

Interpretation and processing of uninformative event mentions

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Work in pragmatics shows that speakers typically avoid stating information already given in the discourse (Grice, 1975; Horn, 1984). However, it's unclear how listeners interpret or process utterances which assert material that can be directly inferred from preceding context. We show that overly predictable event mentions can trigger context-dependent pragmatic inferences, which increase utterance utility in line with listener expectations (Horn, 1984; Levinson, 2000). These results suggest that listeners may experience processing difficulty (cf. Sedivy, 2007) while reading utterances describing overly predictable events, presumably due to the relative difficulty of pragmatically interpreting an utterance with little informational utility, or to the low probability of such utterances in context (Smith & Levy, 2013). While this needs to be confirmed empirically, it would present a challenge for current formal models of processing difficulty, which do not take into account event models or pragmatic reasoning.

In these studies, we look at utterances which refer to event sequences describing common activities (*scripts*, such as *going to a restaurant*). People anticipate upcoming events or future states once a script is 'invoked,' with faster reading times when information is consistent with previous script knowledge (Zwaan, Magliano, & Graesser, 1995). Further, upon recall listeners have difficulty distinguishing whether script-relevant events were, or were not overtly mentioned in a text (Bower, Black & Turner, 1979). Events that are most stereotypically associated with a script can therefore be argued to be part of its conventional meaning.

Design: 24 items; 2 (typical vs. atypical context) x 2 ('predictable' vs. optional event) manipulation – see p. 2. 'Predictable' events (4a) were directly implied by the (typical) script, while optional events (4b) were not. Initial context was typical (1a), or implied the 'predictable' event was optional or atypical (1b).

Experiment: Each participant (N=200, via Mechanical Turk) read 4 of 24 stories, with each condition presented once. Participants saw the first part of the story (1 & 2), and baseline questions asking for activity typicality estimates. After answering, the questions were hidden, and the rest of the story (3-5) was presented, as well as a new series of questions asking for updated ratings. The dependent variable was the change from baseline (Q1) to updated (Q2) typicality estimates, conditioned on the information in (3-5).

Results: A linear mixed effects model (maximal RE structure) showed a context by utterance interaction ($p < .001$), indicating that speakers are more likely to interpret uninformative utterances ($1a_{\text{typical}}-4a_{\text{predictable}}$) as signifying that an activity is unusual, relative to other conditions (see Figures 1 and 2). Typicality ratings were decreased only in the 'uninformative' (1a-4a) condition, which drives the effect (all other condition differences n.s.).

Conclusion: This study demonstrates that listeners can assign uninformative event mentions an 'informative' pragmatic interpretation – for example, by interpreting an otherwise typical activity as unusual in context. This suggests that mentions of highly inferable events are systematically reconciled with an assumption that a speaker is being informative (Atlas & Levinson, 1981; Horn, 1984), and adds to a still-small experimental literature on context-dependent implicatures.

Further, these results open up a secondary line of inquiry, and suggest that the non-literal interpretation of uninformative utterances may incur processing cost (Sedivy, 2007). This could introduce several challenges for building formal models of surprisal, which in general have difficulty incorporating world knowledge, including event models, as well as pragmatic expectations. Processing cost, as indexed for example by reading times, would not be predicted by shallow n-gram models, given the identical utterance strings and immediately preceding context, or by models that take into account expectancy of the semantic or syntactic structure. Modeling knowledge of event sequences would be crucial for predicting any difference in processing difficulty, but would not in itself discriminate whether an utterance encodes 'too little' information. We argue therefore that formal language models would need to incorporate pragmatic reasoning in order to predict any cost incurred by processing uninformative utterances.

(1)

Example Stimulus

Typical context

[1a] John often goes to his local supermarket, as it's close by_{typical}.

[2] Today he entered the apartment with his shopping bags flowing over. He ran into Susan, his best friend, and talked to her about his trip. Susan then wandered over to Peter, their roommate, who was in a different room.

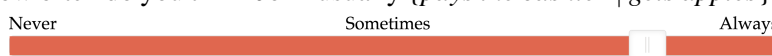
Q1: How often do you think John usually {pays the cashier | gets apples}, at the store?

Atypical context

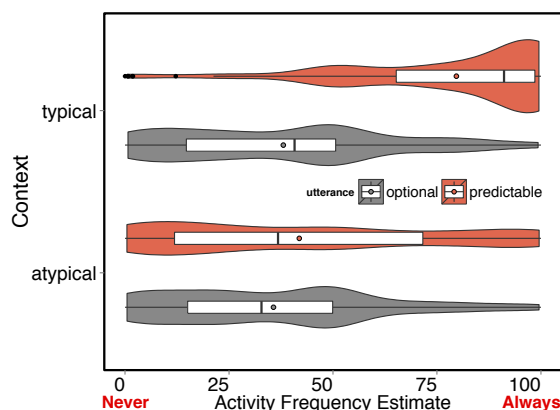
[1b] John often *doesn't pay at the local supermarket, as he's usually broke*_{atypical}.

[3] She commented: "John went shopping. [4a/b] He {paid the cashier_{a-predictable} | got some apples_{b-optional}!} [5] I just saw him in the living room."

Q2: Now how often do you think John usually {pays the cashier | gets apples}, at the store?



Baseline activity frequency



Change in activity frequency

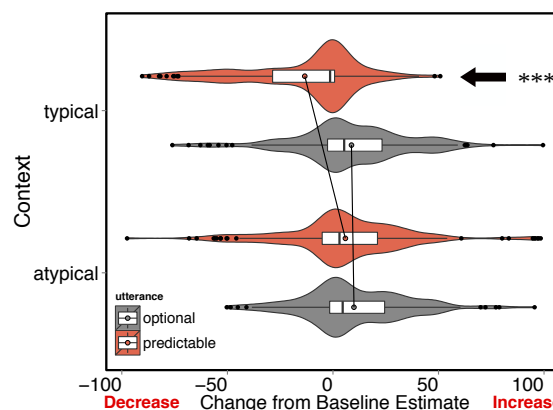


Figure 1: Violin plots show the distribution of ratings, with circles representing mean values.

Figure 2: This plot shows the change from baseline estimates, following the critical utterance [4].

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