

# Perspective guides interpretation of questions, declarative questions and statements in unscripted conversation

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## Abstract

This paper describes research investigating the on-line production and interpretation of questions, declarative questions, statements and their replies. Specifically, we examine the role of shared and private knowledge in the processing of these constructions in unscripted conversation. Questions provide a critical test case for the use of perspective in language processing because their felicitous use requires speakers to distinguish common from private knowledge. Analyses of speech and gaze demonstrate that interlocutors distinguish shared from private information and that attention is directed toward different types of entities depending on utterance form. We argue for a central role of perspective in language processing. Discrepancies in experimental findings regarding use of perspective are discussed in terms of relevance of perspective to the task and the utterances of interest.

Cooperative speakers ask questions when they don't know the answer, but believe their addressee might. They assert things they know but believe their addressee might not know. Since Stalnaker's pioneering work on mutual knowledge (Stalnaker, 1978), formal theories of discourse in computational linguistics and within pragmatics and semantics have assumed that keeping track of shared and private commitments

and knowledge is central to conversation (Clark, 1992).

While the presuppositions tied to use of different constructions suggest that the distinction between private and shared knowledge is basic to language processing, addressees often fail to distinguish shared from private information (Keysar, Lin and Barr, 2003), and when they do, the egocentric perspective can interfere with reference interpretation (Hanna, Tanenhaus & Trueswell, 2003). However, this and other on-line work on perspective used imperatives, which may encourage egocentrism due to authority-induced suspension of skepticism and the addressee's aim not to appear confused. Additionally, in order to have control over the interaction and generate specific experimental utterances, these experiments typically employ confederate speakers who are practiced and knowledgeable about the task. However, there is reason to believe that participants interact with confederates differently than they interact with another naïve participant (see Lockridge & Brennan, 2001).

In the experiment described in this paper, we used a goal-directed interactive conversation to examine five semantic-syntactic forms (a-e, see Table 1) that differ in discourse function (requesting/ imparting/ confirming information). Using interactive conversation between naïve participants assures that the constructions are appropriate for the linguistic context and for the knowledge states of the two participants. Thus, speakers will only ask questions when they really don't know the answer, and only make statements when they do. Examining utterance forms which presuppose a distinction between speaker and hearer knowledge (e.g. questions and replies) should provide insights into whether and when this information is used as language is processed on-line.

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a	Wh-Question	<u>What's next to the pig with the hat?</u>
b	Statement	There's <u>a cow with shoes</u> next to <u>the pig with the hat.</u>
c	Declarative question	It's <u>a cow with shoes?</u>
d	Question response	<i>(What's next to the pig with the hat?)..</i> <u>A cow with shoes.</u>
e	Acknowledgment	<i>(There's a cow with shoes.)... </i> <u>A cow with shoes.</u>

We examined the on-line interpretation of wh-questions, declarative questions and statements, and the on-line production of question responses and acknowledgments. Wh-questions and statements were selected to have parallel syntactic structures; each asked about or mentioned the location of one entity (target) with respect to another previously mentioned entity (anchor). If the distinction between shared and private perspectives can be used on-line, we would expect that addressees would direct attention toward private information as they interpret wh-questions, and towards shared or speaker-private information for statements.

Declarative questions, or rising declaratives (Gunlogson, 2001) were used because they have the syntactic form of a declarative, but have question-like intonation and distinct discourse functions. In this task, participants typically used declarative questions to request confirmation or to express skepticism (e.g. *That's a cow with shoes?*). We expected the interpretation pattern for declarative questions to share similarities with both wh-questions and statements.

The question responses and acknowledgments shared a similar syntactic structure (typically a bare noun phrase), however we expected that speakers would direct more attention to private entities when preparing question responses and to shared entities when preparing acknowledgments.

Our results demonstrate that the distinction between shared and private game-pieces is reflected in referent-type differences across utterance forms, and on-line production and interpretation of utterances with different discourse functions.

Wh-questions primarily inquired about addressee-private game-pieces, whereas statements were about shared or speaker-private game-pieces. The pattern of referent-types for declarative questions was half-way between that for wh-questions and statements, with declarative questions primarily inquiring about addressee-private

game-pieces and sometimes about shared or speaker-private game-pieces.

When we analyzed the fixations that addressees made as they interpreted these expressions, we saw evidence for a distinct interpretation pattern for wh-questions: Fixations to addressee-private and shared game-pieces were initially equivalent, but following reference to the anchor, addressee-private fixations rose and shared fixations dropped. In contrast, for statements, most fixations were directed to shared game-pieces, suggesting that addressees distinguish shared and private information during on-line interpretation, and direct attention to information relevant for the type of utterance being interpreted.

The relationship between referent type and utterance form confirms our assumptions about the felicity conditions associated with questions and statements. More importantly, using goal-directed conversation and naïve participants, we demonstrated that interlocutors take into account each other's perspective when producing and comprehending utterances for which perspective is relevant. Differences in experimental findings regarding the use of perspective in on-line language processing may be best understood by considering whether perspective was relevant to the task and relevant for interpreting the critical utterances. Continued work using a variety of syntactic structures and communicative situations is needed to understand more precisely when perspective is and is not used in language processing.

## References

- Clark, H. H. (1992). *Arenas of Language Use*. Chicago: University of Chicago Press.
- Gunlogson, C. (2001). *True to Form: Rising and Falling Declaratives as Questions in English*. Unpublished Doctoral Dissertation, University of California, Santa Cruz, Santa Cruz, CA.
- Hanna, J. E., Tanenhaus, M. K., & Trueswell, J. C. (2003). The effects of common ground and perspective on domains of referential interpretation. *Journal of Memory and Language*, 49, 43-61.
- Keysar, B., Lin, S., & Barr, D. J. (2003). Limits on theory of mind use in adults. *Cognition*, 89, 25-41.
- Lockridge, C. B., & Brennan, S. E. (2002). Addressees' needs influence speakers' early syntactic choices. *Psychonomic Bulletin and Review*, 9, 550-557.
- Stalnaker, R. C. (1978). Assertion. In P. Cole (Ed.), *Syntax and semantics: Pragmatics* (Vol. 9, pp. 315-332). New York, NY: Academic Press.