

## Does at-issueness predict projection? It's complicated!

Taylor Mahler, The Ohio State University

Simons et al. (2010) hypothesized that utterance content projects if and only if it is not-at-issue with respect to the Question Under Discussion (QUD; Roberts 1996/2012) addressed by the utterance. This paper reports on an experiment designed to test this hypothesis by using interrogative utterances to manipulate the at-issueness of factive presuppositions. As predicted, factive presuppositions were found to be less projective when they addressed an interrogative utterance than when they did not. However, interrogative utterances did not influence the extent to which factive presuppositions were at-issue, nor was their projectivity influenced by their at-issueness. These findings are consistent with analyses of presupposition projection strictly in terms of questions/alternative sets (e.g., Abusch 2010, Beaver et al. 2017), but do not provide evidence that presupposition projection is sensitive to at-issueness. Instead, they challenge assumptions about the relation between interrogative utterances, QUDs, at-issueness, and at-issueness diagnostics.

### Previous experimental findings on at-issueness and projectivity

Xue & Onea (2011) and Tonhauser et al. (in press.) found that the at-issueness and projectivity of contents were correlated, providing empirical support for a relation between projection and at-issueness. Indirect evidence that the projectivity of a presupposition depends on its at-issueness comes from experiments in which the prosodic realization of utterances was found to influence the extent to which utterance content projects (Cummins & Rohde 2015, Tonhauser 2016, Djärv & Bacovcin 2017). However, these experiments do not yet provide evidence for the prediction that the projectivity of a factive presupposition depends on its at-issueness, because at-issueness was either not manipulated (Xue & Onea 2011, Tonhauser et al. in press) or not measured (prosody experiments). The current study tests this prediction by measuring not only the projectivity of factive presuppositions, but also their at-issueness in the context of two types of interrogative utterances. That interrogative utterances influence at-issueness has been widely assumed (e.g., Simons 2007, Amaral et al. 2007:732) but not verified; this study therefore also tests this assumption.

**Methods** The contents used to test this prediction were contents expressed by the complements of 5 (semi-) factive predicates: *discover*, *realize*, *know*, *be aware* and *notice*.

**Participants** 100 participants were recruited on Amazon's Mechanical Turk platform. Data from 88 participants who reported being native speakers of American English was analyzed.

**Materials** There were 15 target sentences, 3 for each predicate. Each target sentence consisted of a subject, a predicate, and a clausal complement, which were embedded under the modal adverb *perhaps*, as in (1):

- (1) Perhaps Rachel discovered that Don's Canadian.

Based on the assumption that at-issue content addresses an interrogative utterance while not-at-issue content does not, the at-issueness of the clausal complement contents were (hypothesized to be) manipulated by being presented in the context of two different types of interrogative utterances. In (2), the content of the clausal complement in Person 2's utterance, that Don is Canadian, is hypothesized to be at-issue because it is an answer to the polar question asked by Person 1. In (3) this content is hypothesized to be not-at-issue because it is not an answer to the why-question asked by Person 1. Each of the 15 target sentences were presented once as the response to a polar question, and once as the response to a why-question.

- (2) **Person 1:** What about Don? Is he American?

**Person 2:** Perhaps Rachel discovered that he's Canadian.

Polar question context

- (3) **Person 1:** What about Rachel? Why did she bring maple syrup?

**Person 2:** Perhaps she discovered that Don's Canadian.

Why-question context

The experiment had two blocks: a projection block that explored the projectivity of the presuppositions associated with the clausal complements, and an at-issueness block that explored the at-issueness of these same contents. The target stimuli in the projection block consisted of two-turn discourses, as in (2) and (3). Target stimuli in the at-issueness block additionally included a third speaker's utterance that dissented with the content of the complement, as in (4). The direct dissent diagnostic is based on the assumption that

at-issue content is more readily dissented with than not-at-issue content (e.g., Amaral et al. 2011, Tonhauser 2012, Syrett & Koev 2015).

(4) **Person 1:** What about Don? Is he American?

**Person 2:** Perhaps Rachel discovered that he's Canadian.

**Person 3:** No, he's not Canadian.

Each participant saw all 15 target sentences twice, once in each block. Each participant saw 7 or 8 of the 15 target sentences in one context, and the other 7 or 8 target sentences in the other context. Both blocks included 2 control stimuli for a total of 34 stimuli.

**Procedure** In the projection block, participants were presented with a question about how certain the speaker of the target sentence is about the content of the clausal complement (e.g., *Is Person 2 certain that Don is Canadian?*), a diagnostic used in previous research to measure the projectivity of factive presuppositions (e.g., Tonhauser 2016, Djärv & Bacovcin 2017). Responses were given on a 7-point Likert scale, labeled at 4 points: No, not certain/1, Possibly not certain/3, Possibly certain/5, Yes, certain/7. Compared to lower responses, higher responses were taken to indicate that the clausal complement content was more projective. In the at-issueness block, participants were presented with a question about whether Person 3's utterance sounded natural (e.g., *Does Person 3's response sound natural in this conversation?*), and gave responses on a 7-point Likert scale labeled at 4 points: No, not natural/1, Possibly not natural/3, Possibly natural/5, Yes, natural/7. Compared to lower responses, higher responses were taken to indicate that the clausal complement content was more at-issue. Block order and within-block stimulus order were randomized.

**Results** The data was analyzed using ordinal mixed-effects models with the maximal random effects structures allowing for convergence. As expected, content was more projective in the why-question context than the polar question context, as revealed by a model predicting projection ratings from context, block order, and their interaction ( $\beta = .65$ ,  $SE = .18$ ,  $z = 3.65$ ,  $p < .001$ ). However, in a model predicting at-issueness ratings from the same fixed effects, at-issueness ratings were statistically identical in both contexts ( $p = .49$ ). A model predicting projection ratings from (repeated contrast-coded) at-issueness ratings, block order, and their interaction revealed a significant interaction: projection ratings were higher for at-issueness ratings 1, 2, and 3 than the other at-issueness ratings only when the projection block was presented first ( $\beta = 1.20$ ,  $SE = 0.47$ ,  $z = 2.56$ ,  $\chi^2(6) = 13.43$ ,  $p = 0.04$ ). To determine whether at-issueness ratings predicted projection ratings for a particular block order, the data from each block order was analyzed in two separate models predicting projection ratings from at-issueness ratings. Neither model revealed an effect of at-issueness ratings on projection ratings in either block order (all  $p > .08$ ).

**Discussion** These results show that the projection of (a subclass of) factive presuppositions is sensitive to whether the presupposition addresses an interrogative utterance, consistent with analyses of projection in terms of alternative sets. However, these findings do not provide evidence that the relevant alternative set is the QUD, since at-issueness ratings were not influenced by whether the presupposition addressed an interrogative utterance. One hypothesis that accounts for this finding is that an interrogative utterance is only interpreted as a QUD within a richer context than the ones provided in this experiment, a context in which the goals of the discourse participants are transparent. Another hypothesis is that the standard at-issueness diagnostic used here does not capture the influence of interrogative utterances on at-issueness. These findings are also compatible with definitions of at-issueness that are not question-based, such as those that define at-issueness in terms of how content updates the common ground (e.g., Anderbois et al. 2015, Murray 2014). The next steps toward evaluating the full range of predictions that follow from the hypothesis that content projects iff it is not-at-issue are to establish how at-issueness ought to be defined, how to manipulate it in an experimental setting, and how the effects of these manipulations can be diagnosed.

**Selected References** Cummins, C. and H. Rohde (2015). Evoking context with contrastive stress: Effects on pragmatic enrichment. *Frontiers in Psychology*, 6.1779 — Simons, M., et al. (2010). What projects and why. *SALT XXI*, 309-327. — Tonhauser et al. (in press.) How projective is projective content? Gradiance in projectivity and at-issueness. *Journal of Semantics*.