

# Beyond Synchrony: Complementarity and Asynchrony in Joint Action

**Rick Dale (rdale@ucmerced.edu)**

Cognitive and Information Sciences, UC Merced, 5200 N. Lake Road  
Merced, CA 95343

**Riccardo Fusaroli (semrf@hum.au.dk)**

Center for Semiotics and the Interacting Minds Center, Aarhus University, Jens Chr. Skous Vej 2,  
8000 Aarhus C, Denmark

**Dorthe Døjbak Håkonsson (dod@asb.dk)**

Interdisciplinary Center for Organizational Architecture, Fuglesangs Allé 20, Building 2635 I106  
8210 Aarhus V, Denmark

**Patrick Healey (ph@eecs.qmul.ac.uk)**

Department of Computer Science and Electronic Engineering, Queen Mary University of London, Mile End Road  
London E1 4NS

**Dan Mønster (danm@asb.dk)**

School of Business and Social Sciences, Department of Economics and Business, Fuglesangs Allé 4  
8210 Aarhus V, Denmark

**John J. McGraw (iksPMC@hum.au.dk)**

TESIS Network, Østboulevarden 11F, 2  
8000 Aarhus C, Denmark

**Panagiotis Mitkidis (mitkidispan@gmail.com)**

Center for Advanced Hindsight, Social Science Research Institute, Duke University, 2024 West Main Street  
Durham, NC 27705

**Kristian Tylén (semkt@hum.au.dk)**

Center for Semiotics and the Interacting Minds Center, Aarhus University, Jens Chr. Skous Vej 2  
8000 Aarhus C, Denmark

**Keywords:** Joint action; distributed cognition; social cognition; interpersonal coordination.

## Summary of Topic

Recent advances in social cognition and joint action reveal the social and the mutual, rather than the individual and the dichotomous aspects of cognition (Hasson, Ghazanfar, Galantucci, Garrod, & Keysers, 2012). A widespread and powerful model of socially interactive behavior is 'synchrony' (Jirsa & Kelso, 2004): Numerous studies have thus recently indicated how individuals through social interaction become increasingly entrained on multiple levels from physiology to syntax: through interaction people synchronize their heart rates, their subtle postural sways, their gestures and gaze behaviors, align their lexicon and their syntax (Fusaroli & Tylén, 2012; Louwerse, Dale, Bard, & Jeuniaux, 2012; Pickering & Garrod, 2004). However, emerging scholarship is increasingly attending to many instances in which patterns of complementary and asynchronous actions rather than synchronous ones seem to predict high levels of interpersonal coordination and joint performance. While some activities such as expertly timed

rowing may afford interacting agents to synchronize their individual behaviours to reach high levels of joint performance, other types of joint activity – like playing a game of baseball – rather afford complementary actions: i.e. tightly coupled, reciprocal activity derived from *different* behaviours performed across an *extended* temporal sequence. Shared construction tasks as well as task-oriented dialogues, for instance, have been shown to require smooth turn-taking, and the development of interactional routines which might involve complementary roles (Dale, Fusaroli, Duran, & Richardson, in press; Fusaroli, Raczaszek-Leonardi, & Tylén, accepted). Cultural practices dwell upon and stabilize complementary distribution of work, to make challenging task as the sailing of a warship or the construction of huge buildings possible (Hutchins, 1995; Perry, 2010).

The session will address the implications and respective roles of synchrony, complementarity and asynchrony as components of coordination. Different methods and perspectives for quantifying and assessing coordinative dynamics in language, behaviour and physiology will be presented conceptually and in their empirical application.

## Speakers

Rick Dale (moderator) is a cognitive scientist at UC Merced. He has worked and published extensively on language and social interaction developing and applying a range of novel non-linear statistical methods to assess dynamical properties of multimodal social coordination (Dale, et al., in press; Dale & Spivey, 2006; Louwerse, et al., 2012; Tollefsen & Dale, 2012).

Patrick Healey is a professor of human interaction and head of the Interaction Media and Communication research group at University of London. His research concerns experimental work on technology-mediated dialogical communication and – in particular – miscommunication (Healey, Howes, & Purver, 2010; Healey & Mills, 2006; Mills & Healey, 2008).

John J. McGraw, cognitive anthropologist (TESIS, a Marie Curie Initial Training Network), and Panagiotis Mitkidis, cognitive psychologist (Interacting Minds Centre at Aarhus University and Center for Advanced Hindsight at Duke University) investigate the role of objects and material structures in the coordination of behavior, cognition, and the enhancement of cooperation (Xygalatas et al., accepted).

Dorthe Døjbak Håkonsson is an associate professor at the Aarhus School of Business. As an organization scientist, her research focuses on how team shared emotions influence organizational decision-making (Håkonsson, Burton, Obel, & Laurdisen, 2012). Dan Mønster is a physicist and assistant professor in the Department of Economics and Business at Aarhus University. His current research interest is investigating interactions among team members and the effects of these interactions on team decisions and team performance.

Kristian Tylén and Riccardo Fusaroli are both post doctoral fellows at the Center for Semiotics and the Interacting Minds Center, Aarhus University, with a background in semiotics and cognitive science. They have published on experimental and dynamical systems approaches to social coordination – in particular task-oriented dialogue (Fusaroli et al., 2012; Fusaroli, et al., accepted; Fusaroli & Tylén, 2012).

## Acknowledgments

Research was supported by NSF BCS-0826825 (RD), EPSRC (PH), TESIS, a Marie Curie Initial Training Network (JJM, PM), MINDLab, Danish Ministry of Science, Technology and Innovation (DDH, DM), EuroUnderstanding (Eurocore) and the Danish council for Independent Research (RF, KT).

## References

Dale, R., Fusaroli, R., Duran, N., & Richardson, D. C. (in press). The Self-Organization of Human Interaction. *Psychology of Learning and Motivation*, xxx(xx), xxx-xxx

- Dale, R., & Spivey, M. J. (2006). Unraveling the dyad: Using recurrence analysis to explore patterns of syntactic coordination between children and caregivers in conversation. *Language Learning*, 56(3), 391-430
- Fusaroli, R., Bahrami, B., Olsen, K., Rees, G., Frith, C. D., Roepstorff, A., & Tylén, K. (2012). Coming to terms: an experimental quantification of the coordinative benefits of linguistic interaction. *Psychological science*, 23(8)
- Fusaroli, R., Raczaszek-Leonardi, J., & Tylén, K. (accepted). Dialogue as interpersonal synergy. *New Ideas in Psychology*, xxx(xx), xxx-xxx
- Fusaroli, R., & Tylén, K. (2012). Carving Language for Social Interaction: a dynamic approach *Interaction studies*, 13(1), 103-123
- Håkonsson, D. D., Burton, R. M., Obel, B., & Laurdisen, J. (2012). Strategy implementation requires the right executive style. *Long range planning*, 45(2-3), 182-208
- Hasson, U., Ghazanfar, A. A., Galantucci, B., Garrod, S., & Keysers, C. (2012). Brain-to-brain coupling: a mechanism for creating and sharing a social world. *Trends in cognitive sciences*
- Healey, P. G. T., Howes, C., & Purver, M. (2010). *Does structural priming occur in ordinary conversation?* Paper presented at the Linguistic Evidence, Tübingen, Germany
- Healey, P. G. T., & Mills, G. (2006). *Participation, Precedence and Co-ordination in Dialogue*. Paper presented at the 28th Annual Conference of the Science Society, Vancouver, Canada
- Hutchins, E. (1995). *Cognition in the Wild*. Cambridge, Mass.: MIT Press
- Jirsa, V. K., & Kelso, J. A. S. (2004). *Coordination dynamics : issues and trends*. Berlin ; New York: Springer
- Louwerse, M. M., Dale, R., Bard, E. G., & Jeuniaux, P. (2012). Behavior Matching in Multimodal Communication Is Synchronized. *Cognitive Science*, 36(8), 1404-1426
- Mills, G., & Healey, P. G. T. (2008). Semantic negotiation in dialogue: the mechanisms of alignment. *Proceedings of the 9th SIGdial Workshop on Discourse and Dialogue*, 46-53
- Perry, M. (2010). Socially distributed cognition in loosely coupled systems. *AI & Society*, 1-14
- Pickering, M. J., & Garrod, S. (2004). Toward a mechanistic psychology of dialogue. *Behavioral and Brain Sciences*, 27(02), 169-190
- Tollefsen, D., & Dale, R. (2012). Naturalizing joint action: A process-based approach. *Philosophical Psychology*, 25(3), 385-407
- Xygalatas, D., Mitkidis, P., Fischer, R., Reddish, P., Skewes, J., Geertz, A. W., . . . Bulbulia, J. (accepted). Extreme Rituals Promote Prosociality. *Psychological Science*, xx(x), xxx-xxx