

## Content nouns and the semantics of question-embedding predicates

This paper proposes that interrogative-embedding verbs (e.g. *know*, *ask*) only take a question as a semantic argument whether or not it can embed a *that*-clause. The argument is based on an entailment pattern of interrogative-embedding verbs, as opposed to verbs that only embed an indicative complement (e.g., *believe*, *deny*), when they combine with ‘content DPs’ (e.g. *the rumor/story*). The resulting view of question and proposition embedding, I argue, captures a generalization which cannot be captured in the alternatives that reduce question-embedding to proposition-embedding.

Verbs that only embed indicative *that* clauses and verbs that embed interrogative complements (interrogative-embedding verbs; henceforth IEVs) have different entailments when they take DPs with a propositional complement as shown in (1) (Vendler 1972; Ginzburg 1995).

- (1) a. John believed/denied the rumor that Mary left.  $\models$  John believed/denied that Mary left.  
b. John {knew/discovered/told me} the rumor that Mary left.  $\not\models$

John {knew/discovered/told me} that Mary left.

For example, for *tell*, the example in (2) shows that telling someone the rumor that *p* does not entail that the subject is committed to the truth of *p*, which is necessary for one to tell someone that *p*.

- (2) Mary told me the rumor that John betrayed her, but, of course, she didn’t believe the rumor.

Thus, whatever the mechanism by which the relevant attitude relation is established between the propositional content of a DP and the subject in the case of non-IEVs in (1a), it does not apply in the case of IEVs in (1b). Note that a simple syntactic story that would say that the *know* of propositional knowledge (like German *wissen*, henceforth  $know_P$ , as opposed to the *know* of acquaintance like German *kennen*, henceforth  $know_A$ ) does not take a DP is not empirically correct because, in concealed questions (CQs),  $know_P$  does take DPs. (The CQ reading of the left-hand side of (1b) is possible given a context where John is asked to answer the question ‘Which of this specific set of stories corresponds to the rumor that Mary left?’) Thus, the puzzle is why there is no reading of the left-hand side of (1b) with  $know_P$  that licenses the entailment, although  $know_P$  is syntactically available (as the CQ reading shows) and such a reading does exist for non-IEVs. To see the problem more clearly, let us assume the following denotations for *believe* and *rumor*, by which we can derive the correct entailment from (5) that John believes that Mary left (cf. Kratzer 2006; Moulton 2008).

- (3) a.  $\llbracket \text{believe} \rrbracket^w = \lambda p_{\langle s,t \rangle} \lambda x. \text{DOX}_{x,w} \subseteq \{w' : p(w') = 1\}$   
b.  $\llbracket \text{rumor} \rrbracket^w = \lambda c_{\langle s,t \rangle} \lambda p_{\langle s,t \rangle}. \mathbf{rumor}(p, w) \wedge p = \{w' : c(w') = 1\}$

- (4)  $\llbracket \text{the rumor that Mary left} \rrbracket^w = \iota p[\mathbf{rumor}(p, w) \wedge p = \{w' : \mathbf{left(m)}(w')\}]$

- (5)  $\llbracket \text{J. believes the rumor that M. left} \rrbracket^w = 1$  iff  $\text{DOX}_{j,w} \subseteq \iota p[\mathbf{rumor}(p, w) \wedge p = \{w' : \mathbf{left(m)}(w')\}]$

This semantics, however, makes the exact same prediction for *know*: (7) entails that John knows that Mary left, given the standard denotation for  $know_P$  in (6).

- (6)  $\llbracket \text{know}_{P*} \rrbracket^w = \lambda p_{\langle s,t \rangle} : p(w) = 1. \lambda x. \text{DOX}_{x,w} \subseteq \{w' : p(w') = 1\}$

- (7)  $\llbracket \text{John knows}_{P*} \text{ the rumor that Mary left} \rrbracket^w = 1$

iff  $\text{DOX}_{j,w} \subseteq \iota p[\mathbf{rumor}(p, w) \wedge p = \{w' : \mathbf{left(m)}(w')\}]$  (Presupposition: M. left in *w*)

**The proposal of the current paper is that IEVs can never take a proposition as a semantic argument.** Thus,  $know_P$  only has the denotation in (8) assuming a Hamblin denotation for questions. When they embed a *that*-clause, I assume that the complementizer *that\** in (10) turns the complement proposition into the singleton question. Hence, the standard truth conditions in (11).

- (8)  $\llbracket \text{know}_P \rrbracket^w = \lambda Q_{\langle st,t \rangle} : \exists p' \in Q[p'(w) = 1]. \lambda x. \forall p[Q(p) = 1 \wedge p(w) = 1 \rightarrow \text{DOX}_{x,w} \subseteq \{w' : p(w') = 1\}]$

- (9)  $\llbracket \text{know}_A \rrbracket^w = \lambda y \lambda x. x$  is acquainted with  $y$  in  $w$

- (10)  $\llbracket \text{that*} \rrbracket = \lambda p. \{p\}$

- (11)  $\llbracket \text{J. knows}_P \text{ that* M. left} \rrbracket^w = 1$  iff  $\text{DOX}_{x,w} \subseteq \{w' : \mathbf{left(m)}(w') = 1\}$  (Presupp.: M. left in *w*)

Assuming that the complementizer *that\** cannot be in the DP, *x knows the rumor that p* can only have a CQ reading that ‘*x* knows what the rumor that *p* is’ (12), or an acquaintance reading that ‘*x* is acquainted with the rumor that *p*’ (13), neither of which entails that *x* knows that *p*.

- (12)  $\llbracket \text{John knows}_P \uparrow(\text{the rumor that Mary left}) \rrbracket^w = 1$  ( $\uparrow$  turns a proposition to a question)  
 iff  $\forall p[p \in ?p'.[p' = \llbracket (4) \rrbracket^w] \wedge p(w) = 1 \rightarrow \text{DOX}_{j,w} \subseteq \{w' : p(w') = 1\}]$   
 (assuming Aloni and Roelofsen's (to appear) theory of CQs)

- (13)  $\llbracket \text{J. knows}_A \text{ the rumor that M. left} \rrbracket^w = 1$  iff J. is acquainted in  $w$  with the rumor that M. left

Ginzburg (1995) accounts for the data in (1) by arguing that non-IEVs select for a proposition but IEVs select for a 'fact', a different object from a proposition in his ontology: since *the rumor* in (1b) does not denote a fact, the sentence only has an acquaintance reading. On the other hand, the complement in the right-hand side of (1b) denotes a fact. Hence the non-entailment. He supports his claim by the observation that the entailment in (1b) does hold when the nominal is factive, such as *fact* or *truth*. However, Ginzburg's account does not apply to *non-veridical* IEVs such as *tell* or *report*, which can take a proposition but need not take a fact, neither when they embed an indicative nor an interrogative complement. This is shown in the example below from Égré & Spector (2007).

- (14) Everyday the weatherman reports/tells us {that it will rain / what the weather will be}, but usually he is wrong.

Also, although Ginzburg assumes a process of coercion that turns a question into a fact when an IEV embeds an interrogative, it is not clear why the process does not apply to the CQ denotation of *the rumor* in (1b), nor why there are factive verbs that do not embed an interrogative, e.g. *regret*, *resent*.

The fact that the entailment goes through for IEVs when the nominal is factive can be captured in the current analysis as a result of the CQ reading, given that factive nominals presuppose the truth of the complement (e.g.,  $\llbracket \text{fact} \rrbracket^w = \lambda p_{\langle s,t \rangle} \lambda q_{\langle s,t \rangle} . q = [\lambda w' : p(w') = 1 . p(w')]$ ): *John knows<sub>SP</sub> the fact that Mary left* means 'John knows which proposition is equal to the fact that Mary left', where each proposition in the question presupposes that Mary left. Since John knows this proposition, he believes that Mary left, and by the factivity of 'know', it is true that Mary left. Hence, John knows that Mary left.

Thus, the resulting view of the possible denotations of an attitude verb is that it can either be exclusively question-taking or exclusively proposition-taking, with the possibility of a question-taking verb embedding a *that*\*-clause. This analysis makes several predictions. First, the interrogative-embedding version of a verb should be factive iff the indicative-embedding version is factive, as argued by Égré & Spector. Also, due to the presence of *that*\*, there should be no verb that embeds only questions. Apparent counterexamples are *ask*, *wonder*, *inquire*, but I argue that these verbs form a natural class in that they have independent presuppositions in (15) to the effect that the question must be non-singleton. This is why these verbs are incompatible with a *that*\*-clause.

- (15)  $\llbracket \text{ask/inquire/wonder} \rrbracket^w(Q)(x)$  presupposes that (i) there is some  $p \in Q$  s.t. it is not the case that  $x$  believes  $p$  in  $w$  and (ii)  $x$  believes in  $w$  that there is some  $p \in Q$  s.t.  $p$  is true

Accordingly, the lack of QVE in the *ask*-type verbs can also be accounted for by giving quantificational adverbs the following denotation, which feeds a singleton question to the predicate of questions created by the LF movement of the question argument (e.g. [1 [John knows  $t_1$ ]]).

- (16)  $\llbracket \text{mostly} \rrbracket^w = \lambda Q_{\langle st,t \rangle} \lambda P_{\langle \langle st,t \rangle, t \rangle} . \text{MOST}_p [Q(p) = 1 \wedge p(w) = 1][P(\{p\}) = 1]$

Unlike Lahiri (2002), who assumes that a proposition-taking verb can embed an interrogative by Interrogative Raising, this account does not have the problem of predicting that *believe* can embed an interrogative, since there is no mechanism by which a verb specified as proposition-taking in the lexicon can embed an interrogative. Since the apparent counterexamples can be explained away as a natural class on independent grounds as in (15), the constraint on question/proposition-embedding posed by the current analysis has an advantage over alternatives that reduce question-embedding to proposition-embedding (Karttunen 1977, Groenendijk & Stokhof 1984, Lahiri 2002), or that derive question- and proposition-embedding meanings of a specific verb independently.

**References** Aloni & Roelofsen. to appear in *L&P*; Égré & Spector 2007. Ms; Ginzburg 1995. *L&P* 18. Kratzer 2006. A talk at HUJI; Moulton 2008. *NELS* 38; Vendler 1972. *Res Cogitans*.