A decompositional semantics for responsive attitude predicates: the case of *to know*

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We propose an equative-based analysis for the meaning of *to know*, which yields the intermediate exhaustive (IE)-reading as the basic semantic interpretation for questions embedded under *to know*. We show how this equative analysis extends to other attitude verbs.

BACKGROUND: There are two main readings of embedded questions under *to know*: the strong exhaustive (SE) reading (1a) and the IE reading (1b). The IE-reading is considered the basic reading by many authors (Cremers & Chemla 2016, Theiler 2014, Fricke et al. 2023).

(1) Luca knows [who danced].
   a. **SE:** Luca knows of every person who danced that she danced, and of every person who did not dance that she did not dance.
   b. **IE:** Luca knows of every person who danced that she danced and does not assume of anyone who did in fact not dance that she danced.

EQUATIVE *KNOW*: In contrast to recent approaches mostly relying on EXH-operators (e.g., Klinedienst and Rothschild 2011, Uegaki 2015), we propose an equative-based lexical decomposition for *to know*. The basic meaning of *to know Q* (*Q* a question) is given in (2b), where a Hamblin (1973) semantics for *Q* with the empty set is assumed, O is an omniscient, objective observer, and *p* is presupposed in the sense of van der Sandt (1991).

(2) Daniel knows who danced.
   a. *The strongest subjective answer (= MAX'$_{ANS}$) to the question who danced that Daniel can give* equals *the strongest objectively true answer (= MAX$_{ANS}$)*.
   b. x knows Q $\rightsquigarrow \lambda v.\ \exists p\ [\ MAX_{ANS}(Q, v, O) = p \wedge p = MAX'_{ANS}(Q, v, x)]$
   c. $MAX'_{ANS}(Q, v, x) = \lambda w.\ \forall p \in Q.\ Dox^{x}_{v} \subseteq p \rightarrow p(w)$
   d. $MAX_{ANS}(Q, v, O) = \bigcap \{p|\ p \in Q \wedge Dox^{O}_{v} \subseteq p\ \}$

This lexical semantics of *to know* also applies to embedded declaratives (with Q = a singleton set). We further show how the analysis is pragmatically strengthened by default to an SE-reading, and that it accounts for a range of puzzles discussed in the literature: (i.) the restriction to SE-readings only with 1st person attitude holders; (ii.) homogeneity effects with embedded wh-questions; (iii.) the emergence of SE-readings with the question particle *all* (Blok & Chark 2021). We then extend the analysis to other attitude verbs.

GENERALIZING THE ANALYSIS: In addition to other knowledge-based factive verbs (*forget*, *remember*), the equative-based analysis extends directly *to agree* and *to predict*, thereby improving on extant accounts. Our analysis for these verbs is given in (3).

(3) a. *G agree on Q* $\rightsquigarrow \lambda v.\ \exists p\ [\ p = MAX_{ANS}(Q, v, G) \wedge \forall x \in G: MAX'_{ANS}(Q, v, x) = p]$
   b. *x predicted Q* $\rightsquigarrow \lambda v.\ \exists p\ [\ p = MAX_{ANS}(Q, v, X) \wedge MAX''_{ANS}(Q, v, x) = p]$

By replacing the omniscient observer O in *MAX$_{ANS}$* with the agreeing attitude group G, and by having the individual belief holder in *MAX'$_{ANS}$* range over the members of G, the meaning of *to agree* in (3a) does not deliver the maximal objectively true answer, but the maximal subjective answer that can be given by any member of G. This circumvents factivity inferences, and it allows for false answers to *Q* (based on incorrect beliefs), while retaining the general equative structure. In (3b), the operator $MAX''_{ANS}(v,Q,x)$ does not denote the strongest answer to *Q* that *x* can or could give, but the strongest answer that *x* actually gave. The *X*-argument of *MAX$_{ANS}$* in (3b) is a free variable that can be bound either to the omniscient observer O, thereby yielding the *correctly predicted*-reading, or else to some not necessarily trustworthy agent.

OUTLOOK: We suggest that equative structures form part of the lexical semantics of those (and arguably only those) attitude predicates that embed declaratives AND questions directly, i.e.,

responsive verbs. Time allowing, we will also discuss the cases of (ambiguous) *to tell* and of cognitive-factives, such as *to puzzle*.

References

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