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Creating a World in the Head: The Conscious Apprehension of Neural Content Originating From Internal Sources

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Klein et al. (2023) argued that the evolutionary transition from respondent to agent during the Cambrian explosion would be a promising vantage point from which to gain insight into the evolution of organic sentience. They focused on how increased competition for resources—in consequence of the proliferation of new, neurally sophisticated life-forms—made awareness of the external world (in the service of agentic acts) an adaptive priority. The explanatory scope of Klein et al. (2023) was limited to consideration of the conscious apprehension of externally sourced content—that is, content delivered from the sensory registration of objects occupying phenomenal space. But consciousness—at least for humans—takes its objects from internal as well as external sources. In the present article, we extend their analysis to the question of how internally sourced content (i.e., mental states) became the object of conscious apprehension.

Keywords: consciousness, evolution, external and internal mental reality, phenomenal space and mind

In a recent article, Klein et al. (2023) argued that sentience[1,2] was a critical component of the adaptive solution to recurrent problems organisms faced in their evolutionary past. Specifically, evolution endowed organisms with the capacity to adopt an agentic stance toward increasingly complex and unpredictable environmental demands placed on them during the so-called Cambrian explosion (hereinafter referred to as CE). One consequence of taking an agentic stance was that it required the organism to project its internally situated representations[3] of reality into a multidimensional phenomenal space[4] existing outside its brain. Projection into an external space, in turn, required the evolution of sentience. Sentience was thus both the consequence of agentic behavior and its modus operandi.

Klein et al. (2023) offered an analysis of the evolution of sentience based on evidence and argument. In the next section, we present a summary of their deliberations. Those interested

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[1] Sentience is the capacity to experience life (Klein et al., 2023). More formally, an organism is sentient if and only if there is "something it is like" for "organism X to be in mental state Y" (e.g., Hacker, 2002; T. Nagel, 1974). Sentience is what most philosophers have in mind when discussing phenomenal consciousness (e.g., Block, 1995; Klein, 2015a; Strawson, 2009). Phenomenal consciousness is a mental state characterized by the manner in which it presents itself subjectively—that is, the way it feels to its possessor (e.g., Block, 1995; Chalmers, 1996; Hacker, 2002; T. Nagel, 1974).

[2] In this article, we use the words sentience, consciousness, subjectivity, awareness, and experience interchangeably. While this treatment may seem overly inclusive (for review, see Van Gulick, 2022), our identification of sentience with phenomenal consciousness (see Footnote 1) helps explain our usage (a similar synonymy is adopted by Chalmers, 2018).

[3] In our usage, the term "representation" refers to an information-bearing neural structure (i.e., a pattern of neural activity possessing semantic properties) whose meaning may be subject to conscious apprehension (i.e., a mental representation).

[4] In Klein et al. (2023), the phenomenal space outside the organism was described as three dimensional. Unfortunately, there are no a priori reasons to attribute a capacity for three-dimensional representation to Cambrian vertebrates. Accordingly, we believe it more prudent to describe the phenomenal space experienced by animals during the CE as "multidimensional."

in the conceptual foundation on which our summation is based are referred to Klein et al. (2023).

A Brief Review of the Evolutionary Origins of Sentience

The Beginning

During the early part of the Paleozoic Era (of which the Cambrian was the first geological period), most life-forms were unicellular and simple. It was not until the CE (which spanned approximately 25 million years beginning around 545 million years ago) that complex, multicellular organisms within the subphylum Vertebrata—including mammals, birds, reptiles, and fish—first appeared.

For early members of the vertebrate lineage, behavior likely consisted of movement occasioned by genetically transmitted action schemata in concert with ontogenetic adjustments (i.e., modifications acquired in the organism's lifetime) executed in response to sensory detection of environmental stimuli. Activity for such organisms was not an intentional effort to act on one's surroundings. It simply was movement in response to stimuli. Prior to the CE, organisms almost exclusively were respondents (Klein et al., 2023).

Respondent Versus Agent

For a respondent, behavior is caused, not chosen. Most typically, the cause is nonsentient detection of an environmental contingency. Once commenced, the behavior continues to completion along a predetermined path, unaccompanied by awareness of having been issued from a self or directed toward objects existing beyond the respondent.

An agent, in contrast, behaves intentionally. Its behavior is deliberately chosen and intentionally directed toward effecting change in a world external to the agent. Prior to completion, agentic acts are subject to modification and correction based on the agent's goals and interpretation of the situation (for discussion, see Ferrero, 2022; MacMurray, 1957/1969; Moreno, 2018; Pickering, 2024; D. M. Walsh, 2015).

A Necessary First Step Toward Agentic Behavior Is to Appreciate There Is a World in Which to Behave

For pre-CE organisms, behavior originated within, and operated on, neurally housed representations. Environmental stimuli were nothing over and above the brain states[5] enabled by neural systems designed to gather information about the world (e.g., electromagnetic radiation) and translate them into electrochemical spike trains (e.g., Aljadeff et al., 2016; Gerstner & Kistler, 2002).

If neural representation benefits survival, natural selection has no adaptation-driven imperative to extend reality beyond its cranial confines. For a system so designed, the physical world has no need of observer-independent realization: It exists for the organism as it exists in the organism. Accordingly, no meaningful distinction can be drawn between the physical world and its neural instantiation. The world was that which was in the organism's head.

The transition from respondent to agent required the organism to transform predetermined, inwardly conceived, and directed acts into intentional behaviors targeting objects positioned in a multidimensional space outside its body (e.g., James, 1904; Pereira, 2018; Pribram, 2004; Rudrauf et al., 2017; Velmans, 2007, 2009). To fashion a world external to the organism, neural activities must be phenomenologically projected onto the space external to the brain in which they originate (e.g., Pribram, 2004; Velmans, 2007). This process—called "phenomenal projection" (for discussion, see Pereira, 2018; Pribram, 2004; Velmans, 2007, 2009)—served both as the product of and occasion for observation of the physical world. To experience a world consisting of objects and their relations requires those objects to be fitted with properties in virtue of which they can be individuated. Sensory registration had expanded to include conscious perception.

Why Evolution Favored Agency

There are clear adaptive advantages accompanying acts performed in the service of reasoned deliberation (e.g., Klein et al., 2023; MacMurray, 1957/1969; Pickering, 2024; D. M. Walsh, 2015). An agent acts on its environment by virtue of being in its environment. In consequence, agentic

[5] A useful examination of the properties of and criteria for qualifying as a "brain state" is provided by Brown (2006).

acts can be tailored to the contingencies as they present and altered in accord with perceived changes of circumstance.

Prior to the CE, all taxa possessed of motility acted from response. However, as competition for resources intensified in consequence of the expansion of behavioral competencies enabled by the CE (e.g., Feinberg & Mallatt, 2016; Ginsburg & Jablonka, 2007, 2019), responses that could be deliberately fitted to the demands of an increasingly unpredictable world would be favored by natural selection. The CE provided a context in which acts issuing from the agency would have adaptive advantages over acts based on response when navigating the hazards posed by CE.

From Agency to Sentience

There is nothing inherent in the sensorial registration of external reality to suggest its phenomenal composition should be assembled into objects (e.g., Kant, 1998; Locke, 1690/1731). This, of course, is reflected in James's (1890) well-known posit that an infant's initial experience of the world consists of a "blooming, buzzing confusion" (p. 488) of sensorial content. A sentient being provides structure to its world by imposing forms on the energetic patterns apprehended by its sensory organs.

There is a long-standing debate regarding how an organism learns to individuate objects of experience (e.g., Aristotle, Hume, Kant, Locke, Mill, Plato). While proposals differ on specifics (for discussion, see Hummel, 2013; Liter & Bülthoff, 1998; Varzi, 2019), there seems to be consensus that object discrimination involves the identification of properties that cohere repeatedly in space and time (e.g., James, 1890; Kant, 1998; Locke, 1690/1731; MacMurray, 1957/1969; Piaget, 1954; Spelke, 1990). Such properties are used to fashion single, undivided objects from the "blooming, buzzing confusion" of the whole. In short, properties that recurrently coalesce in the sensorium constitute and identify the object that possesses them.

We cannot navigate the world independently from our ways of partitioning it into objects. But, to behave agentically toward those objects, the organism must be aware that (a) it is behaving and (b) its behavior targets objects situated in the space external to the organism. Without such awareness, its behavior would be that of a respondent rather than an agent.

But there can be no object-oriented agentic acts absent sentient registration of object-defining properties (e.g., Klein et al., 2023; MacMurray, 1957/1969; Orilia & Paoletti, 2022). The evolution of sentience—the feeling of "what it is like for organism X to experience property Y" (e.g., the color of the sky or the pain of a bee sting; e.g., Chalmers, 1996; Hacker, 2002; T. Nagel, 1974)—is thus necessary for (a) populating phenomenal space with phenomenal objects, (b) behaving toward those objects in an agentic manner, and (c) the passage from sensorial detection to conscious perception.

In summary, natural selection's answer to problems posed by the CE was to change respondents to agents. To act as an agent, an organism must differentiate the target of its behavior from non-targeted objects occupying phenomenal space. This is accomplished by breaking the organism free of its neural mooring and positioning it within a phenomenal space outside its brain. To enable this new way of "being in the world," external space was populated with phenomenal objects whose presence could be detected by sentient registration (i.e., "the feeling of what it is like to experience X") of the properties of which those objects were composed.

The Origin of Internally Sourced Conscious Reality

Klein et al. (2023) took the position that the transition from respondent to agent would be a promising vantage point from which to gain insight into the evolution of organic sentience. They focused on how increased competition for resources—in consequence of the proliferation of new, neurally sophisticated life-forms—made awareness of the external world (in the service of agentic acts) an adaptive priority. Consequently, the explanatory scope of their article was limited to consideration of the conscious apprehension of externally sourced content—that is, content delivered from the sensory registration of objects occupying phenomenal space.

But consciousness—at least for humans—takes its objects from internal as well as external sources (e.g., Chalmers, 1996; James, 1890; Johnson & Raye, 1981; Klein, 2022; Kunzendorf, 2015; Levine, 2003; McGinn, 1991; Robinson, 2008; Tallis, 1991). The goal of the present article

is to extend the analysis in Klein et al. (2023) to the question of how internally sourced content became an object of conscious apprehension.

Externally and Internally Sourced Mental Content

In what follows, we use the terms "external" and "internal" to designate whether the content provided to consciousness was culled from sensory experience or self-generated cerebration.[6] Content originating from the physical world is assembled from sensory innervation: Sense organs target externally located stimuli, which they transform into electrochemical discharges. The resulting activity is used to compile neural representations that capture (to varying degrees of fidelity; e.g., Bartlett, 1932; Münsterberg, 1909) the manner in which the stimuli were encoded at the time at which they first were experienced.

Internally sourced content, in contrast, is generated within the organism. Though often derived from external sources, once housed in the central nervous system (CNS), such content undergoes computational transformations (for discussion, see Bartlett, 1932; Bruner, 1973; Guillery, 2017; Klein, 2022; Klein et al., 2002) prior to recruitment for production of mental states such as imagery, inner monologue, decisions, judgments, and memory.[7] In contrast to externally generated content, internally sourced content is made to available to consciousness via activity originating within the CNS.

Sidebar: Our Use of the Term "Mental State"

In the preceding section, we used the term "mental state." This construct has a long, contentious history among psychologists and philosophers (for modern treatments, see Apperly & Butterfill, 2009; Berger, 2014; Carruthers, 2015; Crane, 2015; Goldstein, 1994; J. Nagel, 2013; Perner, 1991; Searle, 1991). Therefore, explicit specification of our use may help avoid confusion and misunderstanding. While not everyone will agree with our construal, there should be little question of our intended meaning.

A mental state consists of both contentual (i.e., the intentional objects of consciousness)[8] and qualitative (i.e., the subjective feel of those objects) features (e.g., Pernu, 2017). That is, for a state of the brain to qualify as "mental," there must be "something it is like" (e.g., T. Nagel, 1974) for the organism to be in that state.

It is worth mentioning that mental states have nonexperiential neural events supporting their conscious realization (e.g., Klein, 2015a; Searle, 1991; Strawson, 2009). While these nonexperiential preconditions are necessary for enabling a mental state, they are nonmental in the sense that they are mechanisms that help make the mental state possible but are not the mental state per se. They conceivably could (and often do) go on without there being any conscious awareness of their operation (for discussion, see Klein, 2015a; Strawson, 2009).[9,10]

In the remainder of this article, we address one type of internally sourced mental state—imagery. The multitude of intentional objects that populate human consciousness—for example, belief, desire, memory, inner monologue, thought, fantasy, knowledge, judgment, hope—came long (in evolutionary time) after imagery became an intentional object. They will not be addressed herein. Our reasons for focusing on mental imagery are dictated by the principles of evolutionary biology in conjunction

[6] Klein et al. (2002) used the terms inceptive and derived to label what we call externally and internally sourced mental content. In this article, we adopt the latter terminology since it seems better attuned to the distinction we are trying to capture.

[7] It is well known that numerous changes (e.g., addition, subtraction, recombination) can, and typically do, take place between and encoding and retrieval (e.g., Bartlett, 1932; Nadel & Moscovitch, 1997).

[8] All conscious states have content—that is, they are about something. Strictly speaking, these "somethings" are called the "intentional objects of consciousness" (e.g., Brentano, 1995). For ease of exposition, we often will omit the predicate "intentional" when referring to the objects of conscious apprehension.

[9] An analogy may help. A theatrical play consists of a great deal of behind the scenes activity (e.g., financing, venue selection, auditions), but, strictly speaking, none of this activity is the play per se.

[10] The thesis that "all things are in flux" can be traced to pre-Socratic Greek antiquity (cf. late 6th or early 5th century B.C.E.; e.g., Cornford, 1941, 1957; Kirk et al., 1983). The protagonists divide into two camps distinguished primarily by their metaphysical commitments—that is, those who posit change as the nature of reality and those who regard change as the appearance of an unchanging reality that lays behind it. It is important to recognize that despite differences in assignment of ontological status, both camps accord change a central role in the physical world (the appearance of change, after all, is an experience, and experiences are happenings realized in a subcategory of physical reality—i.e., the brains of sentient creatures).

with arguments made by Klein et al. (2023). They are presented in the following section.

The Evolution of Internally Generated Conscious Imagery

Prior to the emergence of vertebrate life, internal monologues, judgments, beliefs, and a host of other mental states had yet to make an appearance. This is not to say that pre-Cambrian organic life was incapable of judgments, decisions, problem resolution, and so forth. But, to the extent these abilities were part of the organism's repertoire, they were enabled by nonconscious response rather than conscious deliberation—a claim whose justification is mandated by acceptance of the thesis that consciousness emerged during the CE.

Flux and Stability in Mental Representation

Sentient beings—in consequence of compositional and perspectival changes objects undergo over time and the multiplicity of contexts in and from which they are encountered—are bathed in flux (e.g., Cornford, 1941, 1957; Klein, 2019a; Noonan, 1989).[11] This poses a problem for creatures whose evolutionary viability depends, in large part, on their capacity to engage agentically with their surroundings. To serve as the focus of agentic behavior, an object must appear sufficiently consistent to permit its perceptual identification and reidentification (e.g., Brennan, 1988; Klein et al., 2023; Mead, 2002; Noonan, 1989; Sider, 2001). However, representational stability is difficult to attain when the assignment of an object's individuating properties (e.g., size, shape, mass, color, orientation) are compromised by ambiguities resulting from componential, contextual, and perspectival variation.

The capacity to transform the flux of external reality into relatively stable mental representations was evolution's answer to this challenge (e.g., Klein, 2019a). In the early stages of vertebral evolution, creatures had recourse only to rudimentary mechanisms of object stabilization (e.g., sensitization, generalization) by which to navigate the chaotic world of experienced variation (e.g., Eccles, 1989; Kaufman, 1974; Mostofsky, 1965; V. Walsh & Kulikowski, 1998; Young, 1976). Such mechanisms, being largely reflexive, were unable to support sustained and flexible agentic engagement with the environment (e.g., Klein, 2019a; Klein et al., 2002). What was needed was a means of stabilizing object representations in the service of agentic behavior.

To lessen the experienced variability of objects in the physical world, natural selection fitted the neural architecture with mechanisms capable of supporting the stabilization of ontogenetically acquired content (e.g., consolidation; Dudai, 2004; McGaugh, 2000; Nadel & Moscovitch, 1997). Although not themselves the objects of consciousness, these representational structures served as the formative basis for the conscious identification and categorization of objects occupying phenomenal space.

But a representational structure, no matter how stable, is little more than a pointless appendage unless accompanied by mechanisms capable of making it available to the right systems at the right times. And this is exactly what the act of perception accomplished. During perception, stabilized representations were selectively recruited from the CNS, providing the interpretive framework within which sensory innervations arriving from the external world were organized, identified, and made available as objects of consciousness (i.e., perceived). In this way, the phenomenal world acquired stability and consistency in which agentic acts could be meaningfully enacted.

Why Mental Imagery? The Principle of Evolutionary Conservatism

By hypothesis, consciousness, in its initial incarnation, consisted of the perceptual registration of external objects whose neural stabilization made them amenable to agentic treatment. This expanded the range and manner in which the organism could address adaptive challenges encountered during the highly competitive conditions characterizing the CE. Additional modifications to this architecture subsequently were incorporated to the extent they enhanced the rate that the organism successfully solved new and/or residual challenges.

Natural selection does not respond to recurrent problems organisms faced in their evolutionary

[11] The principle of evolutionary conservation should not be confused with phylogenetic (or phylogenetic niche) conservatism—a term which refers to the tendency for species to retain their ancestral traits (e.g., Losos, 2008).

past with de novo production of complex, metabolically costly phenotypic systems. Rather, it modifies the design of existing structures in ways that enhance the organism's ability to survive and reproduce (e.g., Barkow et al., 1992; Dawkins, 1976; Klein et al., 2002; Mayr, 1983; Sherry & Schacter, 1987; Williams, 1966). We call this the principle of "evolutionary conservatism," see Footnote 11.

Given the logic of evolutionary conservatism, it is reasonable to assume that the inner sourced content targeted for conscious apprehension initially consisted of nonconscious representational structures employed in the production of perceptual imagery. By extending the purview of consciousness to include these previously insentient representations, agentic acts could be directed toward objects located in an "internal or inner space" (a notoriously vague—both descriptively and phenomenologically—"site" of mental states and happenings: see the What is Inner Space? section). The organism now could consciously experience internally as well as externally sourced imagery.

There is evidence consistent with the proposition that internally and externally sourced imagery drew on many of the same neural structures (i.e., evolutionary conservatism). For example, studies have shown that many areas of the sensory cortex recruited during perception overlap with those active during visual, auditory, tactile, and olfactory imagery (e.g., Dijkstra et al., 2019; Djordjevic et al., 2004, 2005; Ganis et al., 2004; Lee et al., 2016; Stevenson & Case, 2005; Yoo et al., 1990; Zatorre & Halpern, 2005). In addition, it long has been known that visual mental imagery selectively interferes with visual perception and that auditory mental imagery interferes with auditory perception (e.g., Craver-Lemley & Reeves, 1992; Perky, 1910; Segal & Fusella, 1970; but see Hopkins, 2012). Though far from conclusive, these findings are consistent with the hypothesis that many of the same neural structures participated in the evolution of perceptual and mental imagery.

The Adaptive Benefits of Mental Imagery

A case can be made that internally generated imagery served a number of adaptively beneficial functions. For instance, it allowed the organism to anticipate, imagine, and in other ways experiment with content that once existed exclusively as nonconscious representations. Forming and maintaining a mental image of an object permits the organism to manipulate the object agentically from the safety of mental space—enabling the assessment of anticipatory possibilities free from external consequences.

Such capabilities also would be highly valued when searching for prey and avoiding predation. When the target of perception—be it tracking elusive prey, avoiding a stealthy predator, or fetching a bouncing ball—has a nonconstant sensory presence, the agent can remain "on target" and "on task" even when the object of interest no longer is present to perception. In short, conscious awareness of internally sourced imagery helped bridge the epistemological gap created by "out of sight, out of mind."

What Is Inner Space?

Consciousness must, of logical necessity, be directed toward some "other" that serves as its object (e.g., Brentano, 1995; W. Earle, 1955, 1972; Husserl, 1964; Klein, 2012; Neuhouser, 1990; Rossman, 1991; Zahavi, 2005). For humans, the distinction between self and other is as basic as that between life and death. We certainly appear to reside in a physical world outside our body. This space is home to the objects and events toward which we behave. While, as we have argued, our experience of (not necessarily the reality of) the physical world is a projection of a phenomenal space fashioned by the CNS, our daily involvement with external reality affords experiential assurance we are not solipsists.

At some point, either during or following the CE, conscious registration broadened to include imagery positioned within the self (in philosophical parlance, this often is called the "subject"; e.g., W. Earle, 1955; Kant, 1998; Klein, 2012; Zahavi, 2005). This inner space (i.e., the mind) is the experiential reality of hominin life (e.g., Klein, 2015b, 2016). But, in stark contrast to the experienced location of external reality, the placement of our inner mental topography is a matter of considerable debate.

Although well beyond the scope of this article to attempt a scholarly treatment of deliberations on the location of experiential reality, it briefly should be noted that human intuition is not a reliable guide to its placement. For example, the ancient Greeks often located mental states in the torso rather than in the brain (e.g., Sullivan,

1999). And, as advocates of Cartesian philosophy see it, the mind,[12] being an independent, immaterial substance, has contact with, but not location within, the material brain (e.g., Almog, 2002; Descartes, 1984).

Despite debate, virtually all contemporary psychologists, philosophers, and neuroscientists accept the mind as the product of the CNS (for discussion and review, see Clark, 2009; Dehaene, 2014; Joshua et al., 2020; Koch et al., 2016; León & Zahavi, 2023; Prinz, 2012). However, there is a significant difference between the point of origination and the experienced location. Sadly, there is little empirical evidence pointing to a specific experiential placement for inner space.

Some of its properties, however, have been explored. Most of these pertain to the modality of visual imagery. For example, psychological investigations have demonstrated that the experienced terrain of visual inner space shares a number of properties with perceived external space—such as extension, object location, and dimensionality (e.g., Kosslyn, 1980, 1994; Kosslyn & Alper, 1977; Kunzendorf & Reynolds, 2004/2005; Pinker, 1980; Shepard & Metzler, 1971).

Suffice it to say that although inner mental space is an experiential certainty (it widely is held to be the aspect of reality of which we can be most certain; e.g., Gallagher & Zahavi, 2008; Midgley, 2014; Strawson, 2009; Wittgenstein, 1958), little is known about the placement or psychological topography of our internally sourced phenomenology.

Situating Objects in External and Internal Space: Personal Ownership

Since, consciousness of inner and external space share many underlying mechanisms (i.e., the principle of evolutionary conservatism), how are the internal and external objects of consciousness assigned to their corresponding locations?

One possibility is suggested by the concept of personal ownership (e.g., Albahari, 2006; Klein, 2015a; Lane, 2012). By personal ownership, we mean that self-generated (as opposed to sensorially derived) intentional objects are felt as belonging both to and within oneself—that *my* mental states take place *in my head*. What individuates a mental state as distinctly and exclusively taking place in one's head (i.e., the inner space of the mind) is that I sense—without need for intuition or inference—that the content of that state is uniquely and infallibly authored from within (for comprehensive treatment, see Albahari, 2006; Klein, 2012, 2015a; Klein & Nichols, 2012; Lane, 2012; Shoemaker, 1968; Stephens & Graham, 2000; Zahavi, 2011).

Cases involving disruption of personal ownership lend support by showing that intentional objects can be sourced internally, yet be felt as unowned. When this happens, the content of consciousness still is apprehended, but the feeling that the content "belongs to me" no longer is secured. In consequence, the intentional object is treated as an external happening presented to one's senses.

For example, in certain clinical conditions, intentional objects can be present in awareness, yet lack the feeling that they are personally owned. When this occurs, the content that serves as the intentional object is treated as alien to the self (i.e., as external in origin). This can be seen in symptomology accompanying pathologies including, but not limited to, schizophrenic hallucinations (e.g., Bentall, 1990; Freeman & Garety, 2003; Frith, 1992) and somatoparaphrenic denial of body part ownership (e.g., Nightingale, 1982; Vallar & Ronchi, 2009). Misplacement also makes a nonclinical, nightly appearance when personally authored dream narratives are experienced as external reality (e.g., Klein, 2019b).

The finding that individuals can experience mental content absent a feeling that this content belongs to "me" shows that the relation between mental content and personal ownership can come undone. And this, in turn, endorses the conclusion that consciousness and its intentional objects are ontologically real and functionally independent aspects of the mind (for discussion, see Albahari, 2006; Klein, 2012, 2014, 2015a; Lane, 2012).

Returning to the question of localization, something like personal ownership—most likely an evolutionary precursor (personal ownership requires a sense of self, and this likely was missing from early vertebral life; e.g., Gallup &

[12] The concept of "mind" has proven notoriously difficult to fit with a set of propositional "truths" that realize consensual agreement (e.g., Armstrong, 1981; Broad, 1925; Kim, 1998; Pinker, 1997/2009; Rosenthal, 1991; Russell, 1921; Ryle, 1949; Varela et al., 1993). As an article of grammar, "mind" takes, as its adjectival form, the word "mental." Accordingly, we use the word "mind" to mean the collection of subexperiential processes required for having a mental state, in addition to the mental states they enable (e.g., Klein, 2015c, 2018).

Anderson, 2020; Povinelli & Cant, 1996; Reiss & Morrison, 2017; Sedikides et al., 2006)—provided the grounding from which externally and internally sourced objects could be positioned in phenomenal and mental space. The occasional misappropriation of intentional objects in modern humans suggests the possibility that locational slippage may have been far more common in our ancestors (a possibility raised by Jaynes, 1976).

Conclusions

One of the most basic experiential distinctions for sentient beings (at least human sentient beings) is that between subject and object. This dichotomy has been the target of centuries of scholarly discourse. In philosophy and psychology, the issue often has been framed as the relation between self and nonself. While various proposals to make sense of the apparent bipartite division of reality have long been on display—for example, materialism (radical, nonreductive), eliminativism, panpsychism, parallelism, idealism (solipsistic, absolute), phenomenalism, dualism (substance, property), pluralism—a definitive treatment is not in sight. In this article, we offered a speculative meditation on the topic.

Importantly, we made no claim to understanding the nature of consciousness per se: We have absolutely no idea how insentient matter gives rise to an organism's ability to experience life. Rather, we drew on considerations from psychology, philosophy, and evolutionary biology in the hope we might acquire an understanding of (a) how life transitioned from insentient matter to organic consciousness and (b) how the conscious registration of physical (objective) reality broadened to include experiential (subjective) reality.

We cannot vouch that our deliberations adhere to the reality of the evolutionary journey leading to consciousness and its localizations. We have tried to limit our reflections to things we believe logically warranted and consistent with what can be said to be known about the evolutionary progression of organic life. Some will feel our journey has led us astray (e.g., the difficult—but not insurmountable—task of reconstructing events about which direct observation is impossible; for discussion, see de Waal, 2002; Tooby & DeVore, 1987). Perhaps. We do, however, think informed speculation on this topic is absolutely necessary if we hope to make progress toward understanding who we are and where we are.

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