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Title: From compositional semantics to Bayesian pragmatics via logical inference

Abstract: Formal semantics in the Montagovian tradition provides precise meaning characterisations, but usually without a formal theory of the pragmatics of contextual parameters and their sensitivity to background knowledge. Meanwhile, formal pragmatic theories make explicit predictions about meaning in context, but generally without a well-defined compositional semantics. We propose a combined framework for the semantic and pragmatic interpretation of sentences in the face of probabilistic knowledge. We do so by (1) extending a Montagovian interpretation scheme to generate a distribution over possible meanings, and (2) generating a posterior for this distribution using a variant of the Rational Speech Act (RSA) models, but generalised to arbitrary propositions. These aspects of our framework are tied together by evaluating entailment under probabilistic uncertainty.

We apply our model to anaphora resolution and show that it provides expected biases under suitable assumptions about the distributions of lexical and world-knowledge. Further, we observe that the model's output is robust to variations in its parameters within reasonable ranges.