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A restriction on the distribution of exclusive *only*

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The sentences in (1) license upper-bound inferences, viz. that the alternatives obtained by increasing the numeral are false.

(1) a. Alice read three books.
b. Four people can fit in this car.
c. Five students gathered in the hallway.
d. Bob ran for six minutes.

The sentences in (2) license lower-bound inferences, viz. that the alternatives obtained by decreasing the numeral are false.

(2) a. Three eggs are sufficient to bake this cake.
b. Five guests drank over half the beers between them.
c. Bob ran to the store in six minutes.

These bound inferences can be explained as routine scalar implicatures by observing that, in each case, the degree predicate $[\lambda n\,.\,\phi(n)]$ obtained by abstracting over the numeral is either downward scalar ($\phi(n)$ entails $\phi(n-1)$) or upward scalar ($\phi(n)$ entails $\phi(n+1)$). For instance, $[\lambda n\,.$ Alice read n books$]$ is downward scalar, because if Alice read three books, then she also read two; thus, higher numerals are more informative than lower numerals, and so we draw upper-bound inferences (Horn 1972). Conversely, $[\lambda n\,.\,n$ eggs are sufficient to bake this cake$]$ is upward scalar, because if three eggs are sufficient, then so are four (Beck and Rullmann 1999); thus, lower numerals are more informative than higher numerals, and so we draw lower-bound inferences.

As is well known, the exclusive *only* may attach to the sentences in (1) to turn the upper-bound inference into a semantic entailment, suggesting that *only* happily combines with downward-scalar numerical sentences to exclude higher-numeral alternatives.

Curiously, attaching *only* to the sentences in (2) yields an unexpected result: *only* cannot act as a lower-bounding exclusive. For example, (3a) does not have the reading 'three and no fewer than three eggs are sufficient to bake this cake'. At most, *only* may have an evaluative construal ('it is surprising that merely three eggs are sufficient'), and the lower bound is a routine implicature. (The evaluative construal can be accessed by reading the sentences with surprise; it is perhaps more accessible with *merely* or *just*.)

(3) a. Only three$_{\mathrm{F}}$ eggs are sufficient to bake this cake.
b. Only five$_{\mathrm{F}}$ guests drank over half the beers between them.
c. Bob ran to the store in only six$_{\mathrm{F}}$ minutes.

This finding is made clearer in (4), where the sentences in (3) are embedded in downward-entailing environments. If *only* semantically excluded the more informative alternatives, as it is expected to, then (4a) should mean that Alice doubts that three but not two eggs are sufficient to bake the cake, that is, that Alice thinks that two eggs are sufficient. However, (4a) does not have this meaning; similar remarks hold for the other examples in (4).

(4) a. Alice doubts that only three$_F$ eggs are sufficient to bake this cake.
b. Never have only five$_F$ guests drunk over half the beers between them.
c. Bob didn't run to the store in only six$_F$ minutes.

The generalization seems to simply be that *only* $\phi(n)$ is exclusive only if ϕ is downward entailing, but why should that be?

The finding is especially striking from the perspective of Fox (2007), who draws a tight connection between *only* and the grammatical exhaustification operator *exh*: they have the same semantics (modulo presupposing vs. entailing its prejacent). If *exh* is responsible for the bound inferences in (1) and (2), then it is mysterious why *only* should only act as an exclusive when attaching to the former but not the latter.

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