Does the enlightenment of cognitive science rely on letting go of the concept of individual mind?

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In November 2022, a groundbreaking paper titled "Beyond Single-Mindedness: A Figure-Ground Reversal for the Cognitive Sciences" emerged from the collaborative efforts of scholars with backgrounds spanning philosophy, linguistics, psychology, and computer science (Dingemanse et al., 2023). This transdisciplinary manifesto challenged the conventional cognitive science paradigm that considers cognition as a private, individual, internal, and definite process, referred to as "single-mindedness." Instead, the authors presented an interactive stance, emphasizing the centrality of interaction, particularly social interactions, in shaping cognition, denoted as "interacting minds."

The metaphorical inquiry posed in the title of this essay seeks to unravel the profound implications of embracing the interactive stance in cognitive science. Drawing parallels with Buddhist philosophy, the inquiry echoes the notion that enlightenment is attained through letting go of the individual self. In Buddhism, the trust is in that "Everything exists in relation to others." yet paradoxically, the true individual freedom comes from the recognition of such interdependence, which transcends the ignorance. Analogously, the paper posits that cognitive science can achieve the synergy of its interdisciplinary nature by transcending the assumption of the "individual mind".

Interestingly, just before the publication of the paper, in October 2022, two of its authors, Hanne De Jaegher and Abeba Birhane, came together with the Dalai Lama, the spiritual leader of Tibetan school of Buddhism, in an event titled "Interdependence, Ethics, and Social Networks" organized

by Mind & Life Institute [1]. In the conversation with Dalai Lama, Hanne De Jaegher spoke about intersubjectivity and social cognition, and emphasized the intricate interplay between social relationship and individual's self-organization, along with Dalai Lama's reminder of the fundamental sameness of all humans. Abeba Birhane further delved into ethical concerns in AI development, and underscored the fact that data used for training AI models is collected from humans, yet, the complexity and indefiniteness inherent in human experiences, contradicts the prevailing assumptions implemented in AI algorithms that are more aligned with definiteness and singularity about being human.

In this essay, we have a look at the research agenda of Hanne De Jaegher, tracing her journey from embracing the enactive view of cognition to advocating the interactive stance of mind. De Jaegher, a philosopher and cognitive scientist, aligns with the enactive approach pioneered by Francisco Varela, who was known to be a biologist, a philosopher and also a Buddhist practitioner. Varela and his colleagues acknowledge in the book "The Embodied Mind" the influence of Buddhist philosophy in their research in cognitive science (Varela et al., 2017). The concept of interdependence in Buddhism finds resonance in the enactive theory of cognition, which investigates the coupling between the individual and its environment, from the practicality standpoint enabling the action of the individual.

In the subsequent sections, the exploration begins by revisiting the cognitive models that are centered around the individual and the brain, giving rise to the single-mindedness stance in cognitive science. This retrospective analysis is accompanied by a presentation of the primary critiques raised against these approaches. Then, the narrative unfolds into an examination of key concepts in enactive approach, such as sense-making and autonomy, that heavily shaped De Jaegher's research until she introduced the social turn in the enactive theory. A specific focus is directed towards participatory sense-making, an enactive social cognition framework advanced by De Jaegher and Di Paolo (2007). This framework serves as the foundation for the paper's argument in favor of interacting minds.

Finally, the essay scrutinizes the limitations of single-mindedness and elucidates the benefits associated with adopting an interactive stance, particularly within the realms of science and society. Through this exploration,

[1]The video record of this meeting can be accessed: https://youtu.be/hctX1CiTZ-E?si=v2UQRYbClKl9JA8O

we aim to contribute to the ongoing discourse on the transformative potential of embracing a more socially oriented perspective in cognitive science.

We commence our exploration by revisiting the historical precedence of models in cognitive science, particularly the prevalent perspective that perceives cognition as private, individual, internal, and definitive. Early cognitive science embraced the view that cognition is fundamentally reducible to brain processes, where the brain is conceptualized as a machine. Central to this perspective is the Computational Theory of Mind (CTM), wherein the mind is compared to an information processing system akin to a computer, with mental processes characterized as computational operations. Consequently, cognizers are treated as input/output systems that respond to environmental stimuli by evaluating internal demands through a system of representations constructed from input to output. However, CTM has been critiqued for its static and definite treatment of cognition, divorced from the dynamic interplay with the body and environment. Critics argue that this perspective overlooks the intricate ways in which environmental interactions dynamically shape cognitive processes.

Subsequent cognitive theories delved into the social dimension of mind, particularly in addressing the "problem of other minds." The traditional approach to social cognition introduced the concept of "Theory of Mind," emphasizing the capacity to understand others by attributing mental states to them such as beliefs, desires, and intentions. Such mind reading abilities are also called "folk psychology". Furthermore, we can recall the theory-theory which does not only relate to mind-reading capacities but generally studies how human learns about the world and the development of that understanding. It posits that humans learn through a process of theory revision, akin to a scientific exercise where prior beliefs are revised in response to conflicting observations, using statistical generalizations. The social iteration of theory-theory extends this concept to propose that individuals apply a theory of the mental realm to infer judgments of others and check the validity of the theory to develop mind-reading. Conversely, the mental simulation theory claims that mind-reading does not hinge on a process of theory proposal and revision but rather on a mental modeling of others, a process individuals can simulate using their own minds.

Both theory-theory and the simulation theory confront challenges such as the problem of homuncularity, stemming from their modular and algorithmic views of the mind. The inadequacy of these paradigms becomes apparent when attempting to explain how meaning is created (sense-making) in a social

setting during infinite regress of attributing beliefs about others' beliefs, and so on (De Jaegher & Di Paolo, 2007). Moreover, these paradigms face criticism for endorsing an individualistic view of the mind, treating participants in social interactions merely as observers of the mental states of others. Yet, social cognition extends beyond mere observation, requiring acknowledgment of active participant engagement and emotional involvement in interactions (Schilbach et al., 2013).

In navigating the path toward comprehending the interactive stance, a pivotal departure point lies in revisiting the 4E cognition approach. This framework, rejecting reductive individualism or single-mindedness, embraces an embodied, embedded, enactive, and extended perspective of the mind. In contrast to the prevalent cognitive model that confines the mind to the head and seeks to explicate it through brain processes within a computational framework using representations, 4E cognition integrates the brain, body, and environment all together. It discerns the complexity and wholeness of neural, bodily, and environmental dynamics, presenting a Gestalt perspective on their co-evolution.

Within the realm of 4E cognition, enactivism particularly investigates the role of interaction in shaping cognition. This paradigm underscores the intricate and dynamic nature of cognition, positing that an organism's interactions with the environment actively generate cognition rather than perceiving it passively. This active perceptual process is encapsulated in the concept of *sense-making*, denoting the agent's active participation in creating meaning aligned with what matters to the agent. In that regard, sense-making is inherently affective and relational, with the sensorimotor engagement of the agent constituting a central role. A typical example to this is the perception of the softness of a sponge, a phenomenon requiring tactile bodily interactions with the object.

Autonomy, another fundamental concept in the enactive approach, refers to the organizational properties inherent in living organisms. An autonomous agent preserves its identity as a distinct entity in the face of ongoing sense-making and interactions with the environment. Therefore, the organism regulates its coupling with the environment to maintain its self-generated identity.

Delving deeper into the social dimension of enactive sense-making, we encounter participatory sense-making. Here, individuals, as self-organizing sense-makers, engage with the world based on their embodiment's needs and constraints. The interaction process itself assumes autonomy, capable of

evolving beyond individuals' original intentions. The emergent agency stems from the tension between self-organization and the interactive order, culminating in interaction partners actively participating in each other's sense-making. Consequently, participatory sense-making reconceptualizes social cognition, framing it as sense-making at the interplay of interaction processes and engaged individuals. This paradigm shift transcends the traditional understanding of social dynamics as merely the sum of individuals' behaviors, introducing the notion of intersubjectivity. In doing so, it lays a robust foundation for embracing the interactive stance in cognition, challenging the prevailing assumption of a singular and individual mind.

Exploring the practical imperatives for transcending the singular/individual mind assumption reveals compelling motivations rooted in both scientific and societal domains. The inclination to conceptualize the mind as definite and discrete carries notable drawbacks, particularly evident in its reductionist focus on individuals, often neglecting the intricate interactions among them. This limitation is not exclusive to cognitive sciences but permeates various scientific fields where an undue emphasis on information hinders the understanding of complex dynamics underlying a scientific discovery. A pertinent example illustrating this limitation emerges from the critique of the Nobel committee's regulation restricting the awarding of a Nobel Prize to no more than three individuals (Rees, 2022). This rule has faced scrutiny for creating a misleading impression of scientific progress by obscuring the increasingly collaborative nature of contemporary sciences. For instance the grand LIGO experiment, which was a breakthrough in the detection of gravitational waves, involved the collaboration of individuals from diverse nations and disciplines, however, the Nobel Prize is restricted to three laureates chosen from the authors of the key papers, which may involve up to 1000 contributors.

Again in physics, the allocation of substantial resources to experiments addressing a narrow set of highly promoted topics has sparked debates (Hossenfelder, 2022). To narrow the focus on those hot topics is a strategy that researchers tend to adopt for promoting their individual track records quickly. However, this approach overshadows other crucial inquiries and perspectives deserving attention, delaying the overall advancement of the scientific community. A similar criticism is also raised by philosopher Isabelle Stengers, in her work "Another Science is Possible: A Manifesto for Slow Science," where she states that such a rushed approach in sciences is actually blocking the progress (Stengers, 2018). The lack of pluralistic viewpoint, devaluing the interaction of diverse perspectives and focusing on product rather than the

process, causes scientists chasing several individuals or their ideas ruling the research fields.

Beyond its impact on scientific progress, single-mindedness holds implications for societal well-being, particularly in the realm of mental health. Viewing mental well-being through a social cognition lens recognizes it as a collective outcome influenced by the tension or harmony among individuals in social settings. On the other hand, a mindset grounded in the assumption of a singular and definite mind pathologizes mental health issue as individual's mind problem. This interpretation contributes to social stigma, self-stigma, and inhibits individuals from seeking help, reinforcing taboos around psychotherapy and other self-help tools.

Moreover, Hanne De Jaegher's research on engaged participation in autistic interactions (De Jaegher, 2021) sheds light on the consequences of disregarding that the struggle to empathize and understand is reciprocally experienced by both autistic and non-autistic partners in an interaction. Such difficulty in mutual understanding is recognized as the "double empathy problem" in the literature, a term introduced by Milton (2012), an autism researcher who is himself autistic. The identification of the double empathy problem challenged the prevailing theory of "mind-blindness," which previously posited that autistic individuals exhibit impaired ability of empathy and theory of mind. This single-minded perspective frames the internal experiences of autistic individuals as deficient, prompting normalization attempts within the global mental health movement that seek to erase differences. This approach can be detrimental, exemplified by efforts to teach autistic children to make eye contact rather than fostering a deeper understanding of how to facilitate interaction across differences. Consequently, a societal shift beyond single-mindedness holds vital implications for addressing mental health issues, with cognitive sciences playing a pivotal role at the forefront of this responsibility.

In addressing the shortcomings of single-mindedness within scientific research and societal well-being, the interacting minds approach presents an inherently pluralistic paradigm. Central to the interactive stance is the acknowledgment of the participatory nature and collaborative efforts of diverse entities in a phenomenon, such as cognition, fostering a complex network of relationships among them. This pluralistic foundation facilitates interdisciplinary synthesis in research, offering advantages not only to cognitive science but extending its benefits to various scientific disciplines. Two key arguments from the interactive stance, as outlined in our essay's focus paper,

shed light on how this approach can catalyze productive collaboration across different disciplines.

Firstly, the interactive stance conceptualizes reasoning as a dialogical process, serving to joint coordination among individuals rather than framing it as an individual's private rationalization process (Baranova & Dingemanse, 2016). This perspective recognizes the critical role of dialectic engagement across diverse viewpoints to formulate robust hypotheses that aim to comprehend the nature of reality.

Secondly, the interactive stance recalls the argument of interactive repair (Dingemanse et al., 2015), a fundamental aspect of human communication, which is in parallel with the idea that cognition is dialogically extended and hints at another factor supporting interdisciplinary scientific inquiries. Interactive repair can simply be described as the inherent strategy of resolving misunderstandings and disambiguation during a conversation. This process allows agents to progressively recalibrate their contributions and collectively minimize the cost of individualistic rationalization—trying to resolve the other's intention based on the observation of the other like a scientist running an investigation (Arkel et al., 2020).

The adoption of dialogical reasoning and interactive repair in scientific practices can lead to a respecification of foundations within different disciplines by explicating the unstated assumptions of the prevailing theories. This does not necessarily mean to come up with radically new ideas but rather revisiting the grounding principles of prevailing theories with a pluralistic lens, fostering synthesis with novel perspectives in research. Such a mindset not only promotes interdisciplinary research but also guards against research becoming entrenched in singular or limited directions.

Furthermore, the interactive stance offers a transformative perspective on neurodiversity. By viewing cognition as constituted in social interactions, this approach embraces inclusivity for all kinds of minds, stepping away from deficit-based handling of the mind. This shift signifies a departure from pathologizing differences and instead recognizes the inherent value in diverse human experiences, enriching our understanding of the intricate interplay between individuals and their social environments.

In this essay, we delved into the interactive stance of cognition, which asserts that "social interaction co-constitutes cognition.", challenging the conventional notion of single-mindedness that isolates cognition as an individual endeavor. Our examination centered on the enactive theory of social cognition, particularly the framework of participatory sense-making, which paved

the way for this transformative perspective. The elucidation of the benefits associated with adopting an interactive stance, coupled with the delineation of the limitations in single-mindedness, underscores the necessity for cognitive sciences to scrutinize the epistemology of human social engagement. However, as we navigate this intellectual landscape, numerous questions remain open for exploration. Why is there a prevailing tendency to perceive cognition as private and singular? Is this mindset culturally influenced, or do collective fears contribute to its perpetuation? Unraveling the roots of this cognitive framing is paramount, opening avenues to understand thinking fallacies about the cognition and their underlying factors. By confronting and explicating these elements, we empower ourselves to transcend the limitations and embark on a more nuanced and collective understanding of the intricate interplay between our inquiries and the social fabric that shapes them.

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