SCALAR PREDICATES AND NEGATION
PUNCTUAL SEMANTICS AND INTERVAL INTERPRETATIONS

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Many linguists and philosophers hold the view that scalar lexical items are downward bounded semantically and upward bounded only pragmatically, via implicatures à la Grice. This approach, called by Anscombe and Ducrot (1983) the minimalist view, has been controversial for some twenty years. In this paper, I will examine the minimalist argumentation and will show it to be ill-founded in the case of scalar predicates.

Let me first briefly set out the most common view on scalar predicates, that expressed in Horn (1989):

'The lexical meaning of scalar predicates specifies only a lower bound on the set of its predicators... (p. 214)

'some, possible, and related operators are unilateral or lower-bounded by their logical form, but may become bilateral in conveyed meaning through the accretion of an upper-bounding conversational implicatum.' (p. 211).

I have quoted Horn because he is the most explicit on the specific lexical meaning of scalar predicates. Indeed, one must distinguish two very different questions. The observation that scalar predicates are (at least sometimes) treated discursively as logically compatible with a higher value on the scale they evoke, and the theoretical claim that the lexical meaning of scalar predicates specifies only a lower bound on this scale. The two are logically independent, despite their common conflation in minimalist analyses of the behavior of scalar predicates. The theoretical claim—the ascription of an interval or one-sided lexical meaning to scalar predicates—consists in a direct percolation of the empirical observations onto the semantic value of scalar predicates. On the basis of the fact that scalar predicates behave as if they were upward compatible, the minimalist assumes the logical meaning of scalar predicates to be upward compatible. It is this view that I wish to criticize in my paper.¹

INADEQUACIES OF THE MINIMALIST VIEW

Minimalists base their views on three types of data. First, the upward-compatibility of scalar predicates apparent in the following sentence:

(1) Joe has three children, indeed four.

Secondly, downward entailments such as those exemplified below:

(2) Joe has four children → Joe has three (two, one) children.

as well as the logical contraposition of such entailments (a fact often dubbed "the scale reversal effect of descriptive negation"):⁴

(3) Joe doesn't have three children → Joe doesn't have four, {five, six...} children.

Thirdly, the interaction of metalinguistic negation and scalar predicates. Metalinguistic negation is said to cancel the upper-bounding implicature of sentences like Joe has three children, and is seen as providing evidence for the implicature status of the upper-bounds of scalar predicates, in keeping with the idea put forth in Horn (1985), Ducrot (1972) and Fauconnier (1976) that metalinguistic negation does not deal specifically with the truth-conditions of the proposition expressed by an utterance.

The initial appeal of the minimalist view can be best appreciated by looking at its elegant explanation of the contrast between the two following negative sentences:

(4) Joe doesn't have three children; he has (only) two.

(5) Joe doesn't have THREE children; he has FOUR.

The first negation, according to such a view, simply reverses the semantic entailments of the scalar predicate while the second cancels the three only implicature it would otherwise discursively convey. Despite its appeal, I want to show that this explanation is flawed, at least with respect to number names and other scalar predicates.

Many empirical difficulties plague the minimalist view of numerical predicates. First, one rather dramatic effect of the minimalist view is that there are no words naming specific numbers in any language. They all logically refer to the mathematical number. So, three means mathematically \( \geq 3 \), four, \( \geq 4 \) and so forth. This is de facto the position taken by some logicians and philosophers interested in the analysis of natural language. Barwise and Cooper (1981) and Westerstähl (1986), for example, explicitly espouse such a view of cardinal numbers names when describing their translation of some fragment of English into intensional logic.

Secondly, as Kay (1989) noticed, assigning an interval semantics to number names forces an asymmetric semantic analysis of the expressions at least and at most. Indeed, if three means \( [3, \infty) \), at most in at most three would be described as denoting the interval below the referent of its complement. At least, on the other hand, would be described, as is indeed the case in Horn's analysis, as suspending the potential upper-bounding quantity implicature its complement might give rise to. The function of these two operators would therefore be dramatically different, an undesirable result given their parallel syntactic and semantic composition.

Thirdly, there is evidence that at least sometimes scalar predicates refer to points and not half-lines. Witness sentences like More than three people came. There are many arguments for considering the comparative complement in such sentences to directly refer to a region on a scale. If this is true, it is difficult to see what a minimalist analysis would say of examples like:

(6) More than three people came.

If three names the half-line equal or above 3, we cannot make any sense of the
expression more than three.\(^3\)

Independently of these empirical difficulties, the minimalist view is plagued by a defective argumentation. Indeed, it rests on a non sequitur and on incomplete data. At the crux of the argument that the punctual reading of scalar predicates arises through implicatures, lies the following tacit assumption:

(a) If an element of meaning \(e\) is part of the conveyed meaning of utterances of a sentence \(S\) and \(e\) is not part of the literal truth-conditional meaning of \(S\), then \(e\) cannot be the literal meaning of any part of \(S\).

Such an assumption is unwarranted, as can be seen when one applies it to sentences like:

1. (7) Catholics are not oppressed, all minorities are oppressed.
2. (8) Dogs are not cute, all animals are cute.

These examples are similar in all relevant respects to parade examples of metalinguistic negation, including those involving scalar predicates. Let's see how the minimalist reasoning would apply here:

(I) (7) and (8) contain indisputable examples of metalinguistic negation, and what is negated can be paraphrased by only catholics and only dogs respectively.

(II) The information cancelled by the metalinguistic negation is that paraphrasable by only and is not part of the lexical meaning of catholics or dogs. It arises through implicatures.

So far, so good. But it does not follow from either or both of these observations that catholics means something like catholics or other minorities or that dogs means dogs or other animals. Note, for example, that the focused element in the second clause could be different. It could be all religions for (7) and all puppies for (8). The minimalist view would therefore lead us to a wildly indeterminate meaning for catholics and dogs. The denotation of catholics, for example, would include all religions, all minorities... Sentence (7) therefore only shows that Catholics are oppressed will normally implicate Catholics, and no other groups, are oppressed; it does not show that this implicature arises because catholics means catholics or other groups.

If one applies the same reasoning to sentences involving scalar predicates, it becomes clear that one cannot draw the conclusion that 3 means something like 3 or four,... from the fact that a scalar predicate can come in context to implicate \(3\) only, and that this only nuance is what is added via implicature. The third argument adduced in favor of the minimalist view is therefore invalid. Something can be part of an utterance implicature as well as part of the meaning of the corresponding sentence.

The first two arguments given in favor of the minimalist view are faulty too, empirically this time. Scalar predicates do not always give rise to entailments or upward-compatible statements such as those exemplified in (1)-(2). Indeed, both effects depend on the predication these phrases are part of.

Take count phrases. In general, count phrases give rise to two interpretations sententially, a distributed and a set reading. In the sentence:

9 Mary saw three men.

the predicate interpretation can be distributed over each member of the set, so that it can be given the paraphrase:

10 Mary saw \(e\), for each \(e\) in \(M\), a set of men of cardinality 3.

It can also have a group reading, where Mary saw a group of three men:

11 Mary saw \(M\), a set of cardinality 3.

The difference between the two interpretations is clearer in the following type of sentences analyzed in Lakoff and Peters (1966):

12 Three boys carried a sofa up the stairs.

where one can talk about three events involving one boy each or of a single event involving three boys.

Crucially, only distributed readings of count phrases give rise to scalar entailments, as the contrasts between the following pairs of sentences show:

13 Mary didn't see three men \(\rightarrow\) Mary didn't see four men.
13' Three men didn't come \(\rightarrow\) Four men didn't come.
14 Three saw three men \(\rightarrow\) Mary saw two men.
14' Three men came \(\rightarrow\) Two men came.
15 Three boys together didn't bring a sofa up the stairs \(\rightarrow\) Four boys together didn't bring a sofa up the stairs.
15' Three boys together brought a sofa up the stairs \(\rightarrow\) Two boys together brought a sofa up the stairs.

In other words, from the fact that Mary saw three men I can infer that she saw two and might have seen four, but from the fact that three boys together brought a sofa up the stairs, one cannot infer that two boys together carried a sofa up the stairs. This difference in scalar entailments is paralleled by a difference in upward-compatibility, as shown by the contrast between (16)-(16') and (17) on a distributed and set reading respectively:

16 Mary has three children, in fact four.
16' Three men came, in fact four.
17 *Three boys together carried a sofa up the stairs, in fact four.

Moreover, even in the case of the distributed reading, downward entailments are not always present. Predications that impose an at least or at most reading, for example, do not give rise to scalar entailments, although they are upward compatible as (18)-(19) show respectively:

18 If you fail three times, you're excluded.
18' If you fail two times, you're excluded.
19 If you fail three times you're excluded; a fortiori if you fail four times.

Conversely, set readings of count phrases can give rise to upward-compatible predications, provided the verb they complement specifies the numerical value to be a boundary, as in (19'):

19' Three errors will disqualify you, a fortiori four.
Measure phrases behave very much like the set reading of count phrases. In both cases, there is no quantification over the members or subsets of a set and scalar effects are either not present at all, or at least not readable from the logical form of the sentence. So, we do not have the entailments:

\[(20) \text{This book costs } $20 \rightarrow \text{This book costs } $15.\]

\[(21) \text{John weighs } 200 \text{ lbs} \rightarrow \text{John weighs } 150 \text{ lbs}.\]

outside of specialized contexts, despite Fauconnier's (1976) claim to the contrary. The pragmatic nature of scalar entailments in the case of measure phrases is demonstrated by the contrast between the two following dialogues:

\[
(30) \begin{align*}
A: & \text{This book costs } $20. \\
B: & \text{No, you're wrong. It doesn't cost } $20.
\end{align*}
\]

\[
(31) \begin{align*}
A: & \text{Joe has three children.} \\
B: & \text{No, you are wrong. He doesn't have three children.}
\end{align*}
\]

where the two negative sentences are not used with any heavy stress on the numerical values. The first dialogue is compatible with either the book costing more or less than $20. The second dialogue, on the other hand, is incompatible with speaker B's believing that Joe has more than three children. This minimal pair demonstrates that when the context fails to provide special pragmatic or perlocutionary differences, and the negative sentence is intended as a mere (corrective) statement of fact, scalar entailments only occur in the case of the distributed reading of count phrases, and not for measure phrases.

Sentences containing measure phrases are not upward-compatible either without the addition of some particularized conversational implicature. Witness the difference between:

\[(24) \text{Mary has three children, in fact four.} \]

\[(25) \text{This book will cost you } $3, \text{ in fact } $4.\]

That scalar effects arise only pragmatically in the case of measure phrases is controversial. Indeed, many scholars have argued the contrary. Such a view fails to take note of the fact that sentences like \text{It costs } $10\text{ is either upward or downward compatible, if they have interval interpretations at all. So, speakers who accept interval interpretations for such sentences, accept either of the following sentences, depending on the facts, provided the context makes clear that the utterance is meant to argue for the cheapness of a book:}

\[(26) \text{It's pretty cheap: it costs } $10, \text{ in fact } $5.\]

\[(27) \text{It's not so cheap: it doesn't cost } $10, \text{ let alone } $5.\]

Conversely, when the conversational goal is to argue for the expensive character of the book, they accept:

\[(28) \text{It's pretty expensive: it costs } $20, \text{ in fact } $30.\]

\[(29) \text{It's not so expensive: it doesn't cost } $20, \text{ let alone } $30.\]

For such speakers, then, the upward-compatibility of measure phrases is pragmatic, not semantic, as Ducrot (1980) already suggested.

For many speakers, though, (26) and (28) are both ungrammatical. Using the notion of scalar model defined in Fillmore, Kay, and O'Connor (1988), we can say that such speakers allow the scalar model relative to which sentences (26)-(29) are interpreted to be only pragmatically defined in the case of \textit{let alone}, but require it to be semantically-defined in the case of \textit{in fact}. In any case, the existence of such speakers and their rejection of both (26) and (28) corroborate my claim that there is no semantically-determined upward-compatibility for sentences containing subcategorized measure phrases.

Measure phrases that complement verbs that do not subcategorize for them behave like subcategorized measure phrases. In their case too, scalar entailments cannot be read off the quantificational structure of the sentences into which they enter. Witness the difference between the two following sentences:

\[(22) \text{I cut five suits.} \]

\[(23) \text{I cut five inches of rope.} \]

Sentence (22) implies that there has been five cutting events, and therefore four, and so forth; sentence (23), on the other hand, does not entail that I cut four inches of rope outside of any particular context. Scholars who claimed the contrary, as did Fauconnier (1976), were misled by the peculiar nature of examples like:

\[(23') \text{Peter drank three glasses of cognac} \rightarrow \text{Peter drank two glasses of cognac.} \]

Such entailments derive from our world-knowledge of consumption, as Anscombre and Ducrot (1983) have suggested, and not from the logical form of the sentences involved. They stem from our knowledge that somebody who drank three glasses of cognac must have been at one stage in the state of having drunk two glasses of cognac. They therefore depend on the specific knowledge associated with the main predicate and should not be attributed to the inherent semantics of either number names or measure phrases.

There is more evidence that measure phrases refer to specific points on a numerical scale. Note first that measure phrases are straightforwardly paired with questions like:

\[(32) \text{How much does this book cost?} \]

\[(33) \text{How much does John weigh?} \]

which contain a \textit{WH-PHRASE} whose denotation is likely to be a set of specific measures, if it is in keeping with the reference of all others \textit{WH-PHRASE}s. Similarly, the use of \textit{over} in the sentence:

\[(34) \text{It costs over } $20. \]

could not be explained compositionally, if \$20, meant \$[20, \infty]. Finally, one finds sentences such as:

\[(35) \text{Its cost (price) was } $20. \]

\[(36) \text{*Its cost was } $20, \text{ in fact } $25. \]

\[(37) \text{John's weight is } 200 \text{ lbs.} \]

or like:

\[(37') \text{They priced the book at } $25. \]

where it is even clearer that the measure phrase must refer to a specific number on a scale. Everything else being equal, a maximally simple semantics would preserve,
it seems, the near-synonymy between sentences containing nouns like *cost* or *weight* and those containing verbs like, *cost, price at or weigh*, and give a single semantics to measure phrases. I do not need to belabor the point any further. Clearly, number names do not systematically give rise to scalar effects. Even phrases into which number names enter do not indiscriminately exhibit such effects. Rather, their presence hinges on the overall predication the phrase fits in. The first two arguments in favor of the minimalist view are therefore invalidated too: there are no consistent semantically-determined scalar effects to buttress the one-sided, interval semantics ascribed to number names.

We now face the following alternative. Either we ascribe a basic lexical interval semantics to number names and a derived punctual sentential semantics for some sentences into which they enter, or, conversely, we assume that number names have a basic punctual lexical semantics and only sometimes acquire a sentential interval semantics. Although the former solution seems possible, I know of no non-ad-hoc way to do it. Moreover, such a solution would still be unable to explain compositionally phrases like *at least three* vs. *at most three, more than three, over three*. Finally, interval semantics arise only when the predication is distributed over the members of a set. In all other cases, an interval interpretation is only present discursively via a particularized implicature. Ascribing the interval interpretation to the lexical meaning of number names misses the correlation between quantification over members of a set and semantically-determined scalar effects. It is therefore best to take the other route and derive interval interpretations from a punctual lexical meaning. The next section will show in detail how this can be done.

**A NON-LEXICAL ACCOUNT OF SCALAR EFFECTS FOR NUMBER NAMES**

Lexically, cardinal numbers denote their ordinary mathematical value, and therefore refer to specific values on a numerical scale. Count phrases containing cardinals, on the other hand, are analyzed as meaning something like in (B):

(B) "a set of entities bearing the property referred to by the head noun and its potential modifier(s) and which contains *n* elements", where

*n* is the number preceding the (non-)maximal noun phrase.

So, according to the construction glossed in (B), *three men* is analyzed as meaning "a set of men which contains exactly three elements".

The count-phrase construction therefore states that whatever set or category is referred to by its right member has *n* members, where *n* is the number referred to by its left member. Crucially, this construction is given a punctual semantics although sentences in which count phrases appear might be upward-compatible. Count phrases are exactly parallel in that respect to the semantics of other (non-)maximal NPs like *dogs or catholics*.

Sententially, count phrases give rise to two interpretations paraphrasable roughly as follows, for the most salient readings of sentences (9) and (12):

(38) There is a set M, M is a set of men of cardinality 3, for each *e* in M, Mary saw *e*.

(39) There is a set B, B is a set of boys of cardinality 3, B carried a sofa up the stairs.

The semantic paraphrase of the most salient reading of (9), namely (38), allows for an immediate account of its scalar effects. If there is a set of three members such that Mary saw each member, there is obviously a set of two members such that Mary saw each of them. In fact, there are precisely three such sets. Similarly, the aforementioned scale reversal effect of negation is directly accounted for. If there is no set of cardinality three such that Mary saw each of its members, *a fortiori* there is no set of cardinality four such that Mary saw each of its members.

The set reading (39), on the other hand, does not warrant the same entailments, since the predication is of the set as a whole and not of each of its members. That a property is true of a set of cardinality M obviously does not entail that it is true of every set of cardinality N < M.

Finally, pragmatically, sentences containing a distributed reading of count phrases can carry an upper-bounding implicature. As *Catholics are oppressed* often implicates *Only catholics are oppressed*, similarly utterances of *three men arrived* will often implicate that *Only three men arrived*. The use of the Gricean maxim of Quantity or the *Principe d'Exhaustiviteit* presented in Ducrot (1972) still operates in those cases. We only have to generalize a little the account given in Horn (1989) for such implicatures, so as to handle both scalar and non-scalar cases. I will posit the following (sub)maxim of quantity:

(y) **SUBMAXIM OF QUANTITY:**

If the truth set of *Sentence A* is a proper subset of the truth set of *Sentence B*, *A* is more informative than *B*.

Given such a maxim, any utterance of the distributed reading of *Mary saw three men* will normally implicate *Mary didn't see four men*, since the truth-set of *Mary saw four men* is contained in the truth set of *Mary saw three men*.

Measure phrases behave, as I have shown above, in a way similar to the set reading of count phrases and will receive a similar analysis. They are given the meaning paraphrased in (B):

(B) "a number *n* of units of the type denoted by the head noun*, where

*n* is the number name preceding the head noun*. If the measure phrase contains a NP complement (a possibility that arises only in the case of non-subcategorized measure phrases), the following will be added to the rule *the NP complement denotes the substance out of which *n* units are taken*.

According to such a construction, then, *three inches of rope* denotes an amount of rope equal to three inches and *three inches* simply an amount of three inches.

Sententially, measure phrases appear either as subcategorized complements of verbs like *cost, weigh*... or as fulfilling a complement slot of a verb that does not subcategorize for measure phrases. The difference between the two uses of measure phrases is the following. Subcategorized measure phrases are used to denote a specific point on the scale evoked by the lexical semantics of the verb they complement. The verb *cost*, for example, evokes a scale as part of its lexical
specification and requires measure phrases fulfilling its second (or third) argument slot to specify the value of the theme argument on this scale; so, $20 in This book costs $20 specifies a unique value on the scale evoked by cost constituting the value of the book on that scale. Sentences containing non-subcategorized measure phrases, on the other hand, do not contain such an implicit equative and do not correspond qua measure phrases to an argument of the verb they complement. The following informal paraphrases of sentences John weighs 200 lbs and Peter drank two liters of water respectively illustrate the different interpretations measure phrases receive in the two sentential contexts:

(40) There is an amount $M$, $M$ an amount of 200 units of pounds,
John weighs an amount equal to $M$.

(41) There is an amount $M$, $M$ an amount of two liters,
Peter drank water in the amount of $M$.

Such paraphrases make clear that neither type of measure phrases gives rise to any logically determined scalar effect. The existence of an amount of 200 lbs that John’s weight equals does not entail the existence of an amount of 150 lbs that John’s weight would equal too. More generally, as in the case of the set reading of count phrases, the property is predicated of a specific amount $M$ and will therefore not be true of any amount $N < M$. The same argument would apply to non-subcategorized measure phrases.

Sentences (42)-(45) below summarize the diverse semantics of sentences containing number names, where the (b) formulas represent the relevant semantics given to the (a) sentences:

(42) a. Mary saw three men.
   b. $\exists M (\exists x (M)) = 3 \land (\forall x \in M) (\text{Mary saw } x)$.

(43) a. Three boys brought the sofa up the stairs.
   b. $\exists B (\exists x (B)) = 3 \land (B \text{ brought a sofa up the stairs})$.

(44) a. Mary cut three inches of rope.
   b. $\exists x (\exists M (\exists x (M) = \text{inch})) = 3 \land \text{Rope}(x) \land \text{Amount}(x) = M \land (\text{Mary cut } x)$.

(45) a. This book costs $3.
   b. $\exists M (\exists x (\exists M (\exists x (M) = \text{dollar}) \land \text{M}) = 3 \land (\text{this book costs } M))$.

I have shown in the previous section that only sentence (42) will show semantically-determined scalar effects and suggested that in all other cases scalar effects when they arise only arise pragmatically, through the imposition of a scalar model. This is true of both sentences (26)-(29) given above and of (46)-(50) below:

(46) You can buy this book for $15, in fact $10.
(47) *You can buy this book for $10, in fact $15.
(48) *You must pay $15 for this book, in fact $10.
(49) You must pay $10 for this book, in fact $15.
(50) Three men together can bring a sofa up the stairs.

To return to (26)-(29), in a context where it is clear the utterance is meant to argue for the cheapness of a book, a sentence like This book costs $20 will entail This book costs $10 and be compatible with This book costs $30 relative to the scalar model constituted of the two dimensions of increasing amount of money and cheapness. Sentence (26) is then explained. So is sentence (27) via contraposition, defined here on a scalar model. Conversely, sentences (28)-(29) will be interpreted relative to a scalar model constituted by the two dimensions of decreasing amount of money and cheapness. The same analysis explains sentences (46)-(49). Sentence (50), finally, is interpreted through a scalar model comprising the two dimensions of number of persons and ability to perform the action of carrying a sofa up the stairs. What is crucial to both sentences (26)-(29) and (46)-(50) is that the scalar model imposed pragmatically can point in either direction depending on the context measure phrases are embedded in. It is not part of the semantics of the sentence.

LEXICALLY-DETERMINED SCALAR EFFECTS AND THE NOTION OF SCALE

I have shown that there are no lexically-determined scalar effects in the case of number names. More specifically, I have argued (1) that number names be ascribed a two-sided punctual lexical semantics, (2) that distributed readings of count phrases give rise to one-sided interval semantics and potential upper-bounding implicatures sententially, and (3) that measure phrases and set readings of count phrases can receive a one-sided discursive interpretation via the imposition of a scalar model.

My claim, though, is that there are no lexically-determined scalar entailments. Indeed, there are cases where the lexical semantics of the predicate determine scalar effects. For example, the following unilateral entailment obtains because of the lexical semantics of excellent and good:

(51) Sue is excellent $\rightarrow$ Sue is good.
For all such predicate pairs, the minimalist view is vindicated. But it must be noted that to explain such lexically-determined scalar effects, we do not need to appeal to a linguistic notion of scale. All scalar properties of good are simply determined by its internal lexical semantics, and do not require reference to excellent or any other lexical item. In other words, the entailment mentioned above between Sue is excellent and Sue is good is not due to good’s belonging to a multi-lexemic scale with excellent, where good is lower than excellent, but simply to the truth set of good properly containing that of excellent. To do that much, ordinary predicate calculus or the logic of classes is enough. Similarly, we only need the submaxim of Quantity stated in (y) to explain the frequent upper-bounding implicatures such predicates have in context, since the truth-set of Sue is good properly contains that of Sue is excellent.

The derivative nature of the notion of scale for the treatment of scalar effects is further motivated by the fact that a linguistic definition of these scales is not as easy as it may seem. For example, one would a priori like to assume the existence of a scale like < tepid, warm, hot, boiling>. But note that we do not have the entailment:

(52) Your coffee is hot $\rightarrow$ your coffee is tepid.

Similarly, although one might wish to posit a scale like <Il fait froid, il fait froid>, in French ‘<It is cool (out), It is cold (out)>’, the following entailment does not hold:

(53) Il fait froid $\rightarrow$ Il fait froid.

The invalidity of entailments (52)-(53) shows that we cannot simply go from physical
or real-world scales to linguistic scales. Rather, linguistic scales are defined on the basis of entailments like (51) and cannot be used to define or explain those entailments.

**METALINGUISTIC NEGATION, POLEMIC NEGATION AND SCALAR PREDICATES**

Despite all my arguments against the minimalist view of scalar predicates, there is a final general objection I must address. Minimalists might suggest that certain linguistic operators, such as metalinguistic negation, or other metalinguistic operators treat all scalar predicates as a natural class, by cancelling, for example, their upper-bounding implicatures and require a unified description of scalar predicates.

To my knowledge, there are no such operators. Simple metalinguistic negation, for example, cannot be used as an argument that scalar predicates form a natural class. It is too promiscuous. It objects to the assertability of a previous utterance on any ground whatsoever, even truth! So, we have both:

(54) The weather is not WARM, it is HOT.
(55) The weather is not HOT, it is WARM.

Note that such examples are genuine cases of metalinguistic negation, since positive polarity items are allowed in the scope of this negation:

(56) He didn't IMPOSE some ridiculous rules, he SUGGESTED some ridiculous rules.

There is therefore no reason to assume that metalinguistic negation selects scalar predicates as such, since it can apply indiscriminately to cancel upper-bounding implicatures or to object to the previous utterance because of what obtains in the world.

The construction *not X, but Y*, presented in Anscombe and Ducrot (1977) and Horn (1989), seems to provide us with a better case of a metalinguistic negation construction that distinguishes between upper-bounding implicature cancellation as in (54), and mere factually grounded rectification as in (55). Indeed, building on Horn (1989), we have the following paradigm:

(57) It's not WARM, but HOT.
(58) ??The weather is not HOT, but WARM.
(59) *The weather is not WARM, but it's HOT.
(60) The weather is not HOT, but it's WARM.

where, according to Horn, sentences (59)-(60) differ from (57)-(58) in requiring a special concessive intonation, and containing an instance of descriptive negation (by opposition to (59)-(60)). Since, moreover, (58) is infelicitous for many speakers, one is tempted to say that the metalinguistic negation construction exemplified in (57) treats scalar predicates as a natural class and is dedicated to the cancellation of upper-bounding implicatures and the additional mention of a higher point on the evoked scale. This is not the case. First, this construction allows for truth-conditionally-based corrections, as was already noticed by Anscombe and Ducrot (1977), and as the following examples show:

(61) The table is not GREEN, but RED.

(62) Pierre is not FRENCH, but BELGIAN.

The ungrammaticality of (58) does not therefore show that the construction requires a non-truth-conditionally-based objection to the previous utterance so that even if all scalar predicates behaved like (57)-(58), it would not argue that in all cases the negation in the first conjunct cancels an upper-bounding implicature.

Secondly, the infelicity of (58) is only relative and seems to be a function of the logical compatibility of warm with hot. When the second conjunct is preceded by only or when the adjective is embedded in a predication which makes the two scalar indications incompatible, the construction is acceptable. Witness:

(63) The soup wasn't HOT, but only WARM.
(64) I like my soup not HOT, but WARM.

Finally, the pattern extends to cases where there is no inclusion of one predicate within the other and we can have corrections on the scale in either direction. So, both (65) and (66) are grammatical:

(65) The soup wasn't TEPID, but HOT.
(66) The soup wasn't HOT, but TEPID.

There is therefore no reason to assume that the *not X, but Y* construction treats all scalar predicates alike and always cancel an upper-bounding implicature, while indicating a higher point on a scale in the second conjunct.

Other scalar constructions evoked in Horn (1972, 1989) do not show either that all scalar predicates should be treated semantically as a natural class. Constructions such as *X, if not Y, X (or and possibly) even Y*, i.e. both SUSPENDERS and CANCELLERS, certainly target scalar predications as such, but generally only require the availability of a scalar model, as in (68):

(67) This will cost you $40, if not $50.
(68) Hussein is a Mussolini, if not a Hitler.

The possibility of ordering Mussolini and Hitler along a pragmatic scale does not bear on the semantics of the proper names. Similarly, the possibility of using tepid and hot, or cost $10 and cost $20 in a syntactic frame that is interpreted relative to a pragmatically defined scale has no bearing on the (lexical) semantics of such predicates. The argument can be generalized. Any construction that requires the referents of its two open slots to be plotted into a pragmatically determined scalar model cannot be used as evidence for the inherent semantics of predicates that can fill these slots.

Finally, there is the polemic, but not metalinguistic negation exemplified in (69) and schematized in (70):

(69) Poirault isn't a French detective, he is a BELGIAN detective.
(70) [[s-[FOCUS-NEG]]-[s-[FOCUS-]]]

This construction differs from ordinary metalinguistic negation in requiring the objection to the previous utterance to bear on its truth-conditions. Witness the contrast between ordinary metalinguistic negation in (71)-(72) and polemic descriptive negation in (73)-(74):*

(71) Poirault wasn't a FRENCH detective, he was a BELGIAN detective.
Maigret wasn’t a FRENCH detective, he was a PARISIAN detective.

Poirault wasn’t a French detective, he was a BELGIAN detective.

*Maigret wasn’t a French detective, he was a PARISIAN detective.

This negation is both polemic, in that it is used to object to a previous assertion, and propositional, in that the basis for the objection can only be the truth-conditions of the previous utterance. Most importantly for my purpose here, this construction divides scalar predicates into two classes. Those whose scalar effects are due to semantic conventions, either lexical or sentential, which pattern with (73)-(74), and those whose scalar effects arise from pragmatic and contextual factors, which allow corrections in the second clause to go in either direction on the scale, as shown in the paradigm (75)-(84):

(75) Mary doesn’t have THREE children she has FOUR.
(76) ??Mary doesn’t have three children she has FOUR.
(77) This book doesn’t cost $20, it costs $30.
(78) This book doesn’t cost $20, it costs $30.
(79) This book doesn’t cost $30, it costs $20.
(80) This book doesn’t cost $30, it costs $20.
(81) This coffee wasn’t GOOD, it was EXCELLENT.
(82) ??This coffee wasn’t good, it was EXCELLENT.
(83) This coffee wasn’t TEPID, it was HOT.
(84) This coffee wasn’t tepid, it was HOT.

This construction therefore buttresses my division of scalar predicates into those that give rise to scalar effects semantically and those that only give rise to such effects pragmatically.

For a long time, linguists have piled up evidence that scales are often defined pragmatically, while often maintaining a minimalist view for all scalar predicates. This paper has shown that such a view is mistaken in the case of number names. First, pace Horn and others, an element of meaning can belong to the set of adjustments associated with an utterance as well as be part of the semantics of the corresponding sentence. Secondly, scalar effects arise semantically only in the case of the distributed reading of count phrases; they do not warrant a lexical interval semantics for number names. Thirdly, the minimalist view prevents a compositional account of many phrases into which number names enter, e.g. at least vs. at most three, more than three.

In addition, I provided another account of the scalar effects number names give rise to. In this account number names have their pretheoretical punctual meaning, and acquire an interval interpretation at the sentential level, either semantically, as with the distributed reading of count phrases, or pragmatically, via the imposition of a discursively constructed scalar model. Such an account allows for a conceptually simpler lexical semantics of scalar predicates in general, where only categories and the logic of classes are needed. It also allows for a more general implicational treatment of upper-bounding implicatures. The burden on

constructional semantics, both phrasal and sentential, is correspondingly heavier, but not more so than required by any reasonably elaborated semantics of natural languages.

NOTES

* I would like to thank Adele Goldberg, Laura Michaelis, and Eve Sweetser for their comments on earlier versions of this paper. Special thanks go to Paul Kay for his invaluable help. All remaining errors are mine, of course.

1. Probably not all minimalists would agree with Horn. But insofar as they state clearly their views on the lexical semantics of scalar predicates, they hold logically equivalent views. Such views are expressed in Atlas (1984), Kempen (1986), von Storch (1984) and maybe De Cornelier (1984), Fauconnier (1976) and Gazdar (1979). Because of its clarity and straightforwardness, I will deal mainly in this paper with Horn’s statement and leave aside small differences between various minimalists.

2. I am certainly not the first one to suggest that certain sentence types seem to contradict the minimalist assumption that number names have an interval semantics. As Larry Horn (p.c.) reminded me, Sadock (1984), for example, already points out that sentences like 2+2 = 3 would be wrongly deemed true according to a minimalist semantics.

While certain of my objections are of this sentence-specific kind, the main thrust of my criticism of the minimalist view is more general and deals with the minimalist argumentation rather than with particular problematic sentence types. Furthermore, the focus of my paper is not on sentence classes per se, but rather on building a precise lexical and phrasal semantics so as to explain the multiple possible sources of scalar effects.

3. Prenominal expressions such as more than three must be distinguished from metacomparative uses of expressions containing more than such as He is more than happy, he is ecstatic, where the comparative bears on the entire predication and might be used to cancel an upper-bounding implicature.

4. The availability of such entailments depends, of course, on the availability of a wide scope for the negation. This variable is independent of the problem considered here, as (13), (14)-(14') and (15') show, and I will therefore ignore it for the present.

5. Larry Horn and Gregory Ward (p.c.) mentioned that Julia Hirschberg proposed an account of scalar effects similar to mine in her thesis. I was not able to get a hold of it in time for this paper, and will leave the comparison between the two approaches to some later occasion. De Cornelier (1984) also paraphrases certain sentences containing number names in a way similar to mine. But he does not distinguish between the different types of phrases number names enter into, nor does he explain when and how an interval interpretation arises from a lexical punctual semantics. It is therefore difficult to know how his theory compares to mine.
6. I will not attempt here to account for the difference between the two readings of count phrases, nor will I discuss the theoretical status of such "readings" in a monosstral theory of Grammar.

7. McCawley (this volume) argues that there is no metalinguistic negation construction per se, but rather metalinguistic uses or functions of contrastive, polemic negation constructions. Such a view, if true, would not deter from my argument here, namely, that no construction treats scalar predicates as a natural class, although it would require a restatement of the specific constructions I will mention below. I will leave such a restatement to another occasion.

8. There might be some dialectal variations with respect to sentences (73)-(74) and (75)-(84). Almost all speakers called upon for this paper, though, agree with the judgments reported in the text.

REFERENCES


