

# Towards a conversational game theory

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Many of the challenges related to formally accounting for dialogue are met by game board style semantic theories such as KOS (Ginzburg, 2012) and in work by (Cooper, 2012; Cooper and Ginzburg, 2015; Cooper and Larsson, 2009; Breitholtz and Cooper, 2011). Cooper (2014); Breitholtz (2014a); Cooper (prep) introduce a notion of game into game board style semantics but they have no notion of strategy for choice between moves in non-deterministic games. Cooper (in a talk at the CreDog workshop in Paris) suggests that such choices could be modelled using techniques from game theory, which could be integrated in a dialogue semantics cast in TTR, a type theory with records (Cooper, 2005, 2012, 2013).

In this paper we explore how this approach could be applied to *conversational games* modelled as strings of move types that can be employed to perform a particular communicative project, and where roles are assigned to participants depending on their initial engagement in the game, as described in Breitholtz (2014b). On this account games are related not only to contextual parameters, such as degree of formality, but also to the rules of thumb, or *topoi* that are available to each of the conversational participants for underpinning reasoning in the interaction. Which topoi these are is partly context dependent, but also to a significant degree related to the personal experiences and inclinations of the individuals involved in interaction.

We illustrate this with a scenario where A and B are trying to agree on what to do in a particular situation. This could be done by means of various conversational games, and which one is chosen depends on several factors. Assume that A tells B “We are doing *P*!”. In ordering B, A limits B’s choices if B wants to accept her role in an ordering game. On the other hand, choosing this strategy might decrease the likelihood that B will keep playing the game. If A chooses a strategy where he leaves B the possibility of rejecting the suggestion, B is more likely to accept the role assigned to her. If A also adds a reason for doing *P*, the chances of success in actually getting B to agree increases, as long as the reason chosen can be identified by B as drawing on a topos which B accepts and ranks as important.

We will build on Burnett (fthc) to formulate this as a social meaning game and show how it can be integrated into a gameboard semantics for dialogue.

## References

- Breitholtz, E. (2014a). *Enthymemes in Dialogue: A micro-rhetorical approach*. PhD thesis, University of Gothenburg.
- Breitholtz, E. (2014b). Reasoning with topoi – towards a rhetorical approach to non-monotonicity. volume Proceedings of the 50:th anniversary convention of the AISB, pages 190–198. AISB.
- Breitholtz, E. and Cooper, R. (2011). Enthymemes as rhetorical resources. In Artstein, R., Core, M., DeVault, D., Georgila, K., Kaiser, E., and Stent, A., editors, *Proceedings of*, volume SemDial 2011 (LosAngelogue) Proceedings of the 15th Workshop on the Semantics and Pragmatics of Dialogue, pages 149–157.
- Burnett, H. (fthc). Signalling Games, Sociolinguistic Variation and the Construction of Style. *Linguistics and Philosophy*.
- Cooper, R. (2005). Records and record types in semantic theory. *Journal of Logic and Computation*, 15(2):99–112.
- Cooper, R. (2012). Type theory and semantics in flux. In Kempson, R., Asher, N., and Fernando, T., editors, *Handbook of the Philosophy of Science*, volume 14: Philosophy of Linguistics. Elsevier BV. General editors: Dov M Gabbay, Paul Thagard and John Woods.
- Cooper, R. (2013). Clarification and generalized quantifiers. *Dialogue and Discourse*, 4(1).
- Cooper, R. (2014). How to do things with types. In de Paiva, V., Neuper, W., Quaresma, P., Retoré, C., Moss, L. S., and Saludes, J., editors, *Joint Proceedings of the Second Workshop on Natural Language and Computer Science (NLCS 2014) & 1st International Workshop on Natural Language Services for Reasoners (NLSR 2014) July 17-18, 2014 Vienna, Austria*, pages 149–158. Center for Informatics and Systems of the University of Coimbra.
- Cooper, R. (in prep). Type theory and language: from perception to linguistic communication. Draft of book chapters available from <https://sites.google.com/site/typetheorywithrecords/drafts>.
- Cooper, R. and Ginzburg, J. (2015). Type theory with records for natural language semantics. *Handbook of Contemporary Semantic Theory, The*, pages 375–407.
- Cooper, R. and Larsson, S. (2009). Compositional and ontological semantics in learning from corrective feedback and explicit definition. In Edlund, J., Gustafson, J., Hjalmarsson, A., and Skantze, G., editors, *Proceedings of Dia-Holmia: 2009 Workshop on the Semantics and Pragmatics of Dialogue*, pages 59–66.

Ginzburg, J. (2012). *The Interactive Stance: Meaning for Conversation*. Oxford University Press.