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Beyond Single-Mindedness: A Figure-Ground Reversal for the Cognitive Sciences

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Abstract

A fundamental fact about human minds is that they are never truly alone: all minds are steeped in situated interaction. That social interaction matters is recognized by any experimentalist who seeks to exclude its influence by studying individuals in isolation. On this view, interaction complicates cognition. Here, we explore the more radical stance that interaction co-constitutes cognition: that we benefit from looking beyond single minds toward cognition as a process involving interacting minds. All around the cognitive sciences, there are approaches that put interaction center stage. Their diverse and pluralistic origins may obscure the fact that collectively, they harbor insights and methods that can respecify foundational assumptions and fuel novel interdisciplinary work. What might the cognitive sciences gain from stronger interactional foundations? This represents, we believe, one of the key questions for the future. Writing as a transdisciplinary collective assembled from across the classic cognitive science hexagon and beyond, we highlight the opportunity for a figure-ground reversal that

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puts interaction at the heart of cognition. The interactive stance is a way of seeing that deserves to be a key part of the conceptual toolkit of cognitive scientists.

Keywords: Interaction; Cognitive science; Pluralism; Interdisciplinarity; Social interaction

Classical cognitive science started out by focusing on "the properties and operation of the human mind," definite and singular (Levinson, 2012; Keyser, Miller, & Walker, 1978). This was more a practical choice than a principled one, but it turned out to be immensely consequential. It set the cognitive sciences on a path in which product is privileged over process, information over relations, and individuals over interactions. As a result, it obscured how social interaction co-constitutes cognition (De Jaegher, Di Paolo, & Gallagher, 2010; Enfield, 2013; Vygotsky, 1962). Yet, interaction is what turns brains into minds. To truly understand cognition, we must move beyond single-mindedness.

Work on situated action and distributed cognition paved the way by showing that people's plans and representations take shape in interaction and encompass minds as well as material structures (Suchman, 2007 [1987]; Hutchins, 1995). In parallel, disparate lines of work across the cognitive sciences have made progress by putting interaction center stage. Although diverse in disciplinary origins, methods, and theories, these approaches are similar in seeing cognition not as the province of singular minds but as an interactional achievement of embodied agents. Yet, here is a curious fact: most of them are perceived as marginal in their own disciplines. Their kinship and collective power becomes apparent only when we change perspective—and when we do, we find that the scene is set for a Gestalt switch that puts interaction at the heart of cognition (Fig. 1).

What do the cognitive sciences have to gain from an interactive stance? It foregrounds the potential of methodological and explanatory pluralism (Gentner, 2019) and creates new opportunities for synergy across disciplinary borders. Take reasoning, in many ways the textbook case of an individual cognitive capacity. Work in the last decade has thrown new light on why we reason the way we do, unveiling the dialogical roots of reasoning (Dutilh Novaes, 2013, 2021) and suggesting that its primary function is not individual ratiocination but interactive argumentation (Mercier & Sperber, 2017). Indeed, observational work shows how people employ reasons in mundane interaction to coordinate joint action (Baranova & Dingemanse, 2016) in a context of ever-present social accountability (Enfield & Sidnell, 2022). This shows how the interactional angle can foster productive connections between philosophy, psychology, and linguistics.

Or consider the study of autism and other expressions of neurodiversity, long reified (if not fetishized) as special conditions that may shed light on classic topics like modularity, theory of mind, and joint action coordination. Recent work calls attention to the need to respecify neurodiversity from relational and interactional perspectives (Bolis, Balsters, Wenderoth, Becchio, & Schilbach, 2017; Milton, 2012). This allows us to move away from deficit-based views toward more reciprocal contributions. For instance, a careful study of neurodivergent interaction reveals how behaviors seen as "symptomatic of ASD" can be interactionally achieved and coproduced by both participants (Muskett, Perkins, Clegg, & Body,

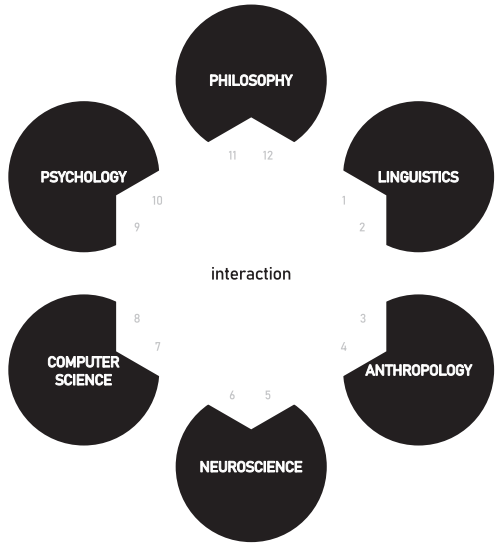

Fig. 1. "Fringe" is in the eye of the beholder. Realigning interaction-centered approaches from across disparate fields can fuel a figure-ground reversal in the cognitive sciences, here illustrated with an assortment of subfields around the classic hexagon: *1* interactional linguistics (Clift, 2016; Schegloff, Ochs, & Thompson, 1996); *2* grammars of language use (Ameka & Terkourafi, 2019; Gregoromichelaki et al., 2022); *3* cognitive ethnography (Hutchins, 1995); *4* situated action (Suchman, 2007); *5* social and second person neuroscience (Schilbach et al., 2013; Wheatley, Boncz, Toni, & Stolk, 2019); *6* joint action (Shockley, Richardson, & Dale, 2009; Vesper, Butterfill, Knoblich, & Sebanz, 2010); *7* dialogue modeling (Schlangen & Skantze, 2011); *8* embodied interaction (Bennett et al., 2021); *9* discursive psychology (Edwards, 1997); *10* ecological psychology (Rączaszek-Leonardi, Nomikou, Rohlfing, & Deacon, 2018; Reddy, 2018); *11* social epistemology (Goldman, 1999); *12* interactivism and enactivism (Bickhard, 2009; Di Paolo, Cuffari, & De Jaegher, 2018).

2010; and see Bottema-Beutel, Crowley, & Kim, 2022). Situated interaction is the meeting ground for all kinds of minds, where cognitive processes are created and developed in dialectical, social, and emotional relations (De Jaegher, 2021b; Reddy, 2018).

As a third example, consider interactive repair: the streamlined ways in which we prompt each other to revise or recalibrate contributions in interaction (Albert & de Ruiter, 2018). Occurring every few turns, repair is far too common to be just a remedial procedure or a last resort (Ginzburg, 2012). Instead, empirical and experimental work reveals how repair drives rapid coordination and efficient communication in human interaction (Micklos & Woensdregt, 2022). Computational modeling shows that interactive repair can greatly alleviate the computational effort otherwise expended in pragmatic reasoning (Arkel, Woensdregt, Dingemanse, & Blokpoel, 2020). As it distributes inferential and computational processes over turns and minds, repair is a prime example of dialogically extended cognition (Fusaroli, Gangopadhyay, & Tylén, 2014). The on-the-fly recalibration embodied by repair is what makes ambiguity surmountable (Piantadosi, Tily, & Gibson, 2012) and good-enough processing viable (Goldberg & Ferreira, 2022).

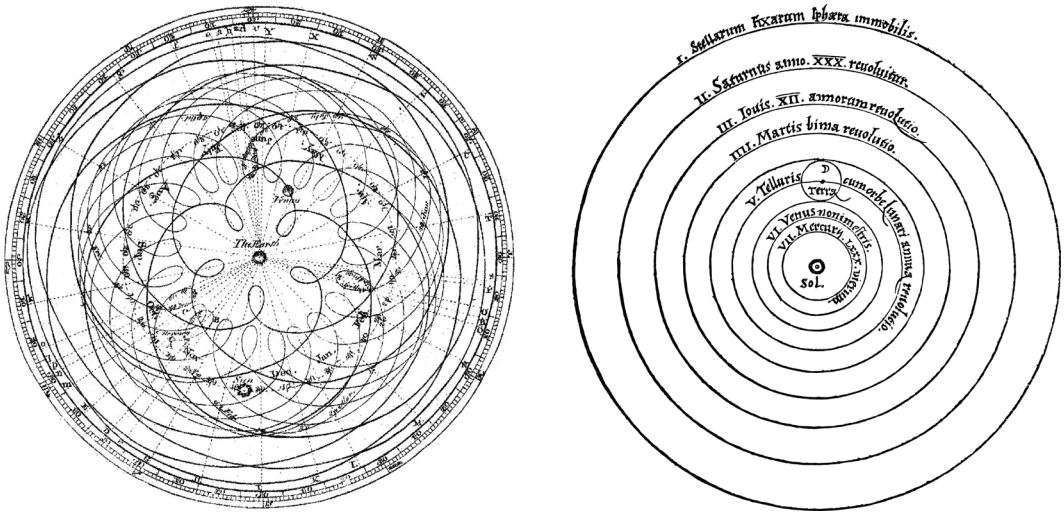

Fig. 2. Seen from Earth, the movements of celestial bodies display near-intractable complexity. When taking not a single vantage point but multiple (here, Sun and Earth), suddenly the picture changes, and new forms of order become visible (Sousanis, 2015). Likewise, key concerns of cognitive science may be illuminated by a change of perspective that locates cognition not in isolated but in interacting minds.

These examples, necessarily selective, show some of the things a move beyond single-mindedness can bring. Interaction offers an unprecedented view of the multiscale dynamics of cognition: a form of direct empirical access that is hard to get otherwise (Wittgenstein, 1968 [1953]). Moreover, taking an interactional perspective can have far-reaching theoretical consequences (Fig. 2). It can affect and even contest the very ontology of the phenomena studied, whether it is a "capacity" like reasoning, a "disorder" like autism, or an "outcome" like mutual understanding. Interaction is like a prism that brings out the irreducibly social and relational aspects of everything that flows through it, enabling new observations and explanations (De Jaegher, 2021a; Enfield, 2013; Sacks, 1992).

There are further areas where an interactive angle is critical for progress. A theory of cognitive gadgets (Heyes, 2018) is incomplete without an account of how such gadgets culturally evolve and come to be socially shared; in short, without empirical grounding in social interaction. The mystery of metacognition (Frith & Frith, 2022) can only receive an adequate explanation if we attend more closely to the material metacognitive tools supplied by language in interaction: public cues to private states of mind that people make available in every turn at talk. The cognitive abilities of nonhuman minds are exceedingly hard to probe, except by studying sequentially organized social action (Bangerter, Genty, Heesen, Rossano, & Zuberbühler, 2022). And in computer science, we can only hope to build artificial agents and explain attributions of "intelligence" if we supplement the computational and cognitivist bent of the field with a deep understanding of situated interaction (Cassell, 2020; Ruane, Birhane, & Ventresque, 2019; Seibt, Vestergaard, & Damholdt, 2020; Suchman, 2019).

We have argued for a recentering of the cognitive sciences around interacting minds. Are there any aspects of cognition that can fully be understood from the perspective of single minds? We do not know, but we submit that a reversal of the burden of evidence is in order. The watershed divide between the mental and the social has always been at best a convenient fiction (Shteynberg, 2014). As we come to terms with forms of cognition not centered on single brains, interaction looms large as the crucial connective tissue: ontologically prior, epistemologically fundamental, ecologically sound. As the cognitive sciences enter their next phase, interaction will be core to the enterprise of understanding how minds are made.

Author Note

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