

Guesses about upcoming content reflect awareness of speakers as intentional communicators

Vilde R. S. Reksnes, Alice Rees, Chris Cummins, Hannah Rohde
University of Edinburgh

Comprehenders rely on real-world knowledge when guessing upcoming content. For example, *taking a sip from the waterfall* is more expected than *taking a sip from the transmitter* (Kutas & Hillyard 1980). By contrast, speakers tend to omit typical content in favour of newsworthy content: they include an optional instrument more often when it is atypical, favouring the production of *stab with an ice pick* over *stab with a knife* (Brown & Dell 1987). These findings are taken to reflect constraints on cooperative communication whereby speakers' contributions are expected to be appropriately informative and relevant (Grice 1975). If comprehenders are rational and are sensitive to speakers' production preferences, these should also bear upon their predictions about upcoming content: that is, they should expect the kind of content that cooperative speakers are likely to *mention*, rather than just the kind of content that is likely to *be the case* in the real world. Here we elicit sentence completions via a Cloze task as an index of comprehenders' expectations about upcoming material (Taylor 1953). We manipulate the salience of the speaker and show that the more aware participants are of the speaker as an intentional communicator, the more informative they expect the speaker's contribution to be.

In an online experiment, participants (N=400) completed sentences with the word or words they expected next. Target items mention a specific location (20 targets), e.g. a train station. We varied the salience of the speaker in a between-participants design (see Figure 1): the **bare condition** only mentions the location; the **third person condition** invokes a speaker talking about someone at the location; the **first person condition** directly mentions the speaker; and the **visible speaker condition** uses first person and adds a photograph of a speaker. In order to establish which objects are considered typical for the locations, an independent pre-test asked participants (N=22) to list 10 objects that appear most plausibly in each location. If comprehenders' anticipation depends on their awareness of the speaker having cooperative intentions, we expect sentence completions to become more informative as the salience of the speaker increases. We measure the informativity of participants' responses with three measures: variability of responses (entropy score per location to compare consistency vs unpredictability), inclusion of modification (which may make otherwise typical content like 'a train' more newsworthy: 'steam train'; or negation to mark the absence of something typical: 'no train'), and typicality of objects mentioned (as compared to pre-test responses).

Table 1 shows that the visible speaker condition elicited the most variability (i.e., more unpredictability; higher entropy for visible speaker/first person/third person conditions than baseline bare and also visible speaker>first person; $p < 0.001$ with paired Wilcoxon signed-rank tests). Moreover, the visible speaker condition elicited the highest modification and negation rates (logistic regressions with RE location and participant; $p < 0.001$; same pattern as entropy), and the lowest typicality (linear regression, $p < 0.001$; same pattern).

The results show that guesses about upcoming words in a sentence-completion Cloze task are malleable by changing emphasis on the speaker, presumably mediated by the comprehenders' awareness of the speaker as an intentional communicator. This finding is corroborated by studies showing that comprehenders are sensitive to speakers' preference to be informative (Rohde, Futrell & Lucas 2021; Kravtchenko & Demberg 2015). A follow-up experiment will investigate whether this expectation for informativity is further malleable depending on properties of the speaker (Grodner & Sedivy 2011). Building on the visible speaker condition, participants will be asked to complete sentences from two different speakers whose speaking style is introduced in a preliminary exposure phase: one speaker routinely makes uninformative utterances, and one produces utterances that are highly informative. At the test phase, we predict that participants' responses will exhibit higher informativity for the latter speaker compared to the former. This, together with our current results, would highlight the importance of taking into account comprehenders' informativity-

driven reasoning about the speaker in models of language processing – including reasoning about individual speakers’ preferences for informativity.

Figure 1: Example trials for the train station location

- [bare]** At the train station, there’s _____
- [third person]** They’re at the train station, and there’s _____
- [first person]** I’m at the train station, and there’s _____
- [visible speaker]**



Fill in the blank:

Table 1

	Visible speaker	First Person	Third Person	Bare
Entropy	4.06	3.30	3.33	3.00
Modification	0.64	0.30	0.25	0.13
Negation	0.21	0.07	0.04	0.01
Typicality	0.24	0.49	0.46	0.55

Table 1 Mean scores for entropy, use of modification and typicality of responses per condition. Entropy and modification were calculated over all the responses for any one location, and then a mean was calculated for each condition. Typicality means were calculated via an independent elicitation task, N=22.

References

Brown, P. M., & Dell, G. S. (1987). Adapting production to comprehension: The explicit mention of instruments. *Cognitive Psychology*, 19, 441–472.

Grice, H. P. (1975). Logic and conversation. In P. Cole and J. Morgan (eds), *Syntax and Semantics III: Speech Acts*. New York: Academic Press. 183–98.

Grodner, D., & Sedivy, J. (2011). The effect of speaker-specific information on pragmatic inferences. In E. A. Gibson, & N. J. Pearlmuter (eds), *Processing and Acquisition of Reference*. Cambridge, MA: MIT Press. 239-272.

Kravtchenko, E., & Demberg, V. (2015). Semantically underinformative utterances trigger pragmatic inferences. *Proceedings of the 37th annual meeting of the Cognitive Science Society*, 1207–1212.

Kutas, M., & Hillyard, S. A. (1980). Reading senseless sentences: Brain potentials reflect semantic incongruity. *Science*, 207, 203–205.

Rohde, H., Futrell, R., & Lucas, C. G. (2021). What's new? A comprehension bias in favor of informativity. *Cognition*, 209, 104491.

Taylor, W. L. (1953). "Cloze procedure": A new tool for measuring readability. *Journalism quarterly*, 30(4), 415-433.