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COMMENTARY



Somebody is home

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Graziano and colleagues (2019) argue that “the hard problem of consciousness belongs fundamentally to the same category as auras, mind beams, soul, ka, chi, and spirit.” They begin by distinguishing between i- and m-consciousness. The former refers to theories that focus on how *information* in the brain is selected, enhanced and processed; the latter, associated with the hard problem, refers to theories that take it as axiomatic that mind has *mysterious*, qualia or subjective experiences.

Among empirically-based frameworks that take neural data into account, Graziano and colleagues believe the Global Neuronal Workspace (GNW) has already made the most progress in explaining i-consciousness. They attempt to show that their social cognitive approach—Attention Schema Theory (AST)—has sufficient conceptual resources to unify GNW with other theories, viz. higher-order thought (HOT) and illusionist perspectives. One purpose of unification is to explain i-consciousness while also explaining the seductive power of m-consciousness. GNW helps explain actual information processing; HOT helps explain m-consciousness, because the higher-order representation of self and the world is a simplified schematic. It is designed to be efficient, not accurate. That it can be inaccurate but useful helps accommodate illusionist perspectives, which argue that subjective experience does not exist.

They focus on attention because, although it is distinguishable from consciousness, it evinces properties that are commonly attributed to consciousness—e.g., both are produced by an agent, a self. But where attention is an objectively measurable property of

the brain, the schematic model that embodies m-consciousness tends to imply a suspect sense of self—an “I” who is aware. Taking their lead from control theory’s idea that a controller’s function is enhanced if it includes an internal model, Graziano and colleagues argue that the schematic model of self is adaptively advantageous because it provides better control of attention, and a theory of mind that enables modelling the attention of others. Naturally, the attention schema that targets self differs from the schema that targets others: targeting of others is limited to information like simple visual cues. When our schema targets self, however, it has access to richer sources of information and it is able to exercise a degree of control.

But is there evidence to suggest that the schematic model comprises ethereal, mysterious elements? To support this argument, Graziano and colleagues draw upon research which suggests that when subjects observe a face gazing at an object, they tend to treat the stimulus as though “an invisible, gentle, mind-force were emanating from the face and physically pushing on the object.” Subjects do not describe events in this way. But this “fluid flow” model—the idea that a fluid or viscous substance generated inside selves flows outward toward targets—is conjectured to be a model, developed in evolutionary time, as a geometric trick, helping us to navigate social life, enabling us to monitor where and to what degree others direct their attention. At the same time, the schematic applied to self enables us to manage our own attentional processes.

In order to marshal support for AST, Graziano and colleagues adduce two additional arguments: (a) they cite experimental and clinical evidence that suggest a possible neural substrate for the attention schema and, (b) they suggest that AST, GNW, HOT and illusionist views cohere. As for (a), extrapolating from previous research, they conjecture that the attention schema is realized in virtue of neuronal activity in a cortical network that includes regions within the temporal parietal junction (TPJ). Brain imaging studies suggest that when people attribute awareness to others or when visual awareness is manipulated, a cortical network that involves the TPJ is recruited. What is more, damage to the right TPJ can cause the most severe cases of hemispatial neglect, a paradigmatic example of disrupted awareness.

As for (b), Graziano and colleagues note that AST comprises three networks: Network A refers to the processing of information in a neural network in such a way that it is admitted to the brain's GNW. Network B constructs an attentional schema, a predictive model of how A deploys attention, playing a role analogous to HOT. Finally, Network C receives output signals from A and B, transforming them into user-friendly form such as speech. In sum, A contains and uses information; B constructs the attention schema; and, C enables the system to report the information it contains to the outside world. But the schematically encoded properties that are reported are constrained by efficiency, not accuracy.

Combining A, B, and C produces a machine that lacks subjective experience. Nevertheless, the machine is busy with information in such a way that it thinks and communicates the belief—the illusion—that it has subjective experiences. It is thus that Graziano and colleagues provide a parsimonious way of linking GNW, HOT, and illusionist perspectives. If this architecture approximates the truth, since there is no experience, the Hard Problem is dissolved.

AST comprises a bold set of conjectures, linking scientific to philosophical concerns, while also suggesting paths for future research. To cite just one example, experimental support they adduce for the idea that people act as though an ethereal fluid is generated inside, one that flows outward toward objects of attention, suggests an implicit folk psychology that may well help explain why m-consciousness is represented by the brain as real. This line of research seems to dovetail with investigations of religion,

especially those that suggest it is part of human nature and unlikely to disappear from human society (Konner, 2019). Recall that according to Graziano and colleagues, “belief in m-consciousness ... is a lingering fragment of a larger cluster of physically incorrect beliefs.”

The attempt to incorporate an empirically-grounded explanation of the illusion of consciousness into AST is commendable. I am, however, dubious that AST will succeed in persuading proponents of the Hard Problem. The nub of the Hard Problem is that explaining how cognition engages in the processing of sensory information is an Easy Problem; so, when AST touts a cognitive function (viz. attention), it automatically becomes a candidate for—arguably facile—dismissal. This vulnerability is aggravated by AST's aspiration to treat consciousness as an illusion and its conjecture that advocates of the Hard Problem are mired in superstition. AST's aspirations make it vulnerable to the retort that it ignores the datum in need of explanation and that faith in the explanatory scope of current cognitive neuroscience is grounded in beliefs that are no less misguided. To move beyond this impasse, I believe that even if AST is found to be true, it will need to be complemented by a set of reasonable expectations for what should be expected of scientific explanation.

Chalmers posed the question (1995, p. 20): “Why is the performance of these functions accompanied by experience?” Now consider that in a letter to Bentley, Newton wrote, “the cause of gravity is what I do not pretend to know ...” (Gillispie, 2017, p. 147). The reason for juxtaposing these two quotes is to echo what others have argued—the Hard Problem is not specific to consciousness science. The history of science is filled with examples of these sorts: success in explaining some phenomena is achieved, but yet more why-questions can be posed. Indeed, this is of a piece with the history of rational thought (Lane, 2017): what I am suggesting is that if we discover that the curvature of spacetime causes gravity, that does not put an end to why-questions concerning the nature of gravity. The point is not that Chalmers' question is idle; it is worth asking. And it is a question that AST can help to answer. But treating consciousness as *uniquely* Hard has served to insulate it from properly contextualized understanding of scientific explanation.

But there is another problem that is even more disconcerting—AST is exclusively cognitive. AST's ambition to unify GNW, HOT and illusionist perspectives, commits it to the position that there is no subjective experience; there is only false but refractory belief. It could just as easily be the case, however, that subjective experience exists in its own right, without belonging to the same category as auras, souls, or spirits. The claim is that subjective experience is not an illusion, but neither is it aligned with m-consciousness.

How might that be so? Note that Graziano and colleagues reiterate the claim that "somebody is home." They fail, however, to articulate what this implies, other than to say that we are misled about the nature of self. For clarification, AST seems to lean heavily on HOT, since AST emphasizes that higher-order thoughts have the content, "I am aware of the stimulus," not merely "there is a stimulus." HOTs then, on this view, not only represent the dynamics and consequences of a GNW, they also represent the self.

But to the extent that AST relies upon HOT for clarification of subjective experience—the experiences of a self—it also inherits HOT's problem. What HOT shares with AST is inclusion of many distortions and inaccuracies (Lane & Liang, 2008). Unfortunately, these inaccuracies include misrepresentation of self (Lane, 2015), thereby leaving it unclear as regards in what sense "somebody is home."

I believe that if we are to make sense of "somebody is at home," AST will need to consider neuronal activity that does not directly overlap with the TPJ and that does not fit comfortably into the attentional schema. An alternative is suggested by the observation that neuronal correlates or preconditions for self are integral to the brain's spontaneous activity (Lane et al., 2016): in an experimental setting it can be shown that the brain's spontaneous activity disposes subjects to judge visual or auditory stimuli as self-related (Bai et al., 2016; Qin et al., 2016). What seems to occur is that stimuli are shaped in such a way that self is intimated. And what makes this type of neuronal activity specifically relevant to subjective experience is that the activity is similar to what is observed in some patients suffering from Disorders of Consciousness when they hear their own name. In fact, degree of signal change not only makes it possible to distinguish between unresponsive wakefulness and minimal consciousness, it also enables predicting the likelihood of recovery (Qin et al., 2010).

If we allow that one's name can serve as a proxy for self, this and similar experimental paradigms (Huang et al., 2014) make possible the investigation of subjective experience in a way that does not imply m-consciousness. In these studies, unlike AST, a special role is attributed to the anterior cingulate cortex (ACC). Indeed, the ACC also features prominently in competing theories of the relationship between self and consciousness: e.g., Schiff's (2010) mesocircuit hypothesis emphasizes the ACC's role in "executive systems" and GNW highlights its role in "self-monitoring" (Dehaene et al., 2017). The difference between these two sets of studies is that where Schiff and Dehaene et al. treat "self" as a concept that involves higher-level or meta-cognitive activity, the other studies cited above treat "self" as a more fundamental entity that does not require reflection, perhaps not even cognition. Which approach will gain more empirical traction remains to be seen. But both attempt to preserve a role for self.

Leaning into the future, in order to get clear about AST's explanatory adequacy, it will be necessary to properly characterize the phenomenon in need of explanation. I submit that, as a first approximation, Humphrey's description of self captures its homey intimacy (2011, p. 90): "the core self (is) ... the owner and occupier of the thick moment of consciousness." This type of subjective experience is not ethereal; indeed, it can be investigated by methods wholly compatible with i-consciousness, and very likely including neural data that concerns the role of the ACC. Graziano and colleagues aspire to explain the feeling, "somebody is home." Doing so will require investigations of i-consciousness that include a place for self.

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