

Seeing the moose with binoculars: speakers' anticipation of potential ambiguity in conversation

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Ambiguous language is often taken to be a violation of expected pragmatic conduct because listeners usually presume their conversation partner to be acting cooperatively by providing all necessary information for successful communication [1]. Therefore, the current research investigates whether speakers notice and correct ambiguity when they run the risk of violating this expectation.

This risk of ambiguity has further implications for a long-standing debate in the study of the origins and use of language, specifically whether language is best suited for thought or communication. Proponents of the communication position often point out that languages' structure and use appear optimised for communication [2]. Meanwhile, proponents of the thought position contend that language is not an optimal communication tool because ambiguity, which can easily result in miscommunication, is prevalent [3,4]. The presence of ambiguity, which may sacrifice communicative efficacy (disambiguation for the listener) for cognitive efficiency (production ease for the speaker) suggests an inability on the part of the speaker to anticipate possible listener misinterpretations. The persistence of ambiguity thus is taken to support the claim that speakers' underlying priority is thought over communication. Prior work supports the claim that, when forced to choose between minimising cognitive effort with ambiguous language and guaranteeing effective communication through higher-effort disambiguation, speakers frequently prioritise cognitive ease over effective communication, perhaps doing so with confidence that listeners' will reason about the most likely intended meaning [1]. However, prior evidence for speakers' non-avoidance of ambiguity comes from speakers' production of garden-path sentences [5]. Because garden path sentences do not necessarily result in miscommunication, only in communication lag, such evidence is insufficient for fully distinguishing thought vs communication priorities [6]. The current study directly examines speaker prioritisation of cognitive ease versus effective communication by testing truly ambiguous sentences that cannot be resolved through linguistic context. It expands prior research by testing varying types of ambiguities (lexical, attachment, scope, and pronoun ambiguities) to establish whether speakers are able to anticipate upcoming miscommunication across types of ambiguity. If speakers often rely on listeners' inferential reasoning when choosing whether to disambiguate, they'd still be expected to disambiguate more when the intended meaning is less typical (and therefore less available to the listener).

Methods. We asked participants (N=80) to listen to one of two one-minute stories containing four or five linguistic ambiguities that could not be resolved by story context (see Table 1). They were told they would later retell the story to another naïve participant, but were not given any instructions in regards to clarity. Participants were presented with a cartoon which resolved the ambiguities visually: e.g., a speaker might hear "Zainab saw a moose with binoculars" and then see a cartoon demonstrating that Zainab saw a moose *who had* binoculars. They were then asked to retell the story to another in-person recruited participant who did not have access to the cartoon. Two versions of each story guaranteed that each of the preferred and dispreferred ambiguity resolutions was viewed by 20 participants. The resulting dataset contained 245 instances of speakers' productions for targeted ambiguities after exclusions.

Results. If speakers prioritise thought over communication, we would expect speakers to repeat the ambiguity without disambiguating a majority of the time. Instead, speakers were found to disambiguate ambiguous language 73.9% of the time. This tendency towards disambiguation applied to most ambiguity types. Speakers avoided pronoun ambiguity in 80.3% of instances, and pronoun ambiguity demonstrated the highest odds of being avoided (Odds = 4.82, 95% CI [2.62, 9.73], $p < .001$). Attachment ambiguity had the next highest odds of disambiguation, with speakers avoiding ambiguity 78.8% of the time (Odds = 3.05, 95% CI [1.90, 5.11], $p < .001$). Scope ambiguity tended towards avoidance but not significantly, with speakers producing expressions that avoided ambiguity 61.7% of the time (Odds = 1.61, 95% CI [0.96, 2.74], $p = .073$). In support of the thought position, however, rates of avoidance within lexical ambiguity did not significantly differ from chance (Odds = 0.62, 95% CI [0.30, 1.22], $p = .174$), although speakers avoided producing the target ambiguities 70.6% of the time. Fig 1 is a forest plot illustrating

these absolute odds of participants avoiding ambiguity in their description of the target ambiguity (error bars show 95% confidence intervals). The dotted vertical line indicates chance level (50/50 probability).

The findings suggest that speakers do anticipate potential miscommunication, opting to rephrase ambiguous expressions that they have encountered when they are retelling the same content to a listener. We speculate that the non-zero rates of ambiguity may reflect speakers' awareness that potential miscommunication can be offset by subsequent repair; the nature of interactive conversation may itself obviate the need to anticipate all potential ambiguity, given the option of repair and recovery.

Table 1: Examples of the 4 ambiguity types, with the more probable interpretation in *italics*

Lexical	The hospital has been sued by six foot doctors → The hospital has been sued by six podiatrists or <i>The hospital has been sued by doctors who are six feet tall</i>
Attachment	Zainab saw the moose with binoculars → Zainab saw the moose who had binoculars or <i>Zainab saw the moose through binoculars</i>
Scope	Every hiker sees a moose → Every hiker sees the same moose or <i>Every hiker sees one of a set of moose</i>
Pronoun	Kate and Zainab went on a walk. She had a spider on her hat → Zainab had a spider on her hat or <i>Kate had a spider on her hat</i>

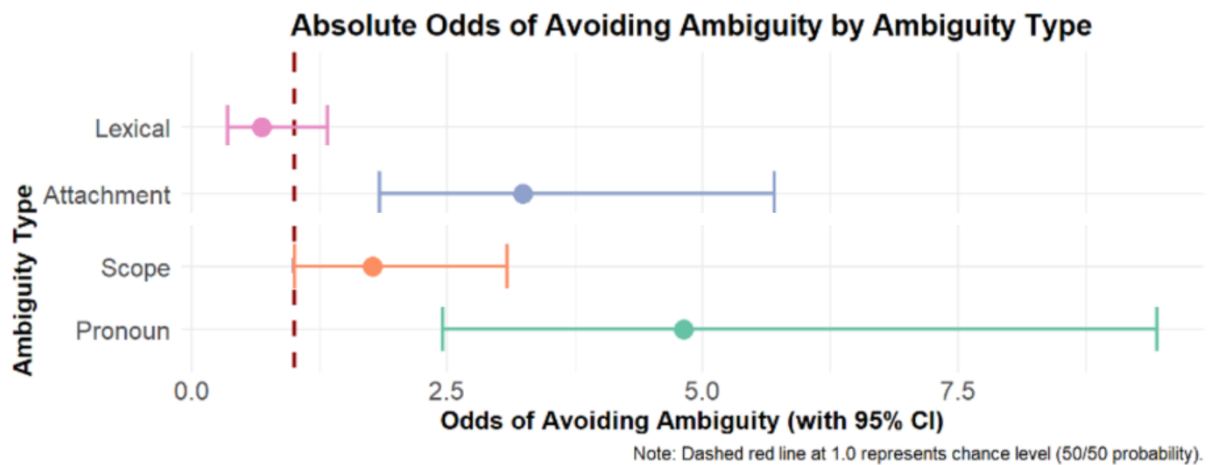


Figure 1: Absolute Odds of Avoiding Ambiguity by Ambiguity Type

References

- [1] Grice HP. Logic and Conversation. In: Speech Acts. BRILL; 1975. p. 41–58. [2] Fedorenko E, Piantadosi ST, Gibson EAF. Language is primarily a tool for communication rather than thought. *Nature*. 2024;630(8017):575–86. [3] Asoulin E. Language as an instrument of thought. *Glossa*. 2016;1(1). [4] Paxton A, Roche JM, Ibarra A, Tanenhaus MK. Predictions of miscommunication in verbal communication during collaborative joint action. *J Speech Lang Hear Res*. 2021;64(2):613–27. [5] Ferreira VS. Ambiguity, accessibility, and a division of labor for communicative success. *Learn Motiv*. 2008;49:209–46. [6] Fujita H. On the parsing of garden-path sentences. *Lang Cogn Neurosci*. 2021;36(10):1234–45.