A New Generalization Over Determiner Denotations

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A well-known claim about natural language determiners is that they obey the Conservativity Constraint (Barwise and Cooper,1981, Keenan and Stavi,1986 a.o.), which implies that natural language determiners denote CONS1 relations (i.e. $D_E(A,B) \Leftrightarrow D_E(A,A\cap B)$). In this paper, we suggest that this constraint is too permissive in that it allows for various determiners that we do not observe in natural languages. We claim that, in addition to CONS1 relations, natural language determiners denote semi-conservative relations on their second argument (semi-CONS2), where semi-conservativity is defined as:

> A determiner relation D (over some E) is semi-conservative on its second member (semi-CONS2) iff for any $A,B \subseteq E$, $D_E(A,B) \Rightarrow D_E(A\cap B, B)$

Note that the implication from $D_E(A,B)$ to $D_E(A\cap B, B)$ is unidirectional. If this implication were birectional, this would mean that all natural language determiners are intersective ($D_E(A,B) \Leftrightarrow D_E(A\cap B, A\cap B)$), which is not true (e.g. "every").

There are some determiner candidates that denote CONS1 relations but not semi-CONS2 relations. This list includes (a) negated universal determiners ("not every", "not all"), (b) the determiner "few" in its proportional partitive (i.e. "few of the") interpretation, (c) proportional partitives ("half", "one-third of", "fifty percent of") in their bounded ("exactly") interpretations and (d) universal exceptives ("every … except John/Mary","all … but Mary"). In what follows, we claim that such expressions are either not determiners or the problematic inferences associated with them come from a source distinct from their denotations.

(a) It has been observed that negated expressions like "not every" and "not all the…" have properties that are quite unlike other determiners (Lasnik 1972, a.o.). For instance, they can only occupy the subject position (e.g. *Not every person saw John* vs **John saw not every person*). Note also that if "not every" is a determiner then the negation operator and the universal determiner form a single unit and should scope from the same position. However, it has been observed that modal operators can intervene between the negation operator and the universal quantifier (from Penka 2011 attributed to Sternefeld):

(1) Not every boy can be above average height $(\neg \gg \blacklozenge \gg \forall)$

(b) In its proportional interpretation ($few(A,B) = |A\cap B|/|A| \leq m$ for some small m) "few" does not denote a semi-CONS2 relation. We note that "few" shows split-scope behavior, which suggests that negation can be severed from the denotation of this determiner (Solt, 2006):

(2) They need few reasons to fire you $(\neg \gg \blacksquare \gg many)$

(3) You can have few reasons to doubt my story $(\neg \gg \blacklozenge \gg many)$

Following Romero (2015) (see also McNally, 1998), we suggest that "few" is decomposed into the (gradable) determiner "many" and (degree) negation. Cardinal, proportional and reverse-proportional denotations of the determiner "many" are all semi-CONS2.

(c) Proportional partitives do not denote semi-CONS2 relations in their bounded ("exactly") interpretations given that, for some $0 \leq n < m$,

(4) n-m(A,B) ⇏ n-m(A∩B,B) since |A∩B|/|A| = n/m ⇏ |A∩B|/|A∩B | = n/m

Following standard assumptions about numerals, we suggest that the "exactly" interpretation of a proportional numeral is not intrinsic to such a determiner. The "exactly" interpretation is derived via pragmatic strenghtening (Horn, 1972 a.o.). Some evidence for this claim comes from the observation that the sentence *John is required to solve two-thirds of the questions* is not understood to entail that it is a requirement for John to not solve more than two-thirds of the questions. For concreteness, we assume that the pragmatic strenghtening of proportional determiners from "at least" to "exactly" readings is achieved via an *exhaustivity* operator (with a meaning similar to "only") appended at the sentential level. It is to be noted that in their "at least" interpretations, proportional determiners denote semi-CONS2 relations.

(d) The analysis for universal exceptive phrases developed in Keenan and Stavi (given in (5)) is not compatible with the claim that natural language determiners denote semi-CONS2 relations:

(5) *every…but John*(A,B) ⇔ {j}=A/B

Under this analysis, it is a semantic fact that John is an A that is not B (the inference *John is not B* is sometimes called *the Negative Entailment*). There is some evidence that the inference *John is an A that is not B* should be analyzed as an implicature given that it can be cancelled (Hoeksema, 1990) Consider: *Except for Dr. Samuels everybody has an alibi, inspector. Lets go see Dr. Samuels to find out if he's got one, too.* As far as *but*-exceptives are concerned, it has been suggested that the Negative Entailment seems to be a semantic consequence of the determiner denotation (von Fintel, 1993) unlike what we observe with *except(-for),* Following Gajewski (2008), Hirsch (2016) suggests that *but*-exceptives differ from other exceptives in that the noun following "but" is focus-marked (see also Crnič, 2018 for the same proposal). Sentences with a focus-marked constituent are obligatorily parsed with an exhaustivity operator (*exh*) appended at the sentential level (as in *exh[[every student but John$_F$] came]*). Taking "Mary" to be an alternative to "John" and negating this alternative of the sentence (due to the presence of *exh*), we obtain the inference that John didn't come. (Observe that $\{\forall x((student(x) \wedge x \neq John) \rightarrow came(x)), \neg \forall x((student(x) \wedge x \neq Mary) \rightarrow came(x))\} \vDash \neg came(John)$). That is, the Negative Entailment does not come from the determiner denotation but from the *exh* operator (similar to what we have seen with the "exactly" interpretations of proportional partitives). Under various analyses, *but*-phrases (as in *but John*) are modifiers on nouns with which they form an NP (*[$_{NP}$ student [but John]]* see Rothstein 1988 a.o.), and this NP restricts the domain of quantification for "every".

Given the observations in (a)-(d), we conclude that (I) "not every" is not a determiner, (II) "few" contains the gradable determiner "many", which denotes a semi-CONS2 function under any interpretation, but "few" is not itself a determiner and (III) the problematic inferences associated with proportional partitives and exceptives come from a source distinct from their denotations. Therefore, such expressions do not provide counterevidence for the claim that natural language determiners denote semi-CONS2 relations. That is, natural language determiners denote CONS1 **and** semi-CONS2 relations.

Overall it appears that natural language determiners are not closed under negation (*contra* Keenan and Stavi, 1986) and the *exh* operator ("only"). Why not? One possible explanation for this might be the Semantic Inflexibility Hypothesis (Hirsch, 2017 a.o.), which suggests that such operators can only combine with expressions of type *t* and of type *(s,t).* Therefore, these two operators cannot directly combine with determiners. If we assume that lexicalization is sensitive to syntactic proximity of some sort, we might be able to explain why negation and *exh* are not in the list of operators out of which determiner denotations are composed.

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