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Comment

Sensorimotor communication and language Comment on "The body talks: Sensorimotor communication and its brain and kinematic signatures" by G. Pezzulo et al.

Chiara Gambi [a,*], Martin J. Pickering [b]

[a] *School of Psychology, 70, Park Place, Cardiff University, CF10 3AT Cardiff, UK*
[b] *University of Edinburgh, UK*

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In their review article, Pezzulo et al. [8] aim to define sensorimotor communication (SMC) as a unique phenomenon, and thus place great importance on distinguishing SMC from other forms of communication, including language. Given this aim, their focus rests inevitably on the differences, rather than commonalities, between SMC and language. The main difference between SMC and language, in their view, is that language-based interactions represent a conventionalised form of communication. As such, language-based interactions make use of a learned, fixed code. In contrast, SMC emerges flexibly from the dynamics of social interactions. Moreover, SMC is embedded in task-oriented social interactions, in the sense that it builds on movements that are integral to the task at hand. Such movements are what Pezzulo et al. [8] call pragmatic actions, for example passing a glass of wine or closing a door.

The distinction Pezzulo et al. [8] make between SMC and language has considerable intuitive appeal. However, we would like to caution against viewing the distinction between SMC and language as one of kind rather than degree. This is because, by doing so, one risks overlooking the many parallels that exists between linguistic and non-linguistic interactions. We believe these parallels are of two sorts.

Firstly, and most obviously, language makes use of speech, and speech is a motor action which, just like manual actions (e.g., [7]), can undergo processes of exaggeration (e.g., in motherese, an example used by the authors themselves; [5]) and of marking of features to express emotion (e.g., raising one's voice to express anger) or to distinguish the intended target from alternatives (e.g., over-articulation of vowels in ambiguous contexts; [2]). Just as in the case of manual joint actions (e.g., [11]), speakers show a tendency to make themselves predictable (e.g., by converging

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* Corresponding author.
E-mail address: GambiC@cardiff.ac.uk (C. Gambi).

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towards the speech rate of one's conversational partner; [9,10]) to facilitate coordination (an idea embedded in the authors' computational model of conversational turn-taking; [4]).

Secondly, it has long been recognised that language is not just a conventionalised code for communication, but also a tool for action. This perspective is embedded in the view of dialogue as a form of joint action [3]. According to this view, linguistic utterances serve a pragmatic function at the same time as they serve a communicative one, just as the authors propose is the case for SMC. For example, by producing the utterance *I have a credit card* in response to the statement *I don't have money for the train*, the speaker is not merely communicating information to the listener (that they have a credit card with them), but they are fulfilling a pragmatic function as well: In effect, the utterance is carrying out an action – an offer to pay [6] – in much the same way as showing the listener the credit card would [1].

Interestingly, the dialogue-as-joint-action tradition also recognized that the duality of language – as a tool for communication and a tool for action – is mirrored by the duality of actions, which also serve communicative functions at the same time as they serve pragmatic ones. For example, to illustrate the latter, [3, pp. 167–168] used the example of a customer conspicuously placing items on the counter in response to an offer of help from the cashier (*Can I help you?*). In this example, a pragmatic action is exaggerated to signal that it should be intended as a response to a verbal offer. It is also easy to imagine situations in which a similar exaggerated action could be used to either express emotion (e.g., frustration after a long wait to pay) and/or to more effectively convey information (e.g., to a distracted cashier), both of which seem to fall under the definition of SMC proposed by the authors (see Fig. 2).

To be clear, Pezzulo et al. [8] are correct in emphasizing the communicative dimension of language. On balance, the communicative function is more evident for language, while the pragmatic function is more evident for actions (e.g., as in the joint carrying of the table). However, we argue it is important not to lose track of the fact that these functions coexist in both domains; not least, because it may help clarify what the defining characteristic(s) of SMC are. In our reading, the defining characteristic of SMS is not so much its "instrumental" nature (i.e., that it is embedded in a pragmatic action), but specifically the fact that it is non-conventional: Unlike language (and conventionalised or stereotypical gestures) it does not require pre-existing shared knowledge, but only the shared sensorimotor experience of carrying out the task.

References

[1] Austin JL. How to do things with words. Oxford University Press; 1975.

[2] Buz E, Tanenhaus MK, Jaeger TF. Dynamically adapted context-specific hyper-articulation: feedback from interlocutors affects speakers' subsequent pronunciations. J Mem Lang 2016;89:68–86.

[3] Clark HH. Using language. Cambridge, U.K.: Cambridge University Press; 1996.

[4] Donnarumma F, Dindo H, Iodice P, Pezzulo G. You cannot speak and listen at the same time: a probabilistic model of turn-taking. Biol Cybern 2017;111(2):165–83.

[5] Fernald A, Kuhl P. Acoustic determinants of infant preference for motherese speech. Infant Behav Dev 1987;10(3):279–93.

[6] Gisladottir RS, Chwilla DJ, Levinson SC. Conversation electrified: ERP correlates of speech act recognition in underspecified utterances. PLoS ONE 2015;10(3):e0120068.

[7] McEllin L, Sebanz N, Knoblich G. Identifying others' informative intentions from movement kinematics. Cognition 2018;180:246–58.

[8] Pezzulo G, Donnarumma F, Dindo H, D'Ausilio A, Konvalinka I, Castelfranchi C. The body talks: Sensorimotor communication and its brain and kinematic signatures. Phys Life Rev 2019;28:1–21. https://doi.org/10.1016/j.plrev.2018.06.014 [in this issue].

[9] Schultz BG, O'Brien I, Phillips N, McFarland DH, Titone D, Palmer C. Speech rates converge in scripted turn-taking conversations. Appl Psycholinguist 2016;37(5):1201–20.

[10] Street RLJ. Speech convergence and speech evaluation in fact-finding interviews. Hum Commun Res 1984;11(2):139–69.

[11] Vesper C, van der Wel RPRD, Knoblich G, Sebanz N. Making onself predictable: reduced temporal variability facilitates joint action coordination. Exp Brain Res 2011;211(3–4):517–30.