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Expected the Unexpected: How discourse expectations can reverse predictability effects in reading time

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THE PROBLEM

Sentences are easiest to process when words that listeners encounter are frequent or predictable given surrounding linguistic context (Kliegl et al., 2004; Levy, 2008; among many others). However, hearers also expect discourse to convey informative, and therefore unpredictable, information (Grice, 1975; Shannon, 1948).

We investigate whether the expectation of informativity can:
1. Make unpredictable words easier to process.
2. Make highly predictable words hard to process, because they are anomalously underinformative.

THE RESULTS

In a self-paced reading time study, we modulate readers’ expectations about the surprisiness of upcoming material in a discourse.

- We describe an individual as either boring or surprising.
- Then we describe them using predictable or unpredictable instruments for some task (Brown & Dell, 1987).

Stimuli were presented using Ibx over Mechanical Turk. 110 subjects saw 4 target sentences each. Words were centered on the screen.

We did not analyze data from subjects who:
1. Were not located in the United States.
2. Did not answer every comprehension question correctly, or
3. Had a mean reading time greater than 2 s.d. above or below the overall mean.

Figure 1: Expecting surprise. The word knife is unpredictable from previous context, but it is in line with the expectation of surprise.

Figure 2: Anomalous underinformativity. The word knife is highly predictable from previous context—which conflicts with the discourse expectation.

Conclusions

- To our knowledge these new findings are the first evidence of comprehension difficulty for material that is overly predictable from local cues.
- The results point to the importance of modeling comprehenders’ pragmatic expectations about upcoming material—namely, their expectations about relevance and informativity.
- We are currently examining whether the same effects hold using conventional linguistic markers of informativity, such as clefts, and using adjuncts other than instruments.

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