Probabilistic Modeling of pragmatic processing and utterance production

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Speakers and hearers often manage to communicate swiftly and efficiently despite tremendous uncertainty. Each interlocutor may be uncertain about what the other wants, believes or considers important. Probabilistic pragmatics is a formal approach to this problem of uncertain interaction, which builds on insights from epistemic logic and game theory but is flexible enough to accommodate in probabilistic cognitive models assumptions about natural cognitive mechanisms, biases and resource limitations that conversationalists may have. A dedicated and growing number of researchers have invested in probabilistic pragmatics, showing that conceptual problems can be solved in this framework and that it allows for an astonishingly good fit to experimental data, including soft, fuzzy and gradient aspects of empirical reality.

Our work in the first phase of this priority program has contributed to establishing probabilistic pragmatics as a serious tool for investigating the connection between formal linguistic theory and experimental data. In particular, we have investigated the use and interpretation of referential expressions and vague quantifying expressions, mostly focusing on */some/, /many/* and */few/*. The second phase of this project would stick with these domains of inquiry in order to address two general issues with probabilistic pragmatics that have not received sufficient attention so far: (i) processing and (ii) natural, free utterance production.

Most importantly, while probabilistic pragmatics has been successfully applied to the modeling of choice behavior in psycholinguistic experiments (i.e., to the outcome of pragmatic deliberation or processing), no model from this framework has approached data related to incremental processing. The second phase of this project therefore proposes an approach to probabilistic modeling of data from self-paced reading tasks and eye-tracking in visual worlds, based on a scheme of predictive, incremental and (approximately) ideal interpretation.

Another pressing issue with probabilistic pragmatics models concerns their scalability. In the second phase of this project, we will therefore look at more complex situations which interlocutors might wish to communicate about. We also manipulate why or for what purpose interlocutors may wish to talk about a situation. In particular, we propose to extend probabilistic modeling to cover cases of argumentative discourse, where the speaker makes an utterance that is to persuade the listener of a particular goal proposition. In all this, we will gather data from (semi-)free production tasks and seek to supply models of utterance production that can account for the rich and possibly open-ended nature of such data.