Convergence of speech rate: Interactive alignment beyond representation

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Speech rate; Alignment; Dialogue; Corpus analysis; English

It has long been known that conversational partners tend to align on common ways of talking about the world, not only in choice of syntactic structures or referring expressions (Pickering & Garrod, 2004), but also in manner (Giles et al., 1991). Alignment in both of these areas has received considerable theoretical attention, however while accounts of the alignment of representations have considered the linguistic mechanisms responsible (for example Pickering and Garrod's, 2004, *Interactive Alignment account*), theories of the alignment of performative aspects of conversation, such as speech rate, have largely tended to limit their scope to motivational explanations (most notably in *Accommodation theory*; Giles & Powesland, 1975).

One exception to this trend has been Wilson and Wilson's (2005) oscillator model of turn-taking. In order to explain high coordination in turn-taking (in particular the very short intervals between turns) they propose that endogenous oscillators in the brains of conversational partners, representing their readiness to speak, have their frequencies determined by each others' speech rate. As these oscillators become entrained (as partners align on speech rate) turn-taking should become more closely coordinated, resulting in more seamless turn-taking. A crucial prediction of this model is therefore that as interlocutors' rates converge, the amount of variance in their turn-intervals should decrease (as each partner become more accurate at predicting turn endings, and timing their responses accordingly).

By establishing the articulation rate in syllables per second of each conversational turn across 128 dialogues between 64 participants from the Map Task Corpus (Anderson et al., 1991), we were able to demonstrate that the speed at which interlocutors spoke converged as each dialogue progressed. Moreover, speakers' articulation rates were related to their interlocutors' articulation rates in the previous dialogue turn, suggesting that the mechanism by which dialogue rates converged appeared to be local priming, shown to also occur in monologue by Jungers and Hupp (2009). While these finding of convergence via local priming would be consistent with Wilson and Wilson's (2005) oscillator model, further analyses found no evidence for the prediction that the amount of variance present in turn-intervals would vary as a function of the extent of rate convergence between partners.

In absence of support for this important claim of the oscillator model, but with evidence for priming of speech rate in dialogue and in monologue, we suggest that the interactive alignment account may extend beyond *what* is said, to *how* it is said. Specifically, we propose an account where the alignment of rate comes as a consequence of the use of production systems during comprehension (Pickering & Garrod, 2007). Finally, our analyses provide a demonstration of the strength of sophisticated modelling techniques for investigating fine-grained linguistic phenomena within dialogue.

References

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