but not two (or three or four ...) assignments now includes the desired upper bound.

(48)[[EXH S]](w) = 1 iff [[S]](w) = 1 and
 $\forall \varphi[(\varphi \in [[S]]_{ALT} \ \& \ \varphi(w) = 1) \rightarrow [[S] \subseteq \varphi]$

(49)[[EXH [Nora failed a single assignment]]]
 = $\exists x[\text{assignment}(x) \ \& \ \text{one}(x) \ \& \ \text{fail}(n, x)] \ \& \ \neg \exists x[\text{assignment}(x) \ \& \ \text{two}(x) \ \& \ \text{fail}(n, x)]$

It is the exhaustified proposition in (49) that serves as EVEN's prejacent, and from which the prejacent's alternatives are also calculated. Consequently, these alternatives will themselves be exhaustified propositions of the form 'Nora failed *n*, but no more than *n*, assignments'.

(50)[[EXH [Nora failed a single assignment]]]_{ALT}
 = { $\exists x[\text{assignment}(x) \ \& \ n(x) \ \& \ \text{fail}(n, x)] \ \& \ \neg \exists x[\text{assignment}(x) \ \& \ n+1(x) \ \& \ \text{fail}(n, x)] : n \geq 1$ }
 = { [[Nora has failed n-and-no-more-than-n assignment(s)]] : $n \geq 1$ }

We see that another effect of EXH's presence is to disrupt any entailment relationships amongst EVEN's prejacent and its alternatives—instead, all of the exhaustified propositions are mutually incompatible.

In tandem, these two effects of EXH-insertion yield the correct results for positive sentences with EE *single* such as (45).

(51)[[EVEN [EXH [Nora failed a single assignment]]]]
 = $\lambda w. [[[EXH [N. failed one assign.]]]](w) \ \& \ \forall n[n > 1 \rightarrow [[[EXH [N. failed one assign.]]]] <_{\mu} [[[EXH [N. failed n assign.'s]]]]$

Since (51) entails the truth of EVEN's prejacent, (45) is correctly predicted to semantically convey its upper-bounding inference. Furthermore, since the alternatives to EVEN's prejacent are now mutually incompatible, they are free to stand in any contextually-given likelihood relation to each other—there are no longer any entailment relationships amongst them that the likelihood measure μ must respect. This is what allows for the satisfaction of EVEN's likelihood condition—it will be satisfied whenever context furnishes the expectation that

Nora failed more than one assignment, since this will make *EVEN*'s prejacent less likely than any of its (relevant) alternatives. More generally, since all of the exhaustified alternatives, including *EVEN*'s prejacent, share the entailment that Nora failed an/one assignment, the prejacent's relative unlikeliness must stem from its additional entailment that Nora failed no more than one assignment. In this way, *EVEN*'s likelihood condition serves to explicitly highlight its prejacent's upper-bounding inference in (45).

4.2 Why *EVEN* ≠ *even*

At this point, another puzzle arises. We've seen that *even one* and *single* pattern together in negative sentences, a fact which motivated our analysis of *single* as a formally-marked counterpart to *one*. But we've also seen, and (52) shows again, that *single* and *even one* fail to pattern together in positive sentences. In particular, *even one* has no corresponding exclusive emphatic use in (52b):

(52) Can you believe it? ...

- a. Nora failed a single assignment this semester.
- b. *Nora failed even one assignment this semester.

Given that exhaustification of *EVEN*'s prejacent was necessary with EE *single* in (52a), one possible explanation for this difference is that overt *even*, unlike covert *EVEN*, somehow precludes an exhaustified prejacent. But why should such a difference exist?

My tentative answer has to do with another inference that is often observed for overt *even*, namely its additive inference. Apart from conveying the relative unlikeliness of its prejacent, overt *even* has also been claimed to convey that some alternative to its prejacent is also true, as in (53iii) (see, e.g., Karttunen and Peters 1979, Rooth 1985, Wilkinson 1996, Rullmann 1997).

(53) Even grandma smokes cigars.

- (i) Grandma smokes cigars. (true prejacent)
- (ii) Grandma is the least likely contextually-relevant person to be a cigar-smoker. (likelihood inference)
- (iii) Someone else smokes cigars. (additive inference)

(54) $\llbracket \textit{even S} \rrbracket(w) = 1$ iff $\llbracket S \rrbracket(w) = 1$ and

$$\forall \varphi [(\varphi \in \llbracket S \rrbracket_{ALT} \ \& \ \varphi \neq \llbracket S \rrbracket) \rightarrow \llbracket S \rrbracket <_{\mu} \varphi] \text{ and} \\ \exists \varphi [(\varphi \in \llbracket S \rrbracket_{ALT} \ \& \ \varphi \neq \llbracket S \rrbracket) \ \& \ \llbracket \varphi \rrbracket(w) = 1]$$

But remember that one of the consequence of exhaustifying *even/EVEN*'s prejacent is that it also yields exhaustified, mutually-incompatible alternatives. This means that exhaustifying *even*'s prejacent in (52b) will prevent its additivity condition

from ever being satisfied, since it will be impossible for the prejacent and some other alternative to simultaneously be true.

$$\begin{aligned}
 (55) & \llbracket \textit{even} [\text{EXH} [\text{Nora failed one assignment}]] \rrbracket \\
 & = \lambda w. \llbracket [\text{EXH} [\text{N. failed one assign.}]] \rrbracket(w) \ \& \\
 & \quad \forall n[n > 1 \rightarrow \llbracket [\text{EXH} [\text{N. failed one assign.}]] \rrbracket <_{\mu} \llbracket [\text{EXH} [\text{N. failed } n \text{ assign.'s}]] \rrbracket] \\
 & \quad \& \exists n[n > 1 \ \& \llbracket [\text{EXH} [\text{N. failed } n \text{ assign.'s}]] \rrbracket(w)]
 \end{aligned}$$

On the other hand, leaving *even*'s prejacent unexhaustified in (52b) will allow for the satisfaction of its additivity condition, but at the expense of an unsatisfiable likelihood condition.

Under the proposed analysis, the fact that covert *EVEN* is acceptable in (52a) suggests that it crucially differs from overt *even* in failing to impose any additivity condition on the prejacent and its alternatives. This will allow for exhaustification of *EVEN*'s prejacent in (52a) in order to satisfy its likelihood condition, as described in section 4.1. The assumption that overt *even* does impose an additivity condition leads to the conundrum that was just identified above, rendering overt *even* unusable in (52b). This same conundrum prevents overt *even* (vs. covert *EVEN*) from occurring with *EE single* in positive sentences:

(56) Can you believe it? Nora failed (**even*) a single assignment this semester.

Even one and pure emphatic *single* are still correctly predicted to pattern together in negative sentences, where recourse to exhaustification was not necessary:

- (57)a. Nora didn't fail a single assignment this semester.
 b. Nora didn't fail *even one* assignment this semester.

The prejacent to *even/EVEN* in (57) are already stronger, and thus less likely, than their alternatives, so the likelihood condition is automatically satisfied (cf. section 3). And since these prejacent entail all of their alternatives, the additivity condition imposed by overt *even* is also automatically satisfied. A further prediction, then, is that overt *even* should happily co-occur with *PE single* in negative sentences:

(58) Nora didn't fail *even a single* assignment this semester.

Finally, we can observe that in both positive and negative sentences, stressed *ONE* patterns with *single*, rather than *even one*, suggesting that it too should be counted as formally-marked counterpart to the ordinary numeral *one*:

(59) Can you believe it? Nora failed (**even*) *ONE* assignment this semester.

(60) Nora didn't (even) fail ONE assignment this semester.

As another formally-marked counterpart to *one*, we may assume that stressed *ONE* obligatorily activates its alternatives, which are in turn met by covert EVEN.

5 \exists , EXH, and differentiated scope

In this final section, I would like to examine a basic feature of the preceding proposal, which is that the existence and upper-bounding inferences conveyed by (61) with EE *single* are introduced separately.

(61) Nora failed a single assignment this semester.

The existence inference that there is a/one assignment that Nora failed is contributed by the indefinite determiner *a*, while I have claimed that the upper-bounding inference that there is no more than one such assignment comes from the covert operator EXH. In all of our examples thus far, the indefinite determiner has occurred within the immediate scope of EXH, but nothing demands that this be so. Instead, we expect that *a* and EXH should be able to scope independently of each other, leading to apparent cases of differentiated, or split, scope. Such a scopal configuration is illustrated in (62b), where some third operator intervenes between the two. ((62a) illustrates the immediate-scope configuration that we have so far considered.)

- (62)a. [OP [EXH [...a (\exists) single ...]]]
b. [EXH [OP [...a (\exists) single ...]]]

That such differentiated scope is indeed possible is demonstrated by the contrasting interpretations of (63a) vs. (63b), both of which contain the deontic possibility modal *allowed* in addition to EE *single*:

- (63)a. (From a website intended for government contractors, who often maintain several separate federal work contracts at once.)
You are allowed to submit a single invoice per month, instead of multiple invoices for each contract.
b. Fans attending the game are allowed to bring a single bag with them.

In both examples, the indefinite noun phrase that hosts EE *single* is interpreted *de dicto*, indicating that the NP scopes below *allowed*. Under its most natural interpretation, (63a) grants the addressee permission to submit exactly one invoice, without ruling out the possibility of submitting more than one. (63b), on the other hand, says something stronger, in that it imposes an upper limit on the number of bags that may be brought into the stadium: fans are allowed to bring a/one bag, and for no number higher than one are they allowed to bring that many bags with

them. As shown in (64), the two interpretations arise by varying the relative scope of *allowed* and EXH—in particular, when *allowed* intervenes between EXH and the indefinite NP, as in (64b), we arrive at an upper limit on what is allowed.

- (64)a. $\llbracket \llbracket \text{allowed} [\text{EXH} [\text{you submit a single invoice}]] \rrbracket \rrbracket = \Diamond(1 \ \& \ \neg(2 \vee 3 \vee \dots))$
 b. $\llbracket \llbracket \text{EXH} [\text{allowed} [\text{you bring a single bag}]] \rrbracket \rrbracket = \Diamond 1 \ \& \ \neg(\Diamond 2 \vee \Diamond 3 \vee \dots)$

The same sort of differentiated scope can be observed for necessity modals—whereas (65a) requires that your abstract be no more than one page long, (65b) instead allows that you take no more than one math class, i.e., no more than one is required:

- (65)a. Your abstract needs to be a single page long.
 b. You need to take a single math class to graduate.

These two interpretations can also be captured by varying the relative scope of the modal and EXH, only this time, when the modal intervenes between EXH and the indefinite, as in (66b), we arrive at an upper bound on what is required.

- (66)a. $\llbracket \llbracket \text{need} [\text{EXH} [\text{your abstract be a single page long}]] \rrbracket \rrbracket = \Box(1 \ \& \ \neg(2 \vee 3 \vee \dots))$
 b. $\llbracket \llbracket \text{EXH} [\text{have} [\text{you take a single math class}]] \rrbracket \rrbracket = \Box 1 \ \& \ \neg(\Box 2 \vee \Box 3 \vee \dots)$
 $\equiv \Box 1 \ \& \ (\Diamond \neg 2 \ \& \ \Diamond \neg 3 \ \& \ \dots)$

Some further, naturally-occurring examples of the differentiated scope reading are given in (67):

- (67)a. You may bring a single 3”x 5” notecard to the exam. [better not bring two]
 b. Veritas serves students who need to take a single class or a full course load or anything in between.
 [most plausibly, students who don’t need to take more than one, rather than students who are prohibited from taking more than one]
 c. This community college is such a hassle to navigate online and in person! I had to take a single class in Physics as a pre-requisite, and the entire enrollment system was screwed up...
 [prerequisites rarely prohibit taking more than one background class]

The possibility of such readings thus provides some further support for a decompositional approach to EE *single*, of the sort that I have proposed here.

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