SCALES AND *ONLY*

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0. INTRODUCTION[1]

It has often been noted that it cannot be that *only* **fully** excludes alternatives (e.g. Rooth 1992, fn. 2). (1), for example, must not exclude that possibility that Alex did invite Lee and Dan, since that he did in fact follows from it:

(1) Alex only invited [Lee, Dan, and Tim]$_F$.[2]

For this reason, Rooth and others concluded that the exclusionary aspect of *only*'s meaning should be limited to *logically stronger* alternatives: (1) should rule out, one way or another, the truth of anything of the form *Alex invited x* which entails *Alex invited Lee, Dan, and Tim*.[3] Other cases similarly lacking full exclusion have an intuitively qualitative dimension to them: what is excluded is alternative possibilities that count as stronger in some pragmatic sense. Borrowing an example from van Rooy (2002), suppose that someone says the following while laying down a hand of cards,

(2) I only have a [six]$_F$.

in a game in which the player holding the highest card wins: what is claimed is obviously *not* that he has a six alone, but that he has no higher/more valuable card(s). It is natural

[1] I am indebted to Daniel Büring and Philippe Schlenker for their numerous and extremely constructive comments on this work. I also wish to thank the participants of the UCLA Syntax/Semantics Seminar (March 2004), Journées Présupposition et Implicatures (October 2004, Ecole Normale Superieure) and the UCLA Semantics Lunch (March 2005).

[2] The notation '[.]$_F$' is intended to indicate focus, understood as the prosodic reflex of a grammatical focus feature (as in Rooth 1996). I leave it to the reader to determine the exact prosody/stress which yields the relevant interpretation(s) for the examples discussed herein.

[3] An alternative theory would be that *only* **is** fully exclusive in (1), but that the domain of quantification is restricted to logically stronger alternatives.

to think of such cases, for illustrative purposes at least, as involving exclusion of alternatives ranked higher on some (pragmatic) scale

The similar lack of exclusion in familiar cases like (1), and with ostensibly more exotic 'scalar' uses of *only* ((2)), has led to the attractive suggestion (Bonomi and Casalegno 1993, van Rooy 2002, Beaver 2004) that the former is a sub case of the latter: *only* always excludes stronger alternatives in some sense: *logically* stronger is a special case, or the default – where no pragmatic ordering of the alternatives is available or relevant. (For example, suppose that (2) were said instead to report progress in a search for some lost cards: full exclusion re-emerges).

This paper attempts to build on this basic approach to a unified semantics for all uses of *only*, paying particular attention to two sets of empirical facts which have not been addressed in previous accounts, and the challenges they pose for such an approach. The first has to do with the presuppositional behavior of *only*, or more theory neutrally, with the *positive component* of *only*'s meaning: the fact that (1), for example, 'says' that Alex *did* invite Lee, Dan, and Tim (in addition to excluding that anything logically stronger of the form *Alex invited x* is true). In the normal case at least, even where a sentence like (1) is embedded, i.e. unasserted, the positive component survives: its truth follows, and it is *not* part of the content acted upon by the embedding operator. A proper utterance of (3), for example, would seem to require that the positive component is (assumed) true: what is asked is simply whether *anything more* is – whether anyone else was invited:

(3) Did Alex only invite [Lee, Dan, and Tim]$_F$?

Such facts led Horn (1969) to propose that (1) (and (3)) *presupposes* (lexically triggered by *only*) that Alex invited Lee, Dan, and Tim, and effectively asserts that he invited nobody else. This analysis has remained popular, though it has recently been challenged (e.g. Geurts and van der Sandt 2004, van Rooy and Schulz 2004). Although in this paper it is assumed that Horn's empirical observation is basically correct – for cases like (3), an observation about the behavior under embedding of scalar uses like (2)

(stated informally below as the 'φ Generalization') is shown to necessitate a different explanation of the source of the presupposition, if it is indeed exactly the same *only* in (1) and (2).

φ Generalization:

> Where *only* excludes along a pragmatic scale, in contrast with when it excludes logically stronger alternatives, and the alternatives are mutually incompatible, the positive component *fails* to survive under embedding.[4]

Consider (1)/(3) on the one hand, and (4)/(5) on the other;

(4) John only got his BA from [Cal State]$_F$ (nowhere better).
(5) Did John only get his BA from [Cal State]$_F$?

only in (5) is the positive component lacking – note that if it weren't the question would fail to have any informative answer at all, given the natural assumption that John has exactly one BA from exactly one place.

In Section 1 I briefly propose and justify a unified semantics for *only* which can account for the φ Generalization, and consider the possibility that it can address some empirical objections that have been raised against accounts in the spirit of Horn (1969) which treat the positive component of *only*'s meaning as a lexically triggered presupposition.

The second two thirds of the paper is an attempt to explain, from the perspective of the type of unified semantics proposed in Section 1, the existence of contrasts which arise among sentences involving *only* appearing adverbially vs. PP internally:

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[4] I attribute this observation to Jacobs (1983), though he didn't solidly establish it. Special thanks to Daniel Büring for translating the relevant passages of Jacobs into English for me.

(6) a. The (idiot) salesman sold this car for only $[500]_F$ dollars.
b. The (idiot) salesman only sold this car for $[500]_F$ dollars.

(7) a. I bought this car for only $[500]_F$ dollars.
b. #I only bought this car for $[500]_F$ dollars.

(8) a. John worked for only $[3]_F$ hours today.
b. John only worked for $[3]_F$ hours today.

(9) a. Alex wrote this song in only $[5]_F$ minutes.
b. #Alex only wrote this song in $[5]_F$ minutes.

The puzzle is why, given the two basic interpretive possibilities for *only* – exclusion of logically stronger alternatives and exclusion of pragmatically stronger alternatives – there is no way for the (b) examples in and (7) and (9) to be felicitously uttered in normal contexts, to mean essentially what their counterparts with PP internal *only* do, or anything at all. The question of course arises for any account of *only*. I argue that it follows elegantly from an independently motivated modification of the unified semantics in Section 1, in conjunction with some new, independent observations about the difference in interpretive possibilities for numerals in different types of *for* PPs ((6)/(7) vs. (8)), and about the meaning of (temporal) *in* ((9)).

1. TOWARDS ONE *ONLY*

As suggested above, suppose that the primary difference between (1) and (4) (in the relevant context) boils down to a difference in the dimension along which *only* excludes alternatives: in the former, it is logically stronger alternatives which are excluded, and in the latter, it is alternatives which bear a particular pragmatic (i.e. non-semantic) relation to the proposition that John got his degree from Cal State; a plausible relation is one that an alternative bears to this proposition iff the alternative proposition describes states of

affairs that are more prestigious with respect to John's degree-holding status than those in which he received it from Cal State. The particular dimension relevant depends in general on context – cf. the discussion of (2) above – though in some cases, in particular where semantic facts or world knowledge (pre)determine that no logically stronger alternative *could* be true (e.g. (4) – given that he got exactly one BA from exactly one place, the normal state of affairs), only exclusion along a pragmatic dimension will be possible, if an informative assertion to be made. The dimension of exclusion can be formalized using the definition *D1*, taken as the formal definition of a scale *S*:[5]

D1 (formal definition of a scale *S*): a (possibly partially) ordered set C of propositions, ordered by a relation *R* defined for C X C.

Let the notation $b <_S a$ correspond graphically to it being the case that a is strictly higher than b on S, and mean formally that $R(\langle a,b\rangle) \wedge \neg R(\langle b,a\rangle)$. Restricting to a manageable set of alternatives, a plausible scale for (4) might look like the following:

S for (4):

John got his degree from Harvard,; John got his degree from MIT, …
John got his degree from NYU, …
…
John got his degree from Cal State
John got his degree from LA Community College

Only in (4) excludes the higher scale-mates of (the proposition) that John got his degree from Cal State. *Only* makes its truth conditional contribution by combining with a scale *S* and a proposition *p*, and returns the proposition that no alternative to the proposition ranked higher on S is true:[6]

$[[only]] = \lambda S.\ \lambda p.\ \lambda w.\ \neg\exists p'[p'(w) \wedge p <_S p']$

[5] There are of course other ways to conceive of 'scales' as mathematical objects, but this definition seems to comport with the notion as employed informally in linguistics.
[6] This is intended as a lexical semantics for adverbial *only*, which is plausibly a propositional operator, only. See Section 2 for a discussion of *only* in non-adverbial positions.

That the scale-mates are proper (focus) alternatives – that the excluded alternatives in the case of (4) are of the form *John got his degree from x*, and not something else – is assumed to be determined in the way proposed in Rooth 1992: focus interpretation constrains the members of the set *C* ordered by *R* to be a subset of the focus semantic value ($[[.]]^F$) of the clause whose interpretation (normal semantic value, [[.]]) *only* takes as (second) argument. The reader is referred to Rooth 1992 for a recursive definition of focus semantic value. For the purposes of this paper, and for those unfamiliar with Rooth's theory, suffice it to say that the alternatives excluded in a clause φ containing (adverbial) *only* will be a set of propositions which is a subset of the propositions expressed by clauses identical to φ, but without *only*, and with an appropriate expression replacing the focus marked expression in φ (notated with $[.]_F$) – so in the case of *John only got his BA from [Cal State]*$_F$, the alternative set *C* should contain exactly and only propositions like those that appear in the given scale for (4).

The positive component of *only*'s meaning, that the proposition that it takes as (second) argument *is* true, was suggested in Section 0 to be presuppositional, following the classical analysis of Horn (1969), on the basis of examples like (3), i.e. the (normal) behavior of its positive component under embedding. Again, if a lexical presupposition is responsible for the positive component in (1)/(3), and the same *only* appears in (4)/(5), it cannot simply be a presupposition *that* the positive component holds; otherwise (5) should never be a question with an informative answer. The reason is that it would presuppose that John got his BA from Cal State, which already answers (affirmatively) the question of whether none of the higher ranked propositions is true: if he got it from Cal State, then he didn't get from anywhere else, given normal assumptions. (Crucially, the felicity of (5) does not depend on the possibility of joint degrees, or a loose interpretation of the uniqueness presupposition of *his BA*). Similarly, there would be no point in asserting (4), since what one would accomplish by doing so would already be accomplished by the presupposition being satisfied. A unified semantics for *only* which derives the positive component (where it exists) via a presupposition, thus needs a presupposition which reduces to a presupposition that p is true in case the scale used is an

entailment scale, but does not necessarily so reduce in case it is a pragmatic scale.[7] Suppose that *only* is a function from scales onto a partial function whose domain is a subset of the set of propositions: namely, onto a function defined only for propositions *p* such that the following proposition is true:

Positive Presupposition: $\lambda w.\ p(w) \vee \exists p'[p'(w) \wedge p <_S p]$[8]

The presupposition can be stated informally as, '*p or some stronger alternative – alternative higher on S – is true'*, or *'at least p*', where 'at least' is understood in a sense appropriate to the scale involved. It should be obvious that in case the ordering relation for S is the entailment relation, this presupposition reduces to the proposition p. The set of worlds *w* such that (1) p is true in w, or (2) something which entails p is true in w, is exactly the set of worlds w such that p is true in w, which is to say, exactly the proposition *p*. So, for example, given that the other relevant individuals are John and Bill, (1) (and, crucially, (3)) will presuppose that Alex invited Lee, Dan, and Tim, when interpreted using an entailment scale, and (1) will assert that, and (3) question whether, the alternatives crossed out below are false:

~~Alex invited Lee, Dan, Tim, John, and Bill~~
~~Alex invited Lee, Dan, Tim, and John; Alex invited Lee, Dan, Tim, and Bill~~
Alex invited Lee, Dan, and Tim
Alex invited Lee and Dan; Alex invited Lee and Tim;…
Alex invited Lee;…

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[7] Jacobs (1983) proposes a unified semantics for *only* similar to that proposed here (and by other authors) in that standard, fully exclusive uses are supposed to be special cases of the scalar. For him, however, the scale relevant where full exclusion is present (i.e. without a qualitative dimension) is supposed to be a *flat* scale – i.e. one which ranks all of the alternatives equally. He also uses Horn's presuppositional analysis of the positive component. This raises two problems for the account: first, he ends up wrongly excluding logically weaker alternatives in cases like (1); second, he has to appeal to an ad hoc mechanism of presupposition cancellation for cases like (5).

[8] I state the presupposition on its own, rather than incorporating it as a restriction on the domain of the function returned by *only* applied to its first argument, simply for the sake of readability. A proper definition appears at the end of Section 2.

In case the focus marked phrase with which *only* associates is (non-plural) individual denoting, or not an expression which denotes (plural or non-plural) individuals, assume that the alternative set *C* forming *S* is a subset of the set containing the simple Roothian alternatives *and* their closure under conjunction. So for example, in the case of *Alex only invited [Lee]*$_F$, the alternatives should be a subset of the closure under intersection of the set {λw. Alex invited x in w: x a singular object}. If the relevant individuals are just Lee, Dan, and Tim, this closure is the set {λw. Alex invited Lee in w, λw. Alex invited Lee in w, λw. Alex invited Tim in w, λw. Alex invited Dan in w, λw. Alex invited Lee and Alex invited Tim in w, … λw. Alex invited Lee and Alex invited Tim and Alex invited Dan in w}; exclusion along an entailment scale would be exclusion of (a subset) of the propositions in this set which are logically stronger than that Alex invited Lee, yielding the desired result. Call the alternatives not in the set of simple Roothian alternatives the *complex alternatives*.

There are two reasons for formulating things in this way: one is that it allows us to be neutral about whether the focus semantic value of a singular denoting expression is the class of (otherwise appropriate) singular objects, or whether it must include plural objects (groups) as well. In the case of non-individual denoting expressions (singular or plural) it will prove to make an explanation of certain readings more perspicuous, given the difficulty of paraphrasing certain alternatives any other way (cf. Section 2). For example,

(10) John only painted a picture in $[5]_F$ minutes

has a reading on which it claims that in no other amount of time than 5 minutes – greater or lesser – did John paint a picture. On the present theory, this would involve excluding, among others, the proposition expressed by *John painted a picture in 5 minutes and John painted a picture in 3 minutes*. The point is that it is not clear what a focus alternatives to *5* could be such that this reading could be captured. An obvious candidate, [[5 and 3 minutes]], seems not to do, since *5 and 3*, at least in this linguistic context, does not clearly yield the desired meaning, or any meaning at all: cf.

(11) *John painted a picture in 5 and 3 minutes.

It is possible that the ungrammaticality (or oddness, or whatever) of (11) doesn't say anything at all about whether *5 and 3* is meaningful in the appropriate way, or that some other focus alternative will do to capture the relevant reading of (10). Consider the assumption made here about the alternatives in the case of singular individual denoting and non-individual denoting expressions to be possibly no more than an expository aid, or a (temporary) way to avoid issues that would raise questions not crucial to the purposes at hand.

A final, important aspect of the meaning of *only* remains – a presupposition which 'locates' the propositional argument as sufficiently low on the scale of excluded alternatives, to speak graphically; call it the *scalar presupposition*:

Scalar Presupposition of *only*: $\lambda w.$ p is low on S in w[9]

The existence of such a presupposition is shown by the oddness of the following examples – and the persistence of their oddness under embedding, when uttered sincerely (in particular, not ironically), and in a normal context:

(12) #I only have a $[\text{queen}]_F$

context: (van Rooy's) game of 'high card wins'

(13) #Bill graduated from high school six months ago, but he (still) has only earned a [Master's Degree].

(14) #I was only $[\text{delivering a baby}]_F$ (when you called).

(12), uttered by a player laying down her hand, would seem to be extremely odd, precisely because in the relevant game a queen is a fairly good card. In the normal case it would suggest that the speaker is unaware of the rules of the game, and at best that she is a fatalist, or privy to inside information about someone else's hand. The relevant

[9] Slightly more formally, *low on S* ≈ for a sufficiently large number of propositions p′ in S, p′Rp and ¬pRp′.

alternatives are plausibly the simple (non-complex) ones, ranked in ascending order according to the quality of the card (with respect to the rules of the game),

I have an ace
I have a king
I have a queen
…

with the assertion effectively being that no better card is held. But it does not follow from this alone that the information passed off – as taken for granted – in (12), that the card held is not so good, should be. An assertion of,

(15) I have nothing better/more valuable (etc.) than a queen

which is nearly synonymous, can be neutral with respect to whether a queen is (fairly) good/valuable or not, and as such can be followed up with something like, 'which isn't so bad'; (12) cannot, and cannot be so followed.[10] The scalar presupposition does the appropriate work: (12) is odd because for it to be felicitously uttered, it must be taken for granted that the proposition that the speaker has a queen counts as low on the relevant scale, which is to say that there are sufficiently many alternatives which outrank it – which is effectively to say that there are sufficiently many cards which count as better (for the speaker to have). This assumption is of course not in effect in the normal case, a queen being understood by anyone who knows the rules or the game as a fairly good card. Similar explanations apply to (13) – in the relevant context, Bill having earned a Master's degree does not count as sufficiently low on the relevant scale, and (14) – while the speaker might very well not have been doing anything other than delivering a baby, it is unlikely that there are sufficiently many more important or pressing things that he could have been doing.

[10] If this empirical observation is correct, it would seem to rule out the possibility of explaining the apparent scalar presupposition as some kind of Gricean *implicature*. At least, as one derived from the (sum) *content* of what is said, assuming that this (sum) content is basically equivalent for (12) and (15).

The vagueness of *low* (and of the corresponding, 'formal' definition in fn. 6) is intentionally imported into the meta-language: what counts as low should vary depending on the context, as the following contrast shows: suppose that Mary is an average student:

(16) The average score on the exam was a C. #Mary only got an [A-]$_F$.

(17) The average score on the exam was an A. Mary only got an [A-]$_F$.

Finally, and crucially, the requirement that *only*'s propositional argument count as low on the scale survives in downward monotonic contexts, and in general where the clause containing *only* is unasserted – which is consistent with/suggestive of its status as a presupposition:[11]

(18) No faculty member here only graduated from [Cal State]$_F$.

(19) John doubts that Bill only graduated from [Cal State]$_F$.[12]

(20) Did Bill only graduate from [Cal State]$_F$? (I thought he was an excellent student in high school/that his parents were very rich)

For example, in (19) and (20), the information survives that Bill having graduated from Cal State counts as relatively un-prestigious, impressive, etc. Since the proposition *only* combines with in (18) contains a variable, the presupposition is slightly more difficult to state, but speaking informally, it seems clear enough that it must not be the case that for any of the faculty members under discussion, having graduated from Cal State *would* count as relatively prestigious.

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[11] (18)-(20) might be most natural in a context in which it has been claimed of some individual that he graduated from Cal State, and a comparison is being drawn, with the relevant value judgment implied.

[12] As expected if the scalar presupposition is indeed a presupposition, it can be 'bound', or blocked from projecting, in embedded contexts as in (19), by making it clear that the relevant proposition is not part of the common ground, but rather simply believed by the attitude holder:

(i) John thinks that Stanford is free and admits anyone who applies, and he doubts that Bill only graduated from [Stanford]$_F$.

Where *only* takes an entailment scale as argument, the scalar presupposition does not encode a qualitative assumption (goodness, prestige, etc.) about how its propositional argument compares to the alternatives. What does it mean then for a proposition to rank low on an entailment scale? The obvious answer is that it is for the proposition to be relatively uninformative compared to its alternatives; the interesting one is that being so corresponds to a notion of relative *numerical* lowness. For example, in the case of *Alex only invited [John and Bill]*$_F$ (interpreted using an entailment scale), as we ascend the scale to successively higher alternatives p′, there is an increase in the maximal number of people such that Alex invited at least that number of people in all of the worlds that p′ is true of. That number is two, in the case of *only*'s propositional argument (that Alex invited John and Bill), and increases by one at each higher level of the scale. (Similarly for a sentence like *I only [worked]*$_F$ *today*, intended to mean that I simply did nothing else (relevant) – the number of things done increases by one at each level of the scale). So the scalar presupposition associated with *Alex only invited [John and Bill]*$_F$, on the natural entailment scale reading (the 'nobody else' reading), is met if and only if John and Bill count as a relatively amount of people for Alex to have (definitely) invited. This should not clash with intuitions. More importantly, this aspect of the proposal goes a long way towards explaining why, even when interpreted exhaustively (e.g. as an answer in a normal context to *Who did Alex invite?*), *Alex invited John and Bill* is *not* synonymous with *Alex only invited John and Bill*. More specifically, consider the oddness of (21)a as compared to (21)b:

(21) a. The meeting was only attended by [John, Mary, and Bill]$_F$, #a surprisingly high turnout.

b. The meeting was attended by everyone except/but Alex, Sue, … , and Eric, a surprisingly high turnout.

Where the domain of (relevant) individuals is {John, Mary, Bill, Alex, Sue, Eric}, all standard accounts all treat the main clauses of (21)a and b as yielding the same meaning – i.e. the proposition that exactly John, Mary, and Bill came to the meeting – whether as combination of presuppositions/implicatures and content expressed, or simply as the

content expressed. An explanation is thus required for the fact that only (21)a is infelicitous with the tag. Without a scalar presupposition which does something akin to the *quantitative* comparison that, any theory of *only* in the vein of that proposed here should predict that there *is* a sensible way to interpret (21)a without the tag feeling contradictory.

The pieces are this: *only* is a function from scales onto a partially defined function from propositions to propositions: the propositions which must be true for *only* to take a proposition *p* as argument – and hence to be meaningful – are the Positive Presupposition, and the Scalar Presupposition. *Only* can be thought of as having an *at least* presupposition (the Positive Presupposition – that p or something higher on the scale holds), and an *at most* assertion (nothing higher than p holds). Putting the pieces together, a lexical entry for *only* looks as follows:[13]

[[*only*]]= $\lambda w.\ \lambda S.\ \lambda p\text{: } (p(w) \vee \exists p'[p'(w) \wedge p <_S p) \wedge (p \text{ is low on } S \text{ in } w).\ \neg\exists p'[p'(w) \wedge p <_S p']$

I conclude this section with some remarks on the source of the positive component of *only*'s meaning. Under the present proposal the positive component – where it exists – arises (as in the classical Hornian analysis) from a presupposition: in case an entailment scale is used, from the Positive Presupposition alone (which reduces to the Hornian presupposition), and in case of unembedded *only* taking a pragmatic scale not reflecting entailment, from the *combination* of Positive Presupposition with assertion. The primary difference predicted is that, where the higher alternatives on the scale do not entail *only*'s propositional argument, the positive component is not presupposed, i.e. fails to survive under embedding. This proved to be an empirically desirable result. It is possible that this feature of the analysis can address the objection often leveled against a Hornian analysis, based on the fact that *only* can felicitously associate with the answer to a *wh*-question:

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[13] I indicate that a function *F* of type *<a, b>* is partially defined, i.e. defined only for objects *X* of type *a* meeting some condition φ, in the following way: λX_a: φ. Y_b

(22) a. Who did Alex invite?

b. Only John.

c. He only invited [John]$_F$.

The objection is that, if (22)c (or b) presupposes that Alex invited John, then presumably it should not count as a felicitous answer to (22)a, given that the questioner is in a state of total ignorance regarding who was invited: but apparently it does.[14]

It is worth noting that it is not entirely obvious that these facts have the weight that is often supposed, given the existence of presupposition accommodation. Nobody seems to have ever objected categorically to the presuppositional analysis of definite descriptions on the grounds that (23)b can be an informative answer to (23)a:

(23) a. Do you work alone, or with someone else?

b. With my assistant.

This example is even more extreme, in that the existence presupposition of *my assistant* – that the speaker has an assistant – seems to *completely* resolve the question (in the case of (22)c, a presupposition of the positive component would only partially resolve the question – only in conjunction with the assertion does it fully resolve it).

In any case, the present proposal predicts that (22)c (and b) should be a felicitous answer – in that it will not presuppose that Alex did invite John – in case it involves some kind of pragmatic scale; crucially, a scale such that at least one higher ranked alternative fails to entail that Alex invited John. The following is such a scale, and one that could be natural in some contexts in which a question like (22)a is asked – for example, in a context in which the *number* of individuals invited, in addition to their identity, is

[14] The facts in (22)a-c were pointed out to me first by Roger Schwarzschild, and are often noted in the literature. I am not sure who first noted them as an objection to the Hornian theory.

particularly relevant. Assume that the relevant individuals are John, Bill, and Tom (Alex presumably wouldn't invite himself, so he is ignored):

Alex invited John, Bill, and Tom

Alex invited John and Bill, Alex invited John and Tom, Alex invited Bill and Tom

Alex invited John, Alex invited Bill, Alex invited Tom

A plausible ordering relation which would yield this ranking of alternatives is one that a proposition *a* bears to *b* iff the maximal number of individuals *n* such that Alex invited at least *n* many individuals in all of the worlds that a is true of is greater than the maximal number of individuals *n* such that Alex invited at least *n* many individuals in all of the worlds that that b is true of. Using such a scale, the Positive Presupposition for (22)c is simply that at least one of the underlined alternatives is true: I leave it to the reader to verify that only from the combination of this presupposition with the assertion, and not from the presupposition alone, does it follow that Alex invited Bill. The crucial point is that the answer (22)c can be exhaustive/fully exclusive, under the present account, without presupposing that Alex invited Bill.[15]

I leave it open whether (22)c is only felicitous as an answer to (22)a in a context which would result in an ordering yielding a scale like this one (in the crucial respect) – or whether it is in fact felicitous in *any context* at all. The problem is that suitably fixing a context to test the prediction is a subtle matter; this can be taken either as a flaw in the proposal, or as consistent with the subtlety of the data and the debate surrounding them. At least, the account proposed here does stand to make some progress in answering the objections surrounding (22)a-c. That being said, recent attempts (Geurts and van der Sandt 2004, van Rooy and Schulz 2004) to derive the positive component of *only*'s meaning in some other way (e.g. via a focal presupposition, an implicature, or a combination of both) seem to be highly desirable, since they stand to provide deeper explanations for the facts surrounding *only*'s meaning. The same would apply to an

[15] The presupposition using the given scale is the following (admittedly odd) one: that Alex invited Bill or at least two (of the relevant) individuals).

attempt to derive the Scalar Presupposition proposed here; I leave the issue open at present.

2. *ONLY*, WITHIN AND WITHOUT PP

So far, the account being developed places no particular restrictions on what properties a pragmatic scale for *only* should have, and in particular on what kinds of relations are admissible to order an *only* scale. Similarly, the limited accounts and discussion of scalar *only* in the literature (see citations Section 1) have either predicted that anything goes, or simply failed to raise the issue. I take the contrasting paradigms (6)a/b and (7)a/b to indicate that the choice of scale is not entirely manipulable by context, but restricted (directly or indirectly) by the lexical semantics of *only*.

(6) a. The (idiot) salesman sold this car for only $[500]_F$ dollars.
b. The (idiot) salesman only sold this car for $[500]_F$ dollars.
Context: uttered by a used car lot manager

(7) a. I bought this car for only $[500]_F$ dollars.
b. #I only bought this car for $[500]_F$ dollars.

Crucially, (7)b has no reading roughly equivalent to (7)a in a normal context – one in which the speaker is a deal-seeking consumer – and is odd, in contrast with (6)b, which does have a reading equivalent to (6)a, and isn't.

In Section 2.1 I show how the oddness of (7)b, and the contrast with (7)a, follows from an appropriately constrained lexical semantics for *only*, and the independent observation that bare numerals in the 'payment'-*for* construction (as in (6)-(7)) cannot (readily) receive an 'at least' interpretation. The account predicts the possibility of (8)b – in any context – in contrast with (6)b and (7)b, given the observation that an 'at least' interpretation *is* available for bare numerals in the 'durational'-*for* construction:

(8) a. John worked for only $[3]_F$ hours today.
b. John only worked for $[3]_F$ hours today.

I section 2.2 I present a semantics for a non-propositional *only*, closely and systematically related to the adverbial version, which allows for *only* to compose with a measure phrase argument PP-internally in the (a) examples and thereby explains the contrast between (7)a and b. In Section 2.3 I discuss the contrast between (9)a and b, which though ostensibly similar to that between (7)a and b, is argued to require a different explanation.

(9) a. Alex wrote this song in only $[5]_F$ minutes.
b. #Alex only wrote this song in $[5]_F$ minutes.

2.1

Intuitively (and collapsing the presupposition/assertion distinction) (6)a excludes the possibility that the car was sold for a larger sum than $500, and says that it *was* sold for a mere $500. Likewise, (7)a excludes the possibility that the car was bought for a larger sum than $500, and says that it *was* bought for a mere $500. A semantics for the (a) examples, with PP internal *only*, is presented in section 2.2, this section address the independent question of why, given what has been said so far about (adverbial) *only*, (6)b can be roughly equivalent to (6)a – or at least can be used in the same kind of context – but not so for (7)b and (7)a.

(6) a. The (idiot) salesman sold this car for only $[500]_F$ dollars.
(7) a. I bought this car for only $[500]_F$ dollars.

(6) b. The (idiot) salesman only sold this car for $[500]_F$ dollars.
Context: uttered by a used car lot manager

(7) b. #I only bought this car for $[500]_F$ dollars.

A crucial difference between (6)b and (7)b is that, in the usual case, from a used car lot manager's perspective, it would have been *better* had the car sold for *more*, whereas from the buyer's perspective, it would have been *better* had the car sold for *less*. But the unified semantics for *only* proposed here fails to bar (7)b from involving an ordering relation like 'is worse than', creating a pragmatic scale ranking the alternative propositions in ascending order by the price paid for the car – the more the higher (i.e. worse). If it could use such a scale, (7)b should be entirely coherent and felicitous, presupposing and asserting things that it cannot: that having paid 500 dollars is low on the 'worseness' scale (i.e. not so bad), and that nothing worse is true (i.e. no higher price than $500 was paid).

The existing accounts or suggestions in the literature (e.g. Bonomi and Casalegno 1993, Beaver 2004, van Rooy 2002) for treating scalar uses of *only* fall prey to exactly the same problem: they fail to rule out this kind of 'derivation' for an example like (7)b. Taking one example, van Rooy's proposal for a unified semantics for *only* makes use of underlying questions in a way similar to the way that the present proposal does scales. Essentially, on van Rooy's account (adverbial) *only* acts as a propositional focus sensitive operator in the way sketched here: the assertion, however, is that no alternative proposition is both true and *more relevant with respect to answering a (contextually determined) underlying question*. In case the underlying question is something general like "how the world looks like", the alternatives excluded are supposed to be only strictly more informative (logically stronger) ones – since these are more relevant to answering that question: this corresponds to the entailment scale reading of the present account. Presumably van Rooy intends that the scalar reading arises in case the underlying question is something that asks, for example, for a degree ('how good are things'); the more relevant, and hence excluded, alternatives, are ones that correspond to better states of affairs. For such an account, the problem regarding (7)b re-emerges as the question of

why the underlying question can't be one that allows it to mean something like what (7)a does: there does not appear to be an obvious answer.[16]

If (pragmatic) scalar uses of *only* in fact must exclude alternatives that count as better, or some similar notion relevant to (6)b/(7)b, then half of an explanation of the contrast is available: (7)b *shouldn't* be able to exclude, along a pragmatic scale, alternatives of the form *I bought this car for 500+n dollars* (call them 'numerically greater' alternatives) on the grounds that they are 'better', because they aren't. If this (half of) an explanation is on the right track, then it should be the case that the acceptability judgments for (7)a and (7)b can be reversed by altering the utterance situation and/or linguistic context minimally, such that the numerically greater alternatives *do* count as 'better' in the buying case, but *don't* in the selling. Consider:

(24) a. They sold me this car for only $[500]_F$ dollars.
b. #They only sold me this car for $[500]_F$ dollars.
(25) a. The customer bought this car for only $[500]_F$ dollars.
b. The customer only bought this car for $[500]_F$.

Crucially, it is impossible to use (24)b – contrasting with (24)a – as a claim that a good deal has been gotten. On the other hand, suppose that the customer being referred to in (25)b has come back to the lot, asking the salesman for a discount on some upgrades to his recently purchased vehicle. If they grant the discount, the lot will essentially lose their profit on the car sale: calling attention to this fact, the lot manager says – entirely felicitously – (25)b to the salesman. I take the effect of perspective and context on the acceptability of (6)b/(7)b to show that nothing is syntactically problematic about (7)b and that the only possible semantic explanation for its oddness is a restriction, direct or indirect, on what kind of pragmatic scales are relevant for *only*.

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[16] van Rooy does suggest that *only* φ indicates that φ is "less than hoped for", and also that his account can somehow explain why (he does not elaborate). My remarks apply to his account as it is presented. One thing which is relevant to his suggestion, however, and that any account must explain, is why *only* φ doesn't always indicate something of this sort: see discussion later in this section.

Before discussing how to modify the semantics for *only* proposed in Section 1, to ensure that when a pragmatic scale is involved, it is 'better' (using that notion loosely for now) alternatives that get excluded, I turn to the other half of the explanation of the (6)b/(7)b, and (24)b/(25)b, contrast. The question in need of explanation is why an entailment scale can't be used to give a sensible semantic 'derivation' for the odd examples. For example, for (7)b, given that *for 500 dollars* means (makes the same truth conditional contribution as) *for **at least** 500 dollars*, exclusion of the numerically greater (simple) alternatives – that I bought the car for 600 dollars, etc. – should in principle be possible, since these alternatives would entail that I bought the car for 500 dollars. (Note that the complex alternatives reduce to the simple ones, if the numerals receive an at least interpretation, and given that I purchased the car exactly once: for all n, n' such that $n>n'$, [[I bought this car for n dollars and I bought this car for n′ dollars]]=[[I bought this car for n dollars]]).

The answer to the puzzle cannot be that, (even) when exclusion is along an entailment scale, *only* must exclude better alternatives, in the same sense in which it must when the scale is pragmatic. (This would be a consequence of, for example, restating the scalar presupposition of Section 1 as something like, '[[φ]] is relatively bad as compared to the higher ranked alternatives'). One reason is simply that not all sentences with *only* have a qualitative dimension analogous to that involved in (6)b (for example):

(26) Alex only invited $[\text{Jenny}]_F$ to the party, nobody else.

(26) is perfectly acceptable where there are no relevant qualitative distinctions to be made among individuals, such that having invited Jenny and someone else would count as better than having invited Jenny alone. It is likewise perfectly acceptable even in contexts in which inviting Jenny alone was the *very best* course of action (since everyone else is a complete bore). There are also cases very close to (6)b and (7)b, in which numerically greater alternatives are excluded, but apparently count as *worse*:

(27) a. That lazy employee only worked for $[3]_F$ hours today.
(uttered by a factory manager)

b. I only worked for $[3]_F$ hours today!
(uttered by the lazy employee)

The point is that from the perspective of the lazy employee (as opposed to that of the factory manager) the less he worked, the better. Another way of putting the puzzle surrounding (7)b, from the perspective of the present account, is why it behaves differently than (27)b: why can't the former be used to announce a deal, while the latter *can* be used to announce a good day on the job? An answer can be derived from an independent difference between the payment-*for* construction and the durational-*for* construction; (bare) numerals in the former resist an *at least* interpretation, while (bare) numerals in the latter do not.

In short, this rules out the possibility of interpreting (7)b using an entailment scale. The (simple/Roothian) alternatives for (7)b are of the form *I bought this car for 500 ± n dollars*; given that – at least with respect to computing the alternatives and interpreting *only – for 500 (± n) dollars* means *for exactly 500 (± n) dollars*, the complex alternatives (*I bought this car for 500 dollars and I bought this car for 600 dollars*) are contradictory, and hence irrelevant , and no simple alternative entails any other. Of course, the complex alternatives stand to be non-contradictory, and hence to variously entail simple alternatives, in case it is possible – consistent with the common ground – that the speaker bought the relevant car more than once. Though this is of course *not* normally the case, the prediction is that (7)b should have a sensible reading in such a state of affairs: the speaker would effectively assert that for no *n* (distinct from *500*) is it that case that he bought the car for 500 dollars and (again/before) for *n* dollars. This prediction seems to be correct.

So the only way to interpret (7)b, in a context in which it is known that the speaker bought the car exactly once, is using a pragmatic scale. This option, I have claimed, is impossible in a normal context, in which the speaker is a deal seeker, given the restriction

that it is better alternatives that should be excluded along a pragmatic scale. The oddity of (7)b follows: there is no way to interpret it, maintaining normal assumptions about car buying and consumers. The explanation crucially depends on the claim that an unmodified numeral *n* cannot receive an 'at least' interpretation, but only an exactly interpretation, in the context *for n dollars* (*pesos,* etc.). I will remain entirely agnostic about what is responsible for this fact, pointing out only that it seems to be one.[17]

Two sorts of evidence are suggestive of this claim. First: Of course in the simple case ((28)a) a numeral in the payment-*for* construction does receive an exactly interpretation. But if a numeral *n* in such a construction means *at least n*, and the exactly interpretation is derived via a scalar implicature – as is often assumed for the 'exactly' interpretations of numerals in (many) other linguistic contexts – then the 'exactly' implicature should be suspendable. This does not seem to be the case. For example, it seems to me that *3 children*, which is readily 'interpreted as' *exactly 3 children* in (28)a, can readily be interpreted as *at least 3 children* in the modal context in (28)b, taking into account the given background situation. In a similar modal context, and given an analogous situation, the 'exactly' reading of a numeral in the payment-*for* construction does not seem to give way to an 'at least' reading; hence the oddness of (29)b:

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[17] Since a numeral must receive an 'exactly' interpretation in the payment-*for* construction, and the alternatives in case *only* associates with a numeral into this construction are (given that there is exactly one event of the relevant kind) mutually exclusive, the account predicts that *reversed* scales should be possible for examples like (6)b, (7)b, and (24)b. That is, *only* in (ii) should be able to exclude alternatives of the form *They sold me this car for 45, 000-n dollars*, so long as these count as 'better' – which would indeed be the case in a normal context (so long as 45,00 dollars counts as a relatively bad price for the car):

(ii) ?They only sold me this car for $[45, 000]_F$ dollars (no better, lower price).

I find such readings marginally possible, which I take to be *not in*consistent with the theory as stated. Something more needs to be said about why they are not entirely perfect. The apparent lack of the analogous reading for (6)b, (7)b, and (24)b probably has to do with the fact that the propositional argument of *only* in these cases does not meet the scalar presupposition (e.g. for (7)b, 500 dollars in a normal context doesn't count as bad enough).

(28) a. Tara has 3 children.
[*3* has an 'exactly' interpretation in an unmarked context]

b. You need to have 3 children to be eligible for the new tax credit.
Situation: A new IRS program gives a special credit to families with 3 children or more (since it has been found that there is a particular spike in family expenses at the level of three children, or to encourage large families, etc.)

(29) a. Tara bought this car for 500 dollars.
[*500* has an 'exactly' interpretation in an unmarked context]

b. #You need to buy that car for 30,000 dollars to get the new tax credit.
Situation: A new Bush administration initiative gives a tax break to buyers of luxury cars, with 'luxury cars' being those costing $30,000 or more. I'm in the process of haggling over the price of a car, when a friend (tries to) caution me.

It seems that the only way for (29)b to be felicitous in a similar type of situation is if the tax program is a rather strange one, cutting a break to purchasers of cars costing exactly $30,000. A second, perhaps less subtle, illustration of the apparent lack of an 'at least' readings for numerals in the payment-*for* construction is their behavior under negation. Embedding (29)b under negation should, if an 'at least' interpretation is available, make available a reading that is true in case John bought the car, if at all, for *less than* 500 dollars: ¬*Tara bought this car for at least 500 dollars* iff *if Tara bought this car, she bought it for less than 500 dollars.*[18] Such an interpretation seems to be unavailable in ((29)c) – what is denied is that the (exact) price paid is 500 dollars – contrasting minimally with the nearly synonymous (29)d, in which the numeral *500* is

[18] As Simons (2001) notes, a sentence like (29)a would not normally be judged to be true on the grounds that Tara didn't buy the car at all – the normal case is that what is objected to is the *price*, but this does not follow straightforwardly from anything strictly semantic – hence the proviso 'if Tara bought this car' is strictly speaking required. In any case, Simons' observation should only make it easier to establish my point. Those who don't share Simons' judgments should simply consider (29)a in a context in which it is given that Tara *did* buy the car.

not in the payment-*for* construction, and also with (29)e, with a numeral in the **durational**-*for* construction:

(29) c. Tara didn't buy this car for 500 dollars.
[no reading equivalent to *John bought this car for less than $500*[19]]

d. Tara didn't pay 500 dollars for this car.
[has a reading equivalent to *John paid less than $500 for this car*]

e. John didn't work for 20 hours this week.
[has a reading equivalent to *John worked for less than 20 hours this week*]

The same data point is slightly more complicated to make, but possibly clearer, using the verb *doubt*, which has the same effect as negation on (a numeral *n* meaning) *at least n*: (29)f can be true merely on the grounds that Eric suspects that Tara has less than three children.[20]

(29) f. Eric doubts that Tara has at least 3 children.

Similarly, a suspicion that less than 500 dollars was paid, and that less than 20 hours were worked, is enough to make (29)g and (29)h true, respectively. Again there is a contrast with the minimally different (29)i, with the payment-*for* construction:

(29) g. Eric doubts that Tara bought this car for 500 dollars.

h. Eric doubts that Tara paid 500 dollars for this car.

i. Eric doubts that John worked for 20 hours this week.

While is (29)g is *consistent* with Eric suspecting that Tara bought the car for less than 500 dollars, the suspicion reported by seems to be that the car was *not bought for exactly* 500 dollars.

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[20] If there is a *de re* reading for *at least 3 children* in (29)f, ignore it: it is not relevant to the point at hand.

Given these facts, the contrast between (7)b and (8)b follows: since an 'at least' interpretation is available in the durational-*for* construction, (8)b can have a reading involving an entailment scale; since it isn't in the payment-*for* construction, (7)b can't. [21] (8)b is felicitous, with numerically greater alternatives excluded even though they do not count as 'better' in the relevant context, precisely because the entailment scale option is open. Because it isn't in the case of (7)b, and because the numerically greater alternatives do not count as 'better' in the relevant context, there is no consistent interpretation available. As argued previously, the nature of the scalar presupposition on entailment scale readings is purely 'numerical', with no (necessary) qualitative dimension of the sort found with pragmatic scales. For the propositional argument *p* of *only* to be low on an entailment scale, in the case of (8)b, is just for the number of hours worked to count as small (with respect to the logically stronger alternatives): so it effectively presupposes that (at least) 3 hours was a small amount for the speaker to have worked. This is of course *consistent* with a contextual assumption that longer work periods are *worse*.

The questions remains of how to enforce the requirement that when *only* operates on a pragmatic scale, it should be (contextually) *better* alternatives that are excluded – and for that matter, whether 'better' is in fact the appropriate notion. Adding the following presupposition to *only* seems to require the most minimal modification of the proposed semantics:

Presupposition ('better'): If *the* ordering relation *R* for *S* is not 'is logically stronger than' (i.e. where *S* is a pragmatic scale), then for all P, P′ ∈ S, P $>_S$ P′ iff P is better than P′

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[21] It *is* possible for a numeral modified by *at least* to appear in the payment-*for* construction.

(iii)(I know that) John bought this car for at least 500 dollars.

This is *not* a particular problem for the present proposal: whatever it is that blocks 'exactly' interpretations for *at least n* phrases in general, despite their purported logical equivalence with corresponding unmodified numeral phrases, presumably applies to *at least n* in the payment-*for* construction.

In the end, this may amount to little more than descriptive statement of the facts as interpreted in this section. The ideal theory, it seems, would be one which is closer in spirit to the original proposal: *only* takes a particular kind of scale as its (first) argument, i.e. a scale with a particular kind of ordering relation; an entailment scale should somehow be a special case of this kind of scale, such that the qualitative ('better') dimension reduces to a purely numerical one.

2.2

The explanation of the oddity of (7)b offered in the previous section alone does not explain the contrast with (7)a, which has *only* appearing PP internally.

(7) b. #I only bought this car for $[500]_F$ dollars.
a. I bought this car for only $[500]_F$ dollars.

If *only* were always a propositional operator –with something like the semantics proposed in Section 1 (and as modified in the previous) – then it would have to take scope outside of the PP in (7)a, at the clausal level, and presumably the same interpretive problems would arise for it as do for (7)b. The prediction under this assumption would be that (7)a and b are entirely equivalent, unless the presence of *only* within the PP in (7)a, at the surface, somehow obviates the otherwise requisite 'exactly' interpretation for the numeral, opening up the possibility of interpreting it using an entailment scale. Given the surface syntax of (7)a, and that it is plausibly (payment)-*for* itself which is responsible for a bare numeral's 'exactly' interpretation in that construction, it seems plausible instead the that *only* in (7)a in fact takes a non-propositional (second) argument. Following a suggestion in Büring and Hartmann (2001), I adopt a flexible type approach to *only*, and in particular that it can take $[500]_F$ *dollars* directly, i.e. PP internally, as its (second) argument in (7)a and its kind. If, as seems plausible, the exactly interpretation forced on an unmodified numeral in the payment-*for* construction results (however it

does) at or after the level at which *for* is composed with its arguments, then at the local point at which *only* composes with $[500]_F$ *dollars* in (7)a, it will have access to the analogue of an entailment scale, so that (numerically) larger measures can be excluded without either of the considerations which rule out a sensible derivation of (7)b applying. Very crudely put, the proposal is that (7)a be analyzed as something like the following: I bought this car and the price was only 500 dollars.

As a simplifying assumption, suppose that *500 dollars* in (7)a/b is (rather than a generalized quantifier) a measure phrase, understood in as neutral a sense as possible: a predicate true of things that measure/amount to 500 dollars – or more precisely, *at least* 500 dollars. The meaning of *only* in (7)a is as follows – where *i* is the type of whatever measures phrases apply to, and *S* is the type of scales (in this case, a partially ordered set of measure phrase denotations, see below):

$[[\text{only}]] = \lambda S.\ \lambda P_{<i,t>}$: P is low on S. λi: $P(i) \vee \exists P'[P' >_S P]\ P'(i)$. $\neg \exists P'[P' >_S P]\ P'(i)$

This instantiation of *only* is a fully defined function from scales onto a partially defined function from measure phrase denotations, onto a partially defined function from measurable entities to truth-values. In particular, given a scale and measure phrase denotation, it returns a function defined for measurable entities such that: (1) the measure phrase denotation, or some alternative to the measure phrase denotation, ranked higher on S, yields the value true when applied to the entity, (2) the measure phrase denotation counts as low on S. Where defined, this function yields the value true if and only if no higher ranked alternative to the measure phrase denotation, applied to the entity, yields the value true.

It is assumed that in exactly the same way discussed in Section 1 (cf. Rooth 1992), focus interpretation constrains the members of S to be a subset of the focus semantic value of *only*'s second argument. The normal and focus semantic values of $[500]_F$ *dollars* are as follows:

$[[500_F \text{ dollars}]] = \lambda i.$ i measures/amounts to 500 dollars

$[[500_F \text{ dollars}]]^F = \{[[n \text{ dollars}]]: n \geq 0\}$

So in the case of (7)a, the alternatives (members of *S*) are denotations *P′* of measure phrases of the form *n dollars*. The denotation of *only* $[500]_F$ *dollars* is defined if and only if 500 dollars is low on the scale *only* takes as argument; where defined it is as follows:

$$[[\text{only}]](S)([[500_F \text{ dollars}]]) = \lambda i: [[500_F \text{ dollars}]](i) \vee \exists P'[P' >_S [[500_F \text{ dollars}]]]\ P'(i).\ \neg\exists P'[P' >_S [[500_F \text{ dollars}]]]\ P'(i)$$

Given a scale *S* such that, ascending from [[500 dollars]], at each successive level there is the denotation of a measure phase, [[n dollars]], for n larger than at the previous level (a properly numerically ascending scale, see below), *[[only]](S)([[*500_F *dollars]])* is a well defined function if and only if 500 dollars counts as low on the scale – i.e. as a small measure. If so, it is a function defined only for entities that [[500 dollars]], or something higher on the scale *S*, is true of; which is to say only for entities measuring at least 500 dollars – again, given that *n dollars* means at least n dollars, and given that S is numerically ascending. Rounding to whole dollar amounts, such a scale *S* would look like the following:

…[[600 dollars]] > … > [[501 dollars]] > [[500 dollars]] > …

Formally, such a (numerically ascending scale) is one such that for all $P' >_S [[500_F$ dollars]], and all $P'' >_S P'$, where *P′*=[[n dollars]] and *P″*=[[n′ dollars]], n′ is greater than n is greater than 500. Since *[[only]](S)([[*500_F *dollars]])* is defined in this case only for entities measuring *at least* 500 dollars, and is true only of entities that nothing higher on the scale than [[500 dollars]] applies to – which is to say of entities that measure at most 500 dollars; it is therefore a function which is both defined and true only of entities which measure exactly 500 dollars.

It is intended that such a properly numerically ascending scale (S) be understood as a derivative entailment scale, in the following sense: for all $P, P' \in$ S such that $P >_S P'$, [[something]](P) ⇒ [[something]](P′). That is, it is a derivative entailment scale because for every measurable entity *i*, and all n greater than n′, if it is the case that *i* is/measures n dollars, it is the case that *i* is/measures n′ dollars. For this reason, such a scale need not be a qualitative one – where higher ranked alternatives count as better than lower ones – and none of the considerations that rule out (7)b apply. The scalar dimension to (7)a can be the analogue of what is found with entailment scale readings of adverbial *only*, with the scalar presupposition having only something like the quantitative/numerical dimension discussed in Section 1: 500 dollars need only count as a numerically small measure; nothing in the semantics requires that in context larger amounts qualify as better.

It is worth noting, though, that it is not obvious that even if a non-propositional scale of this type *did* have to be one in which the higher alternatives counted as better, (7)a analyzed in the way proposed would be predicted to be odd. The reason is that what is compared is bare amounts, not states of affairs, and plausibly a larger amount can count as better, even where *buying a car* for a larger amount counts as worse. If this is the case, then there could be a sensible derivation of (7)a, using a pragmatic scale, even if 500_F *dollars* (and its focus alternatives) had to receive an exactly interpretation at the local (PP internal) point at which it composes with *only*. There is reason to think, though, that *only* in non-adverbial positions (i.e., plausibly non-propositional instances of *only*), simply cannot be interpreted using a pragmatic scale. Consider the contrast between (30)a and b:

(30) a. Only a poor janitor married my sister.
b. My sister only married a poor janitor.

Suppose it is well known that my sister has been married exactly once, and that some (elitist) standard is in effect, such that it is important to marry into money/prestige. (30)a seems to be totally uninformative, and perhaps odd, in such a context, whereas (30)b does not. With the former one would seem to be trying to pass off some old information as

new – namely that my sister didn't marry more than once. This is explained straightforwardly if the alternatives excluded must be ones that are (derivatively) logically stronger; if it asserts that for nobody in addition to a poor janitor married my sister, but that in (30)b a pragmatic scale can be involved, such that the alternatives excluded need not be ones that entail that my sister married a poor janitor, but only ones that represent 'better' states of affairs (ones in which she married exactly one person, higher on the social ladder). I leave a full exploration of this apparent difference between adverbial and non-adverbial *only* for later work, claiming only that given the availability of a derivative entailment scale reading in (7)a, of the type proposed, the contrast with (7)b is explained. In summary, (7)a can have (and possibly only have) the following kind of reading (collapsing the presupposition/assertion distinction): I bought this car for exactly five hundred dollars, a small amount.

2.3

Superficially, the contrast between (9)a and (9)b seems analogous to that between (7)a and b, and would seem to be eligible for the same explanation presented in the previous two sections:

(9) a. Alex wrote this song in only $[5]_F$ minutes.
b. #Alex only wrote this song in $[5]_F$ minutes.

One might suppose that, in a normal context, writing the song faster would not count as better, such that the numerically greater alternatives cannot be felicitously excluded along a pragmatic scale by (9)b. Likewise, it would seem that a using an entailment scale is ruled out for the same reason that it is in (7)b; a numeral *n* in *in n minutes* apparently cannot receive an 'at least' interpretation. There is no reading of (9)c on which it is equivalent (given that Alex did write the song) to 'Alex wrote this song in less than 5 minutes':

(9) c. Alex didn't write this song in 5 minutes.

However, there is a crucial difference between (9)b and (7)b, between *only* associating with a numeral into the payment-*for* construction, versus into the durational-*in* construction. The possibility attested with the former construction, with (7)b (and (25)b), of reversing acceptability judgments by minimally changing the context/perspective, such that the numerically greater alternatives *do* count as progressively better (worse), does not exist for likewise modified examples involving the durational-*in* construction:

(31) a. This employee got tired in only $[3]_F$ hours.
b. #This employee only got tired in $[3]_F$ hours.

(32) a. The chemical we need to work with decomposes in only $[5]_F$ minutes.
b. #The chemical we need to work with only decomposes in $[5]_F$ minutes.
Context: we're trying to complete an experiment, and being hindered by the fact that the crucial chemical is unfortunately unstable

In both (31)b and (32)b – in the relevant contexts – it would seem that the numerically greater alternatives do count as 'better': the employer would prefer workers with more stamina, and we'd have an easier time doing the experiment if the crucial chemical didn't disappear so quickly. It seems that *only* associating with a numeral into the durational-*in* construction can never exclude numerically greater alternatives, regardless of whether the context makes available a sensible pragmatic scale along which it should otherwise be able to do so. On the other hand, (31)b and (32)b become much better – if not entirely acceptable – if slightly modified such that it would make sense to exclude the numerically *lesser* alternatives (possibly as better):

(31) c. ?This employee only got tired in $[14]_F$ hours.
[an exclamation of praise of his stamina]

(32) c. The dangerous chemical only decomposes in $[60]_F$ days.
[a warning about the chemical's persistence]

These facts can be explained straightforwardly if there *are* entailment relationships among the alternatives in the examples involving durational-*in* with a numeral/measure phrase complement, but in a numerically descending way, so to speak. That is, suppose that for all n, n′ such that n is ***less*** than n′, *This employee got tired in n hours* entails that this employee got tired in n′ hours. Then there will be never be a way to exclude the numerically greater alternatives, without contradiction ensuing, and excluding the numerically lesser alternative *will* be possible (at least) using an entailment scale – since the numerically lesser alternatives are logically stronger – so long as the scalar presupposition of *only* is met.

For example, suppose that (any) properly numerically ascending scale were used for (31)b: it would presuppose that the employee got tired in 3 hours or in some number of hours greater than 3, and assert that the employee got tired in no number of hours greater than 3. Together these entail that the employee got tired in 3 hours. If this in turn entails that the employee got tired in *n* hours, for all *n* greater than 3, the assertion plus presupposition is contradictory. On the other hand, given this entailment pattern there is no problem with excluding the (progressively) numerically *lesser* alternative alternatives, i.e. the higher ones on the *reversal* of such a scale, since the reversal is an entailment scale.

This is not however possible for (31)b or (32)b, simply because the scalar presupposition would not be met; hence there is no consistent way to interpret them. The scalar presupposition can be met, however, using such a reversed scale, in the case of (31)c and (32)c. For example, the chemical decomposing in five minutes ((31)b) would presumably not count as low on a numerically descending entailment scale (or numerically descending 'better' pragmatic scale, for that matter), since five minutes is a *short*, not long, amount of time for decomposition, whereas the chemical decomposing in sixty days would/could count as a long amount of time (i.e. as low on a numerically descending scale), or as relatively 'bad' given a pragmatic scale.

The crucial claim about the entailment relations among sentences with durational-*in* is perhaps counterintuitive. That is, *This employee got tired in 3 hours* does not, intuitively, entail that the employee got tired in 4 (5, 6…) hours. This is, I think, no different from the intuition that (contra normal assumptions) *John has 4 cars* fails to entail that John has 3 (2, 1) cars. What makes one hesitant to accept the latter entailment is of course the fact that the relevant *sentences* are in normal contexts associated with scalar implicature which effectively yield an exactly interpretation for the numerals, and obviate the relevant entailments. The sentence *John has 4 cars*, even though it means that John has at least 4 cars (and hence entails that he has at least 3), is associated with a scalar implicature, when uttered in normal circumstances, to the effect no logically stronger alternative to 'John has $[4]_F$ cars' is true, i.e. that John does not have at least 5 (6, 7…) cars. In conjunction with the content actually asserted, the implicature yields an entailment that John has exactly four cars: so if one considers the content plus implicature – the meaning, broadly construed, normally associated with *John has four cars* – the entailment to that John has 3 cars fails. What follows is an informal sketch of a semantics for durational-*in*, which can be associated with a explanation similar to that just given for simple numerals, to account for the intuitive lack of the claimed entailments among sentences with durational-*in*.

First, *in* in its durational sense can sometimes 'mean' *within*; that is, it sometimes specifies the exact duration in which an event culminated, but sometimes a duration *within* which an event (started and) culminated:

(33) a. John wrote this song in five minutes
[measures the (exact) duration of the song writing, start to finish]

b. You need to run the course in five minutes to win.
[can be true if what is need to win is simply to finish within a period of five minutes[22]]

[22] Strictly speaking, this example does not prove that *in* can mean *within*: it could be simply that *five minutes* can mean *at most five minutes*; to finish in at most five minutes is to finish within a period of exactly five minutes. Unless other evidence militates for

Superficially at least, it is the same kinds of contexts which yield the 'within' interpretation for *in* that obviate the exactly implicature for numerals (cf. (28)b from the previous section). A natural, and economical theory, would be that durational-*in* **always** means (truth conditionally) *within*, and that the exact-duration sense of (33)a is derived via a scalar implicature. A second ingredient needed for such a theory is the observation that a numeral *n* receiving an 'at least' interpretation in the *within n minutes (hours, etc.)* construction, or a construction with the same truth conditional content, would absolutely fail to make any informative meaning contribution. *John wrote this song within at least five minutes* is totally uninformative; it claims that the song writing completed within a period measuring five minutes or more, and this could be true if the duration of the song writing was less than five minutes, exactly five minutes, or more than five minutes – that is to say, so long as the song writing completed in some amount of time, which is to say nothing more than that John wrote the song[23] So it is safe to assume that, at least before the relevant implicatures are calculated for *within n minutes*, *n* will be given an 'exactly' interpretation.

So, *John wrote this song in five minutes* means that John wrote this song within five minutes, where the numeral *five* must be given an 'exactly' interpretation for the *within* phrase to make any informative contribution to the meaning. The exact-duration interpretation which this sentence has is the result of a scalar implicature, the negation of the logically stronger propositions that John wrote this song within exactly 4.99 (…4, 3.99,…, 3): if for no *n* strictly smaller than exactly five minutes did John write the song within exactly n minutes, and he did write it within exactly five minutes, then the writing's duration was exactly five minutes. Similarly, interpreting example (31)c, *This employee only got tired in [14]$_F$ hours*, using an entailment (respecting) scale, will involve excluding propositions that (asymmetrically) entail that this employee got tired within exactly 14 hours, i.e. propositions expressed by sentences of the form *This*

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making such an assumption, it seems more plausible to assume that numerals always mean *at least n*, with constructional factors and/or implicatures responsible for appearances to the contrary.

[23] This fact is noted in Schlenker (2003)

employee got tired within exactly 14-n hours, for *n* greater than zero. Similarly for (31)b, *This employee only got tired in [3]$_F$ hours*, except that given the relevant context, that this employee got tired in 3 hours will count as low only on a numerically *a*scending scale – hence its infelicity.

It must be noted that there is some residual oddity in the account suggested here of durational-*in*. First, however, it is *not* odd or unexpected that *at least n* can appear in this construction –

(34) (Clearly) he wrote this paper in at least three days.

interpretation simply requires, in order for *in at least three days* to make an informative contribution to the assertion, that the relevant implicature involving *in at least three days* be calculated. What *is* slightly odd given the present proposal is that a bare numeral *can* receive an 'at least' interpretation where *in* measures the start to finish duration of an event:

(35) He'll run the course in 5 minutes.
Context: For the speaker to win, the person in question must run the course in five minutes or more.

(35) need not assert certainty about the exact duration of the opponent's running the course, but only about the minimal time of completion. Put simply, (34) can express certainty that the duration of the opponent's running the course will measure, start to finish, at least five minutes. For such a meaning to be expressed under the present proposal would require something strange to happen. Since the 'start to finish' interpretation is an implicature based on the meaning of *within n minutes*, this implicature must have been calculated. But in order that it be calculated, the numeral must have been given an exactly interpretation, which it doesn't have. Again, this is required because the implicature could not be computed, under normal assumptions, on a level of content at which *5* meant *at least five*. This is because for no *n whatsoever* is the proposition that

he'll run the course within at least n minutes a logically stronger alternative to the proposition that he'll run the course in at least 5 minutes, because the latter is simply equivalent to the proposition that he'll run the course. It is as if an 'exactly' implicature must be calculated for the numeral, and then the exact duration/start to finish implicature for *within*, followed by a retraction of the numeral's 'exactly' interpretation! I leave this puzzling issue for further work, noting that it may raise very interesting questions about the semantics-pragmatics interface – or the account proposed here.

3. CONCLUSION

Two central claims have been made about the semantics of (adverbial) *only*, and about the possibility for a unified account of the familiar uses of *only*, and uses which have a more obvious scalar dimension. The first is based on the empirical observation that the positive component of *only*'s meaning behaves differently under embedding in the two uses. This differential behavior was shown to be derivable if, rather than presupposing the positive component, a unified *only* effectively presupposes that *at least* the positive component is true, with the sense of 'at least' – *at least as logically strong vs. at least as pragmatically 'strong'*, depending on what kind of scale *only* excludes along – being the crucial factor in deriving the difference. The second point – regarding the puzzle about the interpretive differences between *only* within and without of certain PPs – was independent of the question of whether there is one *only*. The stark contrast between examples like (6)a and (6)b, and (7)a and (7)b, and the effect of context/perspective on the felicity of the (b) examples, was argued to show that the dimension along which *only* excludes in its scalar incarnation – whatever it is – is not entirely free. Having established this to be the case, and in conjunction with some independent observations about the interpretive possibilities of numerals in various PPs, an explanation of such contrasts and their context dependency, was shown to follow straightforwardly from the proposed unified semantics for *only*. I hope to have, if not *resolved* the cause for a unified *only*, at least ramified the case for it against some heretofore-unnoticed objections. I also hope to have raised some interesting questions

about potential differences between adverbial and non-adverbial *only*, and about the source of various interpretive possibilities for numerals.

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