Speakers and listeners don't agree: Audience design in the production and comprehension of acoustic prominence

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EXPERIMENT 1

The Uniform Information Density (UID) hypothesis predicts that words which carry more information in a discourse will have longer duration (Frank & Jaeger, 2008; Levy & Jaeger, 2007; see also Aylett & Turk, 2004).

Experiment 1 tests the prediction that speakers will produce durations that are related to amount of discourse change.

METHODS

Task
Speakers viewed objects moving in on a computer screen (Figure 1) and described these movements to an experimenter who replicated the movements on a separate computer.

Figure 1. Example computer display for Experiment 1 at start of trial.

Design
3 conditions were defined by the context (first) utterance:
- Given condition: Critical item (camel) previously mentioned in the same syntactic position
- Shift condition: Critical item previously mentioned in a different syntactic position
- New condition: Critical items not previously mentioned

EXPERIMENT 2

Experiment 1 shows that duration is related to amount of discourse change as predicted by UID.

Experiment 2 tests whether listeners also use this distinction.

METHODS

Task
Participants rated the prominence of the second (critical) utterance from each trial in Experiment 1.

METHODS CONT.

Participants
- 44 Participants total
- 6 dropped from analysis (1 due to technical error; 5 for failure to complete the task as directed)

RESULTS AND DISCUSSION

Ratings by condition
Tested whether participants’ ratings were significantly different in the 3 conditions (given, shift, new) (Figure 3)
- Given vs. Shift:
  t = -1.576, p > .10.
- Given vs. New:
  t = -1.83, p < .10

Ratings by acoustic variable
Intensiy Mean was the best predictor of listeners’ ratings, t = -5.13, p < .001

Duration was not significantly related to listeners’ ratings, t = -1.16, p > .05

CONCLUSION

UID predicts that speakers will optimize communication by varying the duration of a word with the amount of information carried by that word (Frank & Jaeger, 2008; Levy & Jaeger, 2007; see also Aylett & Turk, 2004).

-- In Exp 1, duration was significantly related to the amount of discourse change.
-- In Exp 2, listeners’ ratings of prominence were not related to duration (Isaacs & Watson, 2008; Lam & Watson, 2008).

Thus, the relationship between duration and information density of words may be due to speaker-internal rather than to communicative processes.