

# *Mere-ology*\*

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## 1 Introduction

We will offer an account of some puzzling semantic and pragmatic properties of the exclusive adjective *mere*, an account which sheds light on the broader issue of what it is to be an exclusive and what the possible meanings of exclusives are. By considering the different uses of *mere* against the backdrop of its more famous cousin *only*, we are able to develop one abstract lexical entry schema containing parameters that can be instantiated differently for different exclusives and different uses thereof.

The categorization of *mere* as an ‘exclusive’ is warranted by the fact that it has a meaning of the form “(at least) X and nothing more,” where “nothing” ranges over a pragmatically salient set of alternatives. This is one property it shares with the paradigmatic exclusive *only*, along with other exclusives, including *just*, *merely*, *solely*, *exclusively*, the adjective *sole*, and adjectival *only*. Both (1) and (2), for example, imply that the female referent in question is (at least) a child, and no more than a child:

- (1) She is a mere child.
- (2) She is only a child.

A second similarity between *mere* and *only* is that the negative part of the meaning (“and nothing more”) is part of the primary semantic contribution, an *at-issue* part of the content in Potts’s (2005) sense, while the positive part is typically presupposed to be true by the speaker. As we discuss further in §2, analyses vary as to what the positive component of the meaning of *only* is; Horn (1969), for example, takes it to be the *prejacent*, which is the proposition that the sentence would express if the exclusive were removed (e.g. in (2), the prejacent is the proposition that the female referent of *she* is a child). Like Beaver and Clark (2008), we take the positive component of the meaning to be the proposition that something *at least as strong* as the prejacent holds, where

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strength is contextually determined. We argue that this is true of both *mere* and *only*, so a speaker uttering either (1) or (2) presupposes that something at least as strong as the proposition that she is a child holds, and asserts that nothing stronger holds. In §2 we provide evidence for this parallel between *mere* and *only* from emotive factive predicates, reason constructions, and negation.

But there are several points of difference between *only* and *mere*. First, *only* is generally associated with *non-scalar*, or *quantificational* readings, *mere* has only *scalar* readings. Example (2) manifests a scalar reading of *only*. The most natural interpretation of (2) – and the only reading of (1) – is not that the referent has no properties other than being a child (the quantificational reading), but that she is of no greater age (and hence, perhaps, ability) than a child (the scalar reading). In general, inter-paraphrasability between *mere* and *only* is limited to scalar readings.

Modifying an argumental noun phrase (as opposed to a predicative one, as in (1) and (2)), the most natural reading of *only* is a quantificational one. Thus examples (3) and (4) mean quite different things:

- (3) The mere thought of him sends shivers down my spine.
- (4) Only the thought of him sends shivers down my spine.

While (3) suggests that his presence or touch would certainly also have the ability to send shivers down the spine, (4), somewhat implausibly, suggests that such things would not have that effect.

This difference in interpretation corresponds to a contrast in the ability to license negative polarity items. In general, and apart from an interesting class of exceptions to which we will turn shortly, subject-modifying *only* licenses NPIs in the VP but *mere* does not.

- (5) Only a smile from him would make any difference.
- (6) \*A mere smile from him would make any difference.

The presence of the NPI *any* in the VP is responsible for the ungrammaticality of (6); if it were replaced by, for example, the indefinite article *a*, the example would become grammatical.

To the extent that *mere* and *only* are similar, our analysis of *mere* leans on prior analyses of *only*. The bulk of prior work on the meaning of *only* concentrates on what we might call simple quantificational readings, and leaves scalar readings aside, although a small subset of prior literature does consider scalar readings.<sup>1</sup> Since, as we will discuss, *mere* is used exclusively to express scalar meanings, it would seem to be prior formal work on scalar interpretations of exclusives that is of most direct relevance to the current paper. However, none

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<sup>1</sup>Work on non-scalar uses of *only* includes Horn (1969); Geach (1972); Herburger (2000); McCawley (1993); Atlas (1991, 1993, 1996); Horn (2002, 1996a); von Stechow (1997); Ippolito (2006) and Roberts (2006); prior work on the scalar properties of *only* includes Jacobs (1983), Schwarzschild (1997), von Stechow and Schulz (2003), Beaver (2004), and Klinder (2004).

of this work serves to explain the contrast between (3) and (4), or the fact that *mere* generally does not license NPIs outside of the noun phrase it modifies.

Our explanation for these facts, presented in §3, is based on scope; *only* takes sentential scope, whereas *mere* takes scope only over the noun it modifies. Essential to our argument is that *mere* should license NPIs in the nominal it modifies, and this prediction is borne out.

To fully capture the contrast in meaning between (3) and (4), however, we must say more about *mere* than that its scope is restricted to the NP level. *Mere* is not the only exclusive with NP-scope; another one is *sole*, and *mere* and *sole* give rise to radically different interpretations (compare *a mere spider* and *a sole spider*). To distinguish between *mere* and *sole*, we propose that they differ in the constraints they place on the structure of the salient set of alternatives.

And there is a twist (the class of exceptions alluded to above): although subject-modifying *mere* generally does not license negative polarity items in the VP, there are some cases in which it does, including the following:

- (7) Of all these children and teens struggling with emotional and behavioral problems, a mere 30% receive any sort of intervention or treatment. ★

In §4, we account for such cases by proposing that in addition to being able to modify properties, *mere* can also modify generalized quantifiers, which take the property denoted by the VP as an argument. When it does so, *mere* takes scope over the entire sentence.

This leads us to a cross-categorical lexical entry for *mere* that accounts for both its property-modifying use and its generalized quantifier modifying use. Interestingly, our proposed lexical semantics for *mere* can also be extended to *only*, which suggests that it may represent a completely general statement of the semantics of exclusives, with differences arising through restrictions on certain abstract parameters.

## 2 Similarities between *mere* and *only*

The meaning of *only* has a positive component and a negative component. In a sentence like (8), the positive component is roughly that the speaker invited John, and the negative component is roughly that the speaker invited nobody else, or nobody more exciting or noteworthy. (The latter would be a scalar reading.)

- (8) I only invited John<sub>F</sub>.

*Mere* has a positive and a negative component as well. This can be shown using examples like (9).

- (9) The trial court had held that Hunt did not owe any such duty because he was a mere employee and not a corporate officer or the “policy-making equivalent” of an officer. ★

To say that someone is a *mere employee* is to imply that they are an employee and no more than an employee, thus, not a corporate officer. As mentioned in the introduction, we take the positive component of the meaning of exclusives to be the proposition that something at least as strong as the prejacent holds, and the negative component to be the proposition that nothing stronger holds. In this case, the positive implication is that he was at least an employee, and the negative implication is that he was no more than an employee, or no higher up in the corporate structure.

It is the presence of *mere* in (9) that generates the negative implication. (10) shows that being an employee is consistent with being higher up on the scale; being, for example, a corporate officer.

(10) He was an employee. In fact he was a corporate officer.

Being a *mere employee* is, in contrast, not:

(11) He was a mere employee. #In fact he was a corporate officer.

Nor is being *only an employee*:

(12) He was only an employee. #In fact he was a corporate officer.

Thus *only* and *mere* both give rise to the “and no more” inference, that is, both have a negative component as part of their meaning.

Another similarity between *mere* and *only* is that the positive component of the meaning is presupposed, while the negative component is at-issue. Evidence for this comes from several sources, including emotive factive verbs, reason clauses, and negation.

Beaver and Clark (2008) use emotive factive verbs to show that the negative component in the meaning of *only* is presupposed, pointing to examples like (13).

(13) I am disappointed that only 3 billion dollars will be paid against the approximately 480 billion dollar federal debt. \*

What is disappointing to the speaker in (13) is not that the three billion dollars were paid – that much is good – but rather that no more than those three billion were paid; in other words, the negative component, and not the positive component, is targeted by the emotive factive verb. The same can be said about the corresponding sentence with *mere*:

(14) I am disappointed that a mere 3 billion dollars will be paid against the approximately 480 billion dollar federal debt.

Assuming that what emotive factive verbs target is at-issue content, this shows that the negative component, and not the positive component, is at-issue.

Reason clauses provide another environment that distinguishes between presupposed and at-issue content (Dretske 1972). Beaver and Clark (2008) give the following example:

- (15) And aides and allies were instructed not to characterize Thursday's vote as a victory or a defeat, even though many viewed it as a partial win, because only 31 Democrats voted for Hyde's resolution. \*

Here, the reason that the vote should not be characterized as a victory or a defeat is not that the 31 Democrats voted for the resolution – those votes are reasons to characterize the vote as a victory – but rather that no more than the 31 Democrats did so. The same interpretation arises with *mere*:

- (16) And aides and allies were instructed not to characterize Thursday's vote as a victory or a defeat, even though many viewed it as a partial win, because a mere 31 Democrats voted for Hyde's resolution.

Here is an attested example of this phenomenon with *mere*:

- (17) Northwest was not liable because it was a mere conduit for another's infringing conduct. \*

The fact that Northwest was a conduit for another's infringing conduct is not what frees it from liability; *au contraire*, if anything that should make it more liable. The reason that it is *not* liable is that it was *no more* than a conduit for another's infringing conduct, and did not actually engage in such conduct *per se*. Assuming that reason clauses target at-issue content, these contrasts show that the negative component is at-issue while the positive component is not, and that this is so for both *mere* and *only*.

If the positive component is presupposed, then it should survive under negation. This can be seen in examples like the following:

- (18) The court determined that Green was not a mere conspirator, but an organizer of the conspiracy. \*

The positive inference in the first clause in (18) is that Green was at least a conspirator. The negative component is that he was at most a conspirator. The negative component is at-issue, so it is targeted by the negation in the first clause, to give: Green was strictly more than a conspirator. In this case, that proposition is entailed by the second clause. Crucially, however, even when the second clause is removed, as in (19), it is still implied that Green was strictly more than a conspirator (i.e. that he was high up in the sinister, conspiratorial hierarchy).

- (19) Green wasn't {a mere, only a} conspirator.

What does not follow is the negation of the positive component, i.e. that Green was strictly less than a conspirator. And this in turn confirms that the positive component is not targeted by embedding operators like negations, and provides evidence that in general the positive component of the meaning of *mere* is presupposed, just as it is with *only*.

A good way to develop a theory of *mere*, then, is to start with a theory of *only*. There are a number of theories of *only* that capture the asymmetry between the positive and negative components, which do not treat it as the simple conjunction of the positive and negative components. According to Horn

(1969), the prejacent is presupposed and the negative universal is asserted. Horn (1996b) suggests instead that what is presupposed is not the prejacent but an existential. According to Ippolito (2006), an implication from an existential to the prejacent is presupposed. It has also been argued that the inference to the prejacent is an implicature (von Stechow and Schulz 2003).

A problem for all of these theories is the existence of scalar readings, as in the following example:

- (20) Some people hate lawyers because most people can only afford mediocre ones and, as goes with most things in life, you get what you pay for. \*

What (20) does *not* imply is that the people in question can afford no lawyers other than mediocre ones; there could be less-than-mediocre lawyers (who charge what they are worth) that these people could afford. What is implied is that the people in question cannot afford lawyers who are better than mediocre (and correspondingly expensive). In this sense, the most natural interpretation for (20) is a *scalar* one.

A related problem for these theories comes from the fact that under scalar readings, the prejacent does not reliably follow as an inference from an *only* sentence. Beaver and Clark (2008) give this example:

- (21) This isn't only a pointless "shoot-em-up" movie. \*

This sentence does not imply that the movie in question is a pointless shoot-em-up movie. On the contrary, it implies the negation of the prejacent: it is *not* a pointless shoot-em-up movie. The same consequence follows if *only* is replaced by *mere*:

- (22) This isn't a mere pointless "shoot-em-up" movie.

Thus the possible disappearance of the prejacent is one of the properties that the *mere*-ologist must capture.

Note, incidentally, that it is not always the case that for scalar readings of *only* and with *mere*, the negation of the prejacent follows under negation. The status of the prejacent depends on the logical relationship between the elements of the scale. Consider for example a negated version of (9), or the corresponding version with *only*:

- (23) She isn't {a mere, only an} employee.

In a context like that of (9), this could imply that she is a corporate officer, for example, which would be a type of employee. In this case, the stronger alternative entails the prejacent, and so the prejacent follows as an inference.

Beaver and Clark's (2008) theory of exclusives captures both scalar and non-scalar readings, and accounts for the occasional disappearance of the prejacent under negation. It is based on Roberts's (1996) notion of the Current Question (CQ), a.k.a. the Question Under Discussion (QUD). The CQ is represented as a set of non-exhaustive alternative answers (propositions), ranked by strength

( $\leq$ ). Beaver and Clark treat *only* as a sentence operator, giving the presupposition and content of  $X$  [*only*  $Y$ ]  $Z$  as follows, where the superscript  $I$  around the denotation brackets stands for *intension*; it is meant to represent the ordinary semantic value:

- presupposition( $X$  [*only*  $Y$ ]  $Z$ ) =  $\text{MIN}_\sigma(\llbracket X Y Z \rrbracket^I)$
- $\llbracket X$  [*only*  $Y$ ]  $Z \rrbracket^I$  =  $\text{MAX}_\sigma(\llbracket X Y Z \rrbracket^I)$

The formula corresponding to the presupposition means that the proposition corresponding to the ordinary semantic value of the prejacent ( $\pi$ ) is at least as strong as every true alternative in the CQ.  $\text{MIN}(\pi)$  is defined as follows:<sup>2</sup>

$$(24) \quad \text{MIN}_\sigma(\pi) = \lambda w. \forall p \in \text{CQ}_\sigma[p(w) \rightarrow p \geq_\sigma \pi]$$

In other words,  $\text{MIN}(\pi)$  means that  $\pi$  is a lower bound on the true alternatives; all true alternatives are at least as strong as  $\pi$ . The at-issue content (i.e. what is asserted in a declarative sentence) is that no true alternative in the CQ is stronger than  $\pi$ , written  $\text{MAX}(\pi)$ .<sup>3</sup>

$$(25) \quad \text{MAX}_\sigma(\pi) = \lambda w. \forall p \in \text{CQ}_\sigma[p(w) \rightarrow p \leq_\sigma \pi]$$

That is,  $\pi$  is an upper bound on the true alternatives; no alternative stronger than  $\pi$  is true.

The value of CQ is constrained by the alternative set corresponding to the prejacent. This is how Beaver and Clark explain it:

The meaning of a sentence with an exclusive depends essentially on the CQ. But not just any CQ will do, for two reasons. First the CQ must satisfy the congruence condition from the Focus Principle (2.54), which ensures that the focus marking in an utterance is appropriate for the question that the utterance helps answer... Second, the CQ must obey the additional constraint imposed by the presupposition of the exclusive, placing a lower bound on the strength of the alternatives that are still open. (Beaver and Clark 2008, 262)

The Focus Principle is as follows:

**Focus Principle:** Some part of a declarative utterance should evoke a set of alternatives containing all the Rooth-Hamblin alternatives of the CQ.

The Rooth-Hamblin alternatives are answers that, unlike Groenendijk and Stokhof's (1984) answers, but like Hamblin's (1971) alternatives, do not partition the

<sup>2</sup>The subscript  $\sigma$  represents an information state.

<sup>3</sup>Note that there is good reason to say that the prejacent is entailed by a simple positive use of a sentence with an exclusive: Even in contexts where there are multiple alternatives of equal rank to the prejacent, the prejacent itself appears to follow. This could be captured simply by replacing  $\text{MAX}(\pi)$  with  $\text{MAX}(\pi) \wedge \pi$  in the asserted content of an exclusive, and this would not detrimentally affect any of the analyses in this paper. We thank Michael Wagner for discussion of this issue.

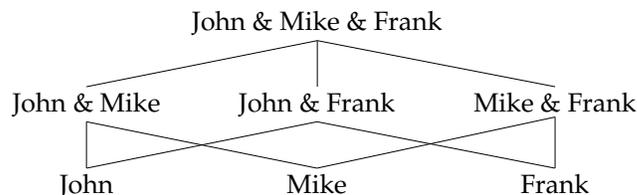


Figure 1: A CQ ranked as a boolean lattice.

answer space, and like Rooth’s alternatives (Rooth 1992), are full propositions rather than fragments. For example, the meaning of the question “Who does Sandy feed Nutrapup?” includes  $\llbracket$ Sandy feeds Nutrapup to Fido $\rrbracket$ ,  $\llbracket$ Sandy feeds Nutrapup to Clifford $\rrbracket$ ,  $\llbracket$ Sandy feeds Nutrapup to Fido and Clifford $\rrbracket$ , etc.

Every expression  $\alpha$  has an alternative semantic value  $\llbracket \alpha \rrbracket^A$ ; an expression “evokes” a set of alternatives by having it as its alternative semantic value. The alternative set for an unfocused atomic constituent is the singleton set containing the intension of that constituent. But if a constituent is focused, then the alternative set will be a set of objects that have the same type as the intension of the focused constituent. Alternative semantic values are computed recursively as follows: If a phrase  $\alpha$  with extensional predicate  $\beta$  and argument  $\gamma$  is not itself focused, then  $\llbracket \alpha \rrbracket^A = \lambda P[\exists a \in \llbracket \beta \rrbracket^A, b \in \llbracket \gamma \rrbracket^A P = \lambda w.a(w)(b(w))]$ . This essentially produces the cross-product of the alternative semantic values. The Focus Principle says that the CQ must be equal to or be a subset of the alternative semantic value of some part of the utterance.

Both scalar and non-scalar readings are analyzed using scales in this framework; what makes non-scalar readings “non-scalar” is just the nature of the scale. Non-scalar readings involve a ranking of the answers in the CQ as a boolean lattice corresponding to the sum operation over individuals, as depicted in Figure 2. Each node in the lattice stands for an answer. (Only names appear on the nodes, but the answers are to be understood as propositional; *I invited Mike and Frank*, *I invited Mike*, etc.) In the context of a CQ ranked this way, (26) receives a “non-scalar” reading:

(26) I only invited John and Mike.

The presupposition (MIN) is that the prejacent (represented by the node labelled “John & Mike”) is a lower bound on the true answers, which rules out answers that are strictly weaker than it, as well as answers that are unranked with respect to it (such as *I invited Mike and Frank*). The assertion (MAX) is that the prejacent is an upper bound on the true answers, which rules out the top node, “John & Mike & Frank”. This means that John and Mike were invited, and nobody other than John and Mike was invited.

The effect of the MIN presupposition can be observed when the sentence is negated:

(27) I didn’t only invite John and Mike.

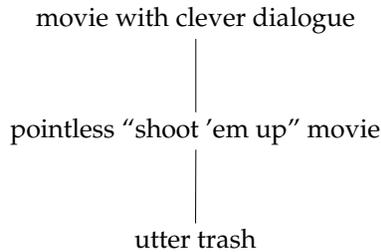


Figure 2: A CQ ranked by artistic merit

This negated version also implies that at least John and Mike were invited, ruling out all answers other than “John & Mike” and “John & Mike & Frank”. To negate the sentence is to negate the MAX proposition, that “John & Mike” is an upper bound on the true answers. This (along with the assumption that the CQ contains at least one true answer) leads to the conclusion that a stronger answer holds. In this case, the only stronger answer is “John & Mike & Frank”. This means that John and Mike were invited, but someone else was as well: Frank.

Crucially, the same technology can be applied to account for scalar readings, as in (21) repeated here:

(28) This is only a pointless “shoot-em-up” movie. ★

In a non-defective context, the answers in the CQ will all attribute properties to the movie in question, and the ranking will be one of artistic merit. The proposition that the movie is utter trash is a weaker answer than the prejacent, and the proposition that the movie has clever dialogue is a stronger answer, as depicted in Figure 2. The MIN presupposition of (21) is that any true answer to the question of how good the movie is is at least as strong as the prejacent. It follows that the movie is no worse than a pointless “shoot ‘em up” movie, i.e. it is not utter trash.

The negated version, in (29), brings out the presupposition.

(29) This isn’t only a pointless “shoot-em-up” movie. ★

When the exclusive is embedded under negation, the assertion is the negation of the negative component of the exclusive meaning, i.e. the negation of the proposition that the movie is no better than a pointless “shoot ‘em up” movie. So the movie is better than a pointless “shoot ‘em up” movie. If the CQ were as in Figure 2, this would imply that the movie has clever dialogue. Beaver and Clark’s theory correctly predicts that the prejacent does not survive as an inference under negation in this case.

Notice that when we replace scalar *only* by *mere*, we get exactly the same interpretations:

(30) This is a mere pointless “shoot-em-up” movie.

(31) This isn't a mere pointless "shoot-em-up" movie.

In particular, (31) implies that the movie lies higher on the scale of artistic merit than a pointless "shoot-em-up" movie. Thus it is presupposed that the movie is at least as high as a pointless "shoot-em-up" movie on the scale of artistic merit, and the asserted content, negated in (31), is that it is no higher on that scale.

At this point, we might be tempted to analyze *mere* in the same way that Beaver and Clark analyze *only*, as a sentence-operator that presupposes that MIN holds of the sentence and asserts MAX (and requires focus on the noun it modifies). But this will only work so long as we limit our attention to predicate nominal-modifying cases of *mere*. In cases involving argumental nouns, *mere* and *only* behave quite differently, as we will see in the next section.

### 3 Property noun-modifying *mere*

Differences between *mere* and *only* begin to emerge in non-predicative cases. Consider the contrast between (32) and (33).

(32) The mere thought of him sends shivers down my spine.

(33) Only the thought of him sends shivers down my spine.

While (32) strongly suggests that things other than the thought of the man in question would send shivers down the spine of the speaker — his presence, for example, or, heaven forbid, his touch — (33) does not have the same implication. What (33) conveys is the somewhat implausible proposition that it is really only the thought that bothers the speaker; for some reason, his presence and his touch don't really bother her. Related, *only* licenses NPIs in the VP when modifying a subject, and *mere* usually does not:

(34) Only a smile from him would make any difference.

(35) \*A mere smile from him would make any difference.

We propose to account for both of these contrasts based on scope. Schematically:

(36) DET mere N = DET  $x$  such that  $x$  is only an N

We can illustrate how this works using a simple episodic example from one of Aesop's fables. A gnat challenges a lion to a fight and kills him, and then becomes fatally entangled in a spider's web. As he is being devoured, he wails:

(37) I, who defeated the strongest of all creatures, am destroyed by a mere spider! ★

The asserted content that we want to derive for this example is the following proposition, where, crucially, MAX scopes over the proposition that  $x$ , which is existentially bound, is a spider:



We assume that phrases are combined via Intensional Functional Application, which we define as follows:

(44) **Intensional Functional Application (IFA)**

$$\text{IFA}(a, b) = \begin{cases} \lambda w.a(w)(b) & \text{if } a \text{ has type } \langle s, \langle \langle s, \tau \rangle, \tau' \rangle \rangle \text{ for some } \tau, \tau'; \\ \lambda w.a(w)(b(w)) & \text{otherwise.} \end{cases}$$

Both  $a$  and  $b$  are presupposed to be intensional types, that is, functions of worlds. In the “otherwise” case, the result is a function from worlds  $w$  to the extension of  $a$  at  $w$  applied to the extension of  $b$  at  $w$ . But if  $a$  is furthermore the intension of a function that takes an intensional object as an argument, then the intension of  $b$ , rather than the extension of  $b$  at  $w$ , is fed as an argument to the extension of  $a$  at  $w$ . In general, we will use IFA to compute the intension of a phrase with daughters  $\alpha$  and  $\beta$ :

$$(45) \quad \llbracket \alpha\beta \rrbracket^I = \text{IFA}(\llbracket \alpha \rrbracket^I, \llbracket \beta \rrbracket^I)$$

The full derivation of the asserted content works as follows (using the “otherwise” clause of IFA except where *mere* combines with *spider*, where the first clause applies):<sup>4</sup>

$$\begin{aligned} \llbracket \text{him} \rrbracket^I &= \lambda w.\mathbf{g} \\ \llbracket \text{destroyed} \rrbracket^I &= \lambda w.\lambda x.\lambda y.\mathbf{destroyed}(w)(y)(x) \\ \llbracket \text{destroyed him} \rrbracket^I &= \lambda w.\lambda y.\mathbf{destroyed}(w)(y)(\mathbf{g}) \\ \llbracket \text{spider} \rrbracket^I &= \lambda w.\lambda x.\mathbf{spider}(w)(x) \\ \llbracket \text{mere} \rrbracket^I &= \lambda w.\lambda P \in D_{\langle s, \langle e, t \rangle \rangle}.\lambda x \in D_e.\text{MAX}(\lambda w'.P(w)(x))(w) \\ \llbracket \text{mere spider} \rrbracket^I &= \lambda w.\lambda x.\text{MAX}(\lambda w'.\mathbf{spider}(w')(x))(w) \\ \llbracket \text{a} \rrbracket^I &= \lambda w.\lambda F \in D_{\langle e, t \rangle}.\lambda G \in D_{\langle e, t \rangle}.\exists x[F(x) \wedge G(x)] \\ \llbracket \text{a mere spider} \rrbracket^I &= \lambda w.\lambda G \in D_{\langle e, t \rangle}.\exists x[\text{MAX}(\lambda w'.\mathbf{spider}(w')(x))(w) \wedge G(x)] \end{aligned}$$

Thus the asserted content of  $\llbracket \text{a mere spider destroyed him} \rrbracket^I =$

$$\lambda w.\exists x[\text{MAX}(\lambda w'.\mathbf{spider}(w')(x))(w) \wedge \mathbf{destroyed}(w)(x)(\mathbf{g})]$$

This accounts for the contrast in NPI licensing between *only* and *mere*. Recall examples (34) and (35), repeated as (46) and (47), showing that subject-modifying *only* licenses NPIs in the VP, while subject-modifying *mere* does not:

(46) Only a smile from him would make any difference.

(47) \*A mere smile from him would make any difference.

This can be explained on the grounds that exclusives only license NPIs in the MAX/MIN environment, and *only* places the entire sentence in this environment, while *mere* takes scope only over the nominal that it modifies.

For concreteness, let us assume, following von Stechow (1999), that Strawson Downward Entailingness, defined as follows, is what is relevant for NPI licensing.

<sup>4</sup>There is non-trivial question about how the variable  $x$  can end up bound by the same existential quantifier in both the presupposed and the asserted content. Dynamic frameworks provide one type of solution to this problem. Here we simply concentrate on deriving the asserted content.

(48) **Strawson Downward Entailingness**

A function  $f$  of type  $\langle \sigma, \tau \rangle$  is Strawson-DE iff for all  $x, y$  of type  $\sigma$  such that  $x \Rightarrow y$  and  $f(x)$  is defined:  $f(y) \Rightarrow f(x)$ .

The entailment operator is defined cross-categorially:

(49) **Cross-categorial entailment ( $\Rightarrow$ )**

- a. For  $p, q$  of type  $t$ :  $p \Rightarrow q$  iff  $p = \text{False}$  or  $q = \text{True}$ .
- b. For  $f, g$  of type  $\langle \sigma, \tau \rangle$ :  $f \Rightarrow g$  iff for all  $x$  of type  $\sigma$ :  $f(x) \Rightarrow g(x)$ .

Intuitively, the way this works with *only* is as follows. *Only John ate vegetables* entails *Only John ate kale* (kale being a specific type of vegetable) under the assumption that the presuppositions of both sentences are satisfied. In this case, the presupposition of the latter sentence is that someone ate kale. If someone ate kale, and only John ate vegetables, then John ate kale, and John was the only one who did so.

Under the present assumptions, the presuppositions of exclusives are MIN statements and the assertions are MAX statements. Von Stechow demonstrates that *only* is Strawson-DE under a more simplistic analysis of *only* than the one we are using here, so in order to explain the contrast in NPI licensing between *mere* and *only*, we must first show that *only* is Strawson-DE under the MAX/MIN analysis. To check whether *Only John ate vegetables* Strawson-entails *Only John ate kale* under our assumptions, we need to check the following argument:

- (50)
1. **kale  $\Rightarrow$  vegetables**
  2.  $\text{MIN}(\llbracket \text{John ate kale} \rrbracket^I)$
  3.  $\text{MAX}(\llbracket \text{John ate vegetables} \rrbracket^I)$
- 
- $\therefore \text{MAX}(\llbracket \text{John ate kale} \rrbracket^I)$

Expanded, these MIN and MAX statements will refer to distinct instances of ALT:

- (51)
1. **kale  $\Rightarrow$  vegetables**
  2.  $\llbracket \text{John ate kale} \rrbracket^I$  is at least as strong as every true alternative in  $\text{ALT}_{\sigma_1}$ .
  3. No true alternative in  $\text{ALT}_{\sigma_2}$  is stronger than  $\llbracket \text{John ate vegetables} \rrbracket^I$ .
- 
- $\therefore$  No true alternative in  $\text{ALT}_{\sigma_1}$  is stronger than  $\llbracket \text{John ate kale} \rrbracket^I$

$\text{ALT}_{\sigma_1}$  is “Who ate kale?” and  $\text{ALT}_{\sigma_2}$  is “Who ate vegetables?”. The second premise can be paraphrased, “any true answer to the question of who ate kale includes John.” The third premise can be paraphrased, “no true answer to the question of who ate vegetables corresponds to a group containing John as well as others.” The conclusion makes an analogous claim about who ate kale. Does the conclusion follow, given that kale is a type of vegetable? Suppose it were not true; people other than John ate kale. Then there would be people other than John who ate vegetables, contradicting our third premise. So the argument is valid. This shows that *only* is Strawson-DE on the MAX/MIN analysis, as is *mere*.

This predicts that *only* should be able to license NPIs in its scope. Under the assumption that *only* is a sentence-level operator, the VP is correctly predicted to be able to contain NPIs, as in (46). The reason that the NPI in (47) is not licensed is that *mere* does not take scope over the VP.

Essential for this argument is that *mere* can license NPIs if it does have scope over them. Because the nominal that *mere* modifies is in a Strawson-DE environment by virtue of being in the scope of MAX/MIN, it is predicted that NPIs should be possible there. This prediction is borne out:

- (52) The mere thought of any one of the delegates ever receiving his displeasure over this prevented any of them from ever claiming the document.

★

(There are NPIs inside the VP in this example, but these are coming from *prevent* rather than *mere*.) We have thus successfully accounted for the difference in NPI licensing properties between *mere* and *only*, while capturing a similarity at the same time: both license NPIs in their scope.

The lexical entry we have given also helps to explain the contrast between (32) and (33), repeated here:

- (53) The mere thought of him sends shivers down my spine.

- (54) Only the thought of him sends shivers down my spine.

The asserted content of (53) will look very roughly like the following, translating *the* with  $\iota$  (even though this is not a typical definite noun phrase) and glossing over many other details:

- (55)  $\lambda w.\mathbf{sends-shivers}(w)(\iota x.\mathbf{MAX}(\lambda w'.\mathbf{thought-of-him}(w')(x)))(w)$

The asserted content of (54) will look more like this:

- (56)  $\lambda w.\mathbf{MAX}(\lambda w'.\mathbf{sends-shivers}(w')(\iota x.\mathbf{thought-of-him}(w')(x)))(w)$

For (53), the salient set of alternatives ALT is required to contain the proposition that  $x$  has the property denoted by the noun (*thought of him*). Since this is not an answer to the sentence-level question (“What sends shivers down my spine?”), it is impossible for *mere* to be construed as answering that question in this context. This explains why (53) does not assert that nothing other than the thought of him would do the trick, unlike (54).

Example (53) says rather that the highest-ranked property that the shiver-sender has is that of being a thought of him. Similarly, (37) says that the highest-ranked property that the destroyer of the gnat has is that of being a spider. Scope restrictions are not quite enough to guarantee such interpretations. The fact that ALT must contain the proposition ‘ $x$  is a spider’ means that ALT must be a set of alternative answers to an NP-scope question, as opposed to a sentence-scope question. But it does not require that the alternatives are a set of answers to the question “What properties does  $x$  have?”, because this is



In addition to distinguishing between *mere* and *sole*, this ensures that *mere* takes scope over the nominal it modifies and nowhere else. This allows us to account for the contrast in meaning between (53) and (54), and the contrast between *mere* and *only* in their ability to license NPIs; while both license NPIs in their scope, *mere*'s scope is restricted to the noun phrase it modifies, and therefore it cannot license NPIs in the VP when it modifies the subject.

At the same time, this lexical entry captures the inter-paraphrasability between *mere* and *only* in predicative sentences like *it is(n't) {only a, a mere} pointless shoot-em-up movie*. If we assume that the copula and the indefinite article are semantically vacuous, then the proposition of which MIN is presupposed and MAX is asserted will be the attribution of the property (e.g. *pointless shoot-em-up movie*) to the subject in both cases.

## 4 Generalized quantifier-modifying *mere*

Now for the twist: There *are* cases in which *mere* actually does license NPIs in the VP:

- (62) Of all these children and teens struggling with emotional and behavioral problems, a mere 30% receive any sort of intervention or treatment. \*
- (63) A mere 4% listed it at all. \*
- (64) [A] mere fraction of what was here showed any interest in biting. \*
- (65) At present a mere minority of the Chinese overseas have any living memory of the ancestral land. \*

On our current analysis, this should not happen. We suggest that what *mere* is modifying in (63)–(65) is a generalized quantifier, which takes the VP as an argument. To see what this means, let us consider the following simplified version of (63):

- (66) A mere 30% of teens receive treatment.

Suppose that 30% denotes a quantifier of type  $\langle\langle e, t \rangle, \langle\langle e, t \rangle, t \rangle\rangle$ :

$$(67) \quad \lambda P \in D_{\langle e, t \rangle} . \lambda Q \in D_{\langle e, t \rangle} . \frac{|\{x | P(x) \wedge Q(x)\}|}{|\{x | P(x)\}|} = 0.30$$

Its intension is of type  $\langle s, \langle\langle e, t \rangle, \langle\langle e, t \rangle, t \rangle\rangle\rangle$ , with vacuous abstraction over  $w$ :

$$(68) \quad \lambda w . \lambda P \in D_{\langle e, t \rangle} . \lambda Q \in D_{\langle e, t \rangle} . \frac{|\{x | P(x) \wedge Q(x)\}|}{|\{x | P(x)\}|} = 0.30$$

To get the intension of “30% of teens”, written  $[[30\% \text{ of teens}]^I]$ , we combine  $[[30\%]]^I$  with  $[[\text{of teens}]]^I$  using Intensional Functional Application ((44)). Assuming that  $[[\text{teens}]]^I$  is the predicate **teen** which is of type  $\langle s, \langle e, t \rangle \rangle$ , and *of* is semantically vacuous,  $[[30\% \text{ of teens}]]^I$  is:



The property-modifying lexical entry for *mere* represents the case where  $\sigma = e$ , and the generalized quantifier-modifying lexical entry represents the case where  $\sigma = \langle e, t \rangle$ .

The lexical entry in (74) can be extended to produce a sentence-operator analysis of *only*, as in for example Beaver and Clark (2008), if we can set  $\sigma$  to  $\emptyset$ , and stipulate that  $\langle \emptyset, \tau \rangle = \tau$ , and prune the  $\lambda$ -term for the argument of type  $\emptyset$ :

(75) **Lexical entry for sentence-operator exclusives**

$$\lambda w . \lambda P \in D_{\langle s, t \rangle} . : \text{MIN}(\lambda w' . P(w'))(w) . \text{MAX}(\lambda w' . P(w'))(w)$$

But it is worth considering other ways of extending (74) to give an analysis of *only*. As a VP-modifying adverb, *only* takes scope only over the VP, so for this use of *only*, it might be most appropriate  $\sigma$  set to  $e$ , just like property-modifying *mere*. For the NP-modifying *only* that appears in (4), the most promising analysis seems to us to be to treat the NP as a generalized quantifier that takes the VP as an argument in the manner of Heim and Kratzer (1998), and instantiate  $\sigma$  as  $\langle e, t \rangle$ , in order to capture the fact that NP-modifying *only* licenses NPIs in its scope. Considering the full range of uses of *only* from this perspective is beyond the scope of the present paper, but we hope to have shown that *mere* opens up a new perspective on *only*.

Indeed, a typology of exclusives is beginning to emerge. What exclusives seem to have in common are MIN and MAX: For *only*, *mere* and *sole*, MIN is presupposed and MAX is asserted. With this as a core, there are at least two dimensions along which exclusives can vary. The *scope* dimension is captured by constraints on the type parameter  $\sigma$  in the general entry (74), along with syntactic properties of the exclusives. For *sole* and property noun-modifying *mere*,  $\sigma = e$ , and because they take the property denoted by the noun they modify as an argument, they have NP-internal scope. *Only* has VP- or sentence-level scope; we have suggested that for VP-modifying *only*,  $\sigma = e$ , and for NP-modifying *only*,  $\sigma = \langle e, t \rangle$ . *Mere* can also have sentence-level scope, when it modifies a generalized quantifier; in that case  $\sigma = \langle e, t \rangle$ . Perhaps exclusives in other languages will reveal further instantiations of  $\sigma$ .

The other dimension is the *structure of the alternatives*, as implemented by presuppositional constraints on the contents of ALT. *Mere* requires the alternatives to differ with respect to the property, and *sole* requires the alternatives to differ with respect to the individual to which the property is ascribed. This parameter may underlie the difference in meaning between *only* and *just* as well; *only* seems to prefer boolean lattices of individuals, while *just* allows a wider range of scales. See Coppock and Beaver (2011) for further discussion.

The presupposed vs. at-issue status of the MIN component may be another parameter along which exclusives can vary; Orenstein and Greenberg (2010) argue that Hebrew *stam* asserts both MIN and MAX. Other parameters may emerge, as the range of exclusives is explored further.

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