Exactly one theory of multiplicity inferences

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Spector (2007) observes that an utterance of (1) gives rise to the inferences in (1a) and (1b), in which the plural nominal _difficult problems_ is interpreted exclusively and inclusively respectively.

(1) Exactly one of my students has solved difficult problems.
   a. one of my students has solved _more than one_ difficult problem
   b. none of my other students have solved _one or more_ difficult problems

To account for these cases, Spector (2007) proposes that the literal meaning of (1) is inclusive, but pragmatically strengthened relative to an alternative equivalent to (2). As the reader can verify, conjoining the literal meaning of (1) with the negation of (2) entails both (1a) and (1b).

(2) There is a unique student who has solved exactly one difficult problem.

While the details of Spector's analysis are unimportant here, we note that his account is incompatible with a principled theory of alternatives (e.g., Katzir 2008; Fox and Katzir 2011) and requires in particular that alternativehood (or Horn-mateness) be non-transitive.

In this snippet, we aim to improve upon Spector's analysis by offering an implicature-based account of (1) that retains a principled theory of alternativehood. In line with Spector (2007), we adopt the view that the exclusive interpretation of the plural is an _implicature_. For concreteness, we follow Mayr's (2015) account, framed in terms of _predicate-level exhaustification_: singular NPs, which range over atoms, are _scalar alternatives_ to plural NPs, which range over atoms and groups. Applying EXH to a plural NP yields a multiplicity implicature by winnowing out the atoms, (3).

(3) A student has solved EXH [difficult problems]
⇒ a student has solved _more than one_ difficult problem

Second, we draw on Sauerland's (2013, p. 159) analysis of _exactly_ as a focus sensitive expression: much like _only_, _exactly_ takes a proposition _p_ that contains a focused element (i.e., a numeral) and returns that (i) _p_ is true and (ii) for every _q_ ∈ ALT(_p_) that is not entailed by _p_, ¬_q_ is true, (4).

(4) Exactly/Only [ONE_F student came to the meeting]
   a. one student came to the meeting
   b. ¬[n students came to the meeting], for any numeral _n > one_

Third, we rely on previous findings (a.o., Gajewski and Sharvit 2012; Alxatib, 2014; Bar-Lev, 2018) showing that, in the scope of expressions like _only_, implicatures are generated in the upward-entailing (UE) component (e.g., in the prejacent), yet disappear in the downward-entailing (DE)
component (e.g., in the negated alternatives). We illustrate this for exactly/only below, using the not-all implicature associated with some.

(5) Exactly/Only \([\text{ONE}_F \text{ student ate some of the cookies}]\)
    a. UE component: implicature
       one student ate some but not all of the cookies
    b. DE component: no implicature
       \(\neg [n \text{ students ate some of the cookies}], \text{for any numeral } n > one\)

We propose that the case in (1) is another instance of the above phenomenon: a multiplicity implicature is generated in the UE-prejacent of exactly, delivering (1a), but not in its DE-alternatives, hence (1b). The intuition here is that EXH can be rendered vacuous in these DE-alternatives as its working would otherwise weaken their meaning, (6). This should ultimately follow from the Economy condition constraining the distribution of EXH (a.o., [Fox and Spector] 2018).

(6) Exactly \([\text{ONE}_F \text{ student solved EXH [difficult problems]}]\)
    a. one student solved EXH [difficult problems]
       \(\Rightarrow\) one student solved more than one difficult problems
    b. \(\neg [n \text{ student solved EXH [difficult problems]}], \text{for any numeral } n > one\)
       \(\Rightarrow\) none of the other students have solved one or more difficult problems

To close, our account relies on decomposing an apparently non-monotonic operator into a UE and a DE component. Hence, we predict that if a non-monotonic operator cannot be analyzed in this way, the implicatures should be distinct. We leave a thorough exploration of this to future work.

References


