

## The semantics of responsive predicates and their complements in Estonian

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**Background:** Responsive Predicates (ResPs) are those predicates which may take either declarative or interrogative complements, like *know* and *say*. To maintain single lexical entries for each ResP, ResP complements must be treated as having a unified type, despite standard assumptions that declaratives and interrogatives differ in type. Prior accounts diverge on how to best accomplish this, from type-shifting interrogatives to declaratives (Karttunen 1977, Groenendijk & Stokhof 1984, *et seq.*), declaratives to interrogatives (Uegaki 2015) or dispensing altogether with the assumption that the two are different types (Theiler et al 2016).

**The Puzzle:** A productive avenue for determining the semantic type of verbal complements is identifying patterns in the lexical semantics of those verbs (Lahiri 2002). In Estonian, several ResPs, chief among them *mõtleva* ‘think, consider’, exhibit an unusual distributional pattern: when paired with a declarative complement, *mõtleva* indicates representational belief like English *think* (1), but with an interrogative complement, it indicates ignorance toward the answer to the embedded question, like English *wonder* (2).

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| (1) Ma mõtlen, et sajab vihma.<br>I think that falls rain<br>‘I think that it’s raining.’ | (2) Ma mõtlen, kas sajab vihma.<br>I think Q falls rain<br>‘I wonder whether it’s raining.’ |
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Cross-linguistically, nonfactive representational belief verbs are typically only declarative-embedding (anti-rogative) and ignorance-implicating verbs are only interrogative-embedding (rogative) (Spector & Egré 2015, Uegaki 2015), yet *mõtleva* displays characteristics of both, as in (1) where it is translated as *think*, and (2) where it is translated as *wonder*. In this talk, I provide a semantics for *mõtleva* that reconciles these facts and pragmatically derives these two seemingly contradictory interpretations from a single lexical entry. Ultimately, I conclude the *mõtleva* facts are parsimoniously obtainable by treating its complements as interrogatives, and unobtainable treating its complements as declaratives, providing evidence in favor of the interrogative-style denotation analysis of ResP complements.

***Mõtleva p*:** Unlike anti-rogative nonfactive belief verbs like *uskuma* ‘believe’, *mõtleva p* does not entail an agent’s commitment to *p*. Ordinarily, commitment to *p* is inferred, but this commitment is cancelable. Unlike *think*, *mõtleva p* may be used felicitously when *p* is plainly incompatible with the attitude holder’s beliefs, but she is nonetheless entertaining *p* as though it were true. In such cases, the interpretation of *mõtleva* is roughly, ‘think about the idea that *p*’ as in (3):

- (3) Ma mõtlen, et dinosaurused on ikka elus, kuigi ma tean, et ei ole.  
I think that dinosaurs are still alive although I know that NEG be.NEG  
‘I’m thinking about dinosaurs still being alive, even though I know they’re not.’

***Mõtleva Q*:** With an interrogative complement, *mõtleva* indicates ignorance on the part of the attitude holder to the true answer to the embedded question, but a desire to know that answer, like *wonder*. *Mõtleva Q* does not entail ignorance about *Q*, contra *wonder*; it can be used in situations where the attitude holder knows full well the answer to *Q*:

- (4) Liis mõtleb, kas sajab vihma, kuigi ta teab, et sajab.  
Liis thinks Q falls rain although she knows that falls  
‘Liis is thinking about whether it’s raining, even though she knows that it is.’

An ignorance implicature is derived when the attitude holder believes there are two or more epistemically possible answers to the embedded question: that is, their beliefs do not entail any particular  $p$  that is an answer to  $Q$  (6).

- (5) *Context: There is a knock at Jaan's door, but he isn't expecting visitors.*  
 Jaan mōtleb, kes ukse taga on.  
 Jaan thinks who door behind is  
 'Jaan wonders who is at the door.'

In cases like (6) where there is not a *mōtlema* relationship between an attitude holder and a specific  $p$ , an embedded interrogative cannot be naturally reduced to a declarative.

**Analysis:** I treat the complement of *mōtlema* as a set of propositions (Hamblin 1973). The denotation of *mōtlema* in (7) relates an agent  $x$  to an embedded  $Q$  by saying  $Q$  is an element of a pair in  $x$ 's contemplation state  $\text{CONTEM}_x^w$ , the set of ⟨issue, set of world⟩ pairs ⟨ $Q$ ,  $W$ ⟩ such that  $Q$  is a partition of  $W$  and  $Q$  is being actively attended by  $x$  in  $w$ . Embedded propositions are type-shifted into interrogatives by the ID operator (Uegaki 2015), which takes propositions and returns the singleton set containing that proposition.

$$(6) \llbracket m\ddot{o}t\ddot{l}e\ddot{m}a \rrbracket^w = \lambda x_e. \lambda Q_{\langle st, t \rangle}. \exists W_{\langle st \rangle} [\langle Q, W \rangle \in \text{CONTEM}_x^w]$$

Crucially, although this denotation does not encode either ignorance or belief, the litany of interpretations for *mōtlema* can then be straightforwardly derived from pragmatic principles.

With an embedded declarative, *mōtlema* indicates that the  $p$  specified by the complement is under consideration by an agent  $x$ . Crucially, this is not commitment;  $x$  can follow up with an explicit rejection of  $p$ , unlike with lexically belief-encoding verbs like *uskuma*. However, in the absence of independent evidence that  $x$  believes  $\neg p$ ,  $x$  *mōtlema*  $p$  indicates that  $p$  exclusively is being contemplated by  $x$ , giving rise to the inference that  $x$  tacitly accepts  $p$ .

The behavior of *mōtlema* with embedded interrogatives can also be explained pragmatically under this account. In contemplating multiple (non-intersective) propositions, a natural inference to draw is that the attitude holder is considering the ramifications of various possible answers, precisely because she doesn't know which is actually true. The attitude holder is welcome to contemplate various propositions even if she knows many of them to be false, although in ordinary conversation, such a scenario is unlikely to arise.

**Conclusion:** The existence of verbs like *mōtlema* indicates a reductive declarative semantics for ResP complements to be insufficient. The denotation for *mōtlema* outlined here accounts for its considerable interpretative flexibility by uniformly treating its complements as sets of propositions related to an individual's contemplative state, compatible with a question-embedding semantics of ResPs. A close study of lexical semantics in a language heretofore absent from discussion of ResPs broadens our understanding of such predicates typologically, and provides further clues as to the optimal semantic treatment of their complements.

**References:** J. Groenendijk & M. Stokhof. 1984. Studies on the Semantics of Questions and the Pragmatics of Answers. • Hamblin, C. 1973. Questions in Montague English. • Karttunen, L. 1977. Syntax and semantics of questions. • Lahiri, U. 2002. Questions and Answers in Embedded Contexts. • B. Spector & P. Egré. 2015. A uniform semantics for embedded interrogatives. • Theiler, N., F. Roelofsen, & M. Aloni. 2016. A uniform semantics for declarative and interrogative complements. • Uegaki, W. 2015. Content nouns and the semantics of question-embedding.