The Case for Simulation Theory and Theory Theory as Interaction Accounts of Theory of Mind

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> Abstract • Simulation theory and theory theory are interaction accounts of theory of mind that have been neurocentrically characterized. A hybrid of these theories approximates the interaction theory of social cognition, and can be described in an indexical-symbolic processing framework.

« 1 » In the target-article, Shaun Gallagher argues against standard models of Theory of Mind (ToM), namely the simulation theory (ST) and theory theory (TT) accounts, which are presented as neurocentric accounts (Mirror Neurons and ToMM, respectively). Instead, the author offers an "alternative phenomenological-enactive approach" (§41) that "rejects the idea that [humans] mindread the hidden mental states of others" (§41). While I agree that neuroscientists have aspired to reduce ST and TT to circumscribed circuits or systems in the brain, I contend that ST and TT, in terms of their original conception, have more similarity with the author's phenomenological-enactive approach than there are differences. This is because both accounts are, nonetheless, premised on interaction principles between the self and the other, and the environment at large.

« 2 » According to TT, our knowledge of other minds is embodied in an explicit symbolic theory, with axioms and rules of inference, from which we may deduce what others know and want (Gopnik & Wellman 1992). A main principle of this account is that theories of the mind are constructed through observation of the world (with the other at its center), and are subject to revisions with newly incoming information. As such, these theories of the mind are a product of a learning process that is facilitated through a brain-X environment interaction. In contrast, ST contends that we mentally simulate others' thought processes and feelings, using our own mental state as a model of theirs (Harris 1992). Here too, the ST account can be described in interactive terms since it is based on a state-matching system, which is common to the observer (self) and the observed (other). It can be argued that the mirror neurons, which are seen by many as a physiological basis for this account, confirm this interactive view, since these neurons make no distinction between self and other (Jeannerod 1999). It should be noted, however, that this conceptualization is different from the view of other theorists arguing that ToM development depends on an innate ability or a specialized module or mechanism (Leslie 1992).

« 3 » However, it is important to acknowledge that neither of these accounts is satisfactory to account for ToM, as they use different informational units for the representation of the mind. The ST uses the observable, or one might say indexical, information to build theories of the mind, whereas TT uses, at least at its base, symbolic information. A hybrid of the two theories might approximate the author's interaction theory, as this would merge both the indexical and symbolic fields upon which the interaction theory appears to be based (§46). It also would align with developmental evidence the author uses in support of his interaction theory, according to which the child progresses from primary to secondary intersubjective relations (§42). This developmental progression can be construed as a shift from an indexical- to a symbolic-based world of mental state representation (see Figure 1).

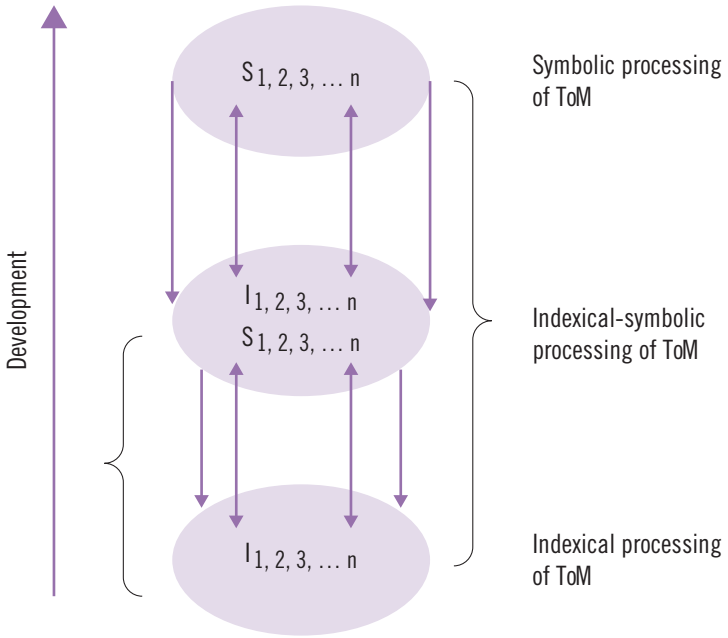

Figure 1 • Symbol-index relationship and the development of theory of mind (ToM) representations (modeled after Deacon 1998). Developmentally, ToM processing initially relies on indexical information and has been observed in children as young as two years of age (Southgate, Senju & Csibra 2007). This continues to be the dominant mode of processing until four years of age, with symbolic processing only appearing in five-year-olds and older (Abu-Akel & Bailey 2001). This conceptualization is consistent with the view suggesting that the child's understanding of false belief reflects an increase in her ability to use and generate symbolic representation (Karmiloff-Smith 1992), and with meta-analytic evidence revealing that saliency and temporal markers (i.e., indexical information) facilitate the success of younger children on ToM tasks (Wellman, Cross & Watson 2001).

« 4 » Moreover, like the interaction theory, the indexical-symbolic (or the ST-TT hybrid account) embodies the body-brain-environment triad. Just like development culminates in one's ability to also use symbolic information to model the other's mind, so the converse is correct when the brain or the body regresses. For example, compared to left-hemisphere-damage patients, right-hemisphere-damage patients had more difficulties with ToM when presented with symbolic-laden questions, but these differences were no longer discernible when the questions contained indexical information (Siegal, Carrington & Radel 1996). Similarly, individuals with congenital heart disease demonstrated difficulties with third-person (symbolic), but not first-person (indexical) ToM (Chiavarino et al. 2015). While the contribution of the physiological characteristics or the severity of the heart disease to these difficulties is yet to be ascertained, it has been suggested that these difficulties may also be due to environmental and emotive factors such as limited peer relationships and activities (Kovacs, Sears & Saidi 2005). In either case, regression in the body state can affect one's abilities to draw on the full range of indexical and symbolic representations.

« 5 » All this considered, neurocentric accounts might have blurred the interaction premises of ST and TT accounts. A hybrid of these accounts can be conceptualized within an indexical-symbolic processing framework, akin to the premises of the author's interaction theory of social cognition.

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Saving the Third-Person Stance

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> Abstract • While acknowledging the important contribution of Gallagher's interactive approach to perception, agency and social cognition, I suggest that the second-person stance it brings forward is not sufficient to account for the way humans navigate the social world. One of the main characteristics of the durable, impersonal constraints proper to institutions might indeed be to bypass the second-person and trigger a subjectless third-person stance.

« 1 » Countering the reduction of social cognition to mindreading, Shaun Gallagher has persistently and convincingly argued that the most pervasive way of understanding others is not based upon the inferential work of competent observers but upon the *first-person stance* of actors who engage in the course of interaction with others.[1] As Gallagher put it in his target article, such a first-person stance can be accounted for neither in individualistic terms, nor in neurocentric, infra-individualist terms. Against the solipsist view of the individual as independent from her physical or socio-linguistic environment, against the neurocentric view of the mind as being enclosed in the boundaries of the skull, Gallagher's interactive model posits the first-person stance as dynamically produced *via* intersubjective attunements and ecological adjustments. By definition, such dynamical adjustments are not reducible to a set of mechanisms contained within the individual or the brain; they function as a holistic system of interactions, as a body- and world-involving cycle in which agents *participate* and which ensures the maintenance of "a shared, intersubjective world" (§41).

1| Since Gallagher's article is very general, my commentary will also take into account the main tenets of the embodied, phenomenological approach or "interaction theory" that he has launched with his colleagues these last years.