Toward a second-person neuroscience

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Introduction & Conceptual framework

Debates about how we understand others have been dominated by Theory-Theory and Simulation Theory. According to the former, we treat other people like any scientiﬁc treat their object of study, i.e. we approach them from a detached, observational, and third-person perspective (3PP). According to the latter, we use our own ﬁrst-person experience (1PP) to create pretend states and project them onto the other. Such views ignore the fundamental difference between online and ofﬁne cognition: Arguably, our understanding of others differs depending on whether we are directly engaged in social interaction or merely observing it.

This difference, we suggest, can be captured by a second-person approach (2PP), emphasizing direct engagement and the reciprocity resulting from the dynamic feedback essential to online social cognition. Such a 2PP approach can be developed by extending the enactive approach to cognition to the social domain.

ENACTIVE COGNITION

Cognition arises from the successful coupling of embodied agent and environment, and from the exercise of skillful know-how in the active exploration of the environment. Herein, the body functions as an egocentric principle of experience and as an experiencing organism. Perception is enabled by bodily actions (Thompson 2007, Noe 2004).

Online cognition is characterized by producing "fluid and flexible real-time adaptive responses to incoming sensory stimuli" (Wheeler 2005). The relevant know-how is implicit rather than explicit. By contrast, oﬄine cognition is manifest when one is, say, pondering on a mathematical problem or deliberating about what to eat. In online cognition, objects are presented as effortlessly available and ready to use.

ENACTIVE SOCIAL COGNITION

Basic social cognition is enabled by successful coupling between two agents and the exercise of skillful embodied know-how about people, acquired in direct interaction. Embodied practices, e.g. facial expressions and gestures are essential here (Gallagher 2001, Ratliff 2007).

Online social cognition is characterized by feedback loops and reciprocal interaction (Frith 2007), not by observation. E.g., Moll et al. (2007) showed that one-year olds can attribute knowledge/ignorance to others, depending on joint engagement between infant and adult (see also Reddy 2009).

In online social cognition, we can perceptually pick up social affordances (Costall 1995), arising from coupling and appropriate feedback (cf. infants' sense for reciprocity/musicality of interaction in still-face procedure & video-delay studies, Murray & Trevarthen 1985).

Enactive social understanding is systematically, phylogenetically and ontogenetically prior to and more basic than mindreading (Singer & Gallagher 2008, Schlicht 2007). The relevant knowledge is implicit rather than explicit. For example, autistic patients may pass false-belief tasks when prompted to do so and thus may not need an explicit theory of mind. Yet, as Senju et al. (2009) showed, even then they remain impaired in the "automatic online computation of others' mental states" — as predicted by the enactive approach to social cognition.

Evidence from functional neuroimaging

Being Addressed as You: The neural correlates of self-directed, socially relevant facial expressions


Minds Made For Sharing: Initiating joint attention in 'online' interaction recruits reward-related neurocircuitry

Figure 3. A) Screenshot depicting an anthropomorphic virtual character and three objects (grey squares). B) Neural correlates of looking at a grey object together with the virtual character (joint attention, regardless of whether or not it was self- or other-initiated). C) Neural correlates of looking at an object different from the one the virtual character is looking at (no joint attention, regardless of whether or not it was self- or other-initiated joint attention of other-initiated). D) Neural correlates of other-initiated joint attention. E) Neural correlates of self-initiated joint attention. AMPCF: anterior medial prefrontal cortex, DMPCF: dorsal medial prefrontal cortex, FEF: frontal eye field, VS: ventral striatum. Activation overlays based on re-analysis of data taken from: Schilbach et al. (2009).

Discussion & Outlook

Here, we argue for a second-person approach (2PP) to other minds suggesting that interpersonal understanding is primarily a matter of direct interaction with others during which the affective and sensorimotor contingencies that result from being personally addressed prompt responses which feed into the reciprocal to and fro constitutive of ‘online’ social interaction. We suggest that this account — well-grounded in current philosophical considerations and supported by developmental evidence — provides a radically different route to the investigation of intersubjectivity by emphasising aspects of social cognition specifically related to the procedural nature of social interactions. Furthermore, we argue for the application of this approach to the neurobiological investigation of social cognition based on our analysis that ‘dark matter’ in social neuroscience remains due to difficulties of investigating real-time social interactions. While preliminary neuroscientific evidence suggests that social cognition, indeed, is fundamentally different when we are engaged in ‘online’ interaction, many questions remain open. Studies are needed to directly compare ‘online’ and ‘offline’ social cognition with respect to the recruitment of underlying mechanisms. A second-person neuroscience will, therefore, make use of innovative experimental setups to investigate social interaction in an ecologically valid way (e.g. Wilms et al. 2010). Such developments will not only help neuroscience to really ‘go social’, but may also be relevant for our understanding of psychiatric disorders construed as disorders of social cognition.

References & Acknowledgements

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