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What is it like to be a human?

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Abstract

The explicit link between awareness and sociality put forward in the accompanying article opens new doors to thinking about the evolutionary origins of consciousness. Human subjective experience undoubtedly has some features that are species-specific and others that are shared over a broad phylogenetic base. The authors' proposal that consciousness depends on high-level neural circuits evolved for social perception begs the question whether animals lacking such circuitry experience a fundamentally different form of consciousness from humans. It also highlights the need for comparative work elucidating neural mechanisms by which animals other than primates perceive and respond to their conspecifics.

The neural basis of consciousness is arguably the most mysterious scientific puzzle facing us. Human subjective experience is a product of the brain, yet cannot be neatly pinned down to a particular neural system or circuit. As far as we can tell, other animals partake consciously in the world as we do, albeit sometimes drawing upon very different perceptual adaptations (Nagel, 1974). This raises the question of whether consciousness, and the neural systems that promote it, can be studied in a comparative and evolutionary context.

The accompanying article focuses almost exclusively on humans, but draws upon data from nonhuman primates when necessary. Yet by linking consciousness to social perception, the proposed framework raises the possibility that the study of consciousness via comparative social neuroscience can provide valuable new insights. The article argues that high-level social perception, turned inwardly, gives rise to conscious awareness. In other words, human self-awareness draws upon the same neural computations used to assess the mental states of others. While this explanation, like most explanations of consciousness, retains a mystical tinge, it does unambiguously link awareness to neural mechanisms of social perception. What is meant by awareness? The authors are clear on this point: it pertains not only to metacognition or access consciousness, but also to phenomenal consciousness – as they put it, “awareness of anything, awareness of a color, or a sound, or a smell.”

The notion that social neuroscience can advance our understanding of consciousness is an optimistic and welcome view. Let us briefly consider what is known about social perception in animals. First, major taxa such as mammals and birds are composed of species that range from being solitary to highly gregarious. Second, social complexity is a critical factor in shaping species intelligence and encephalization (Humphrey, 1976; Shultz & Dunbar, 2010). Finally, behavioral and ethological testing has shown that socially oriented species across a range of taxa are capable of monitoring and interpreting the behaviors of their conspecifics (Byrne & Bates, 2010; Leopold & Rhodes, 2010). Thus there is good reason to believe that high-level social perception is common in the animal world, that its level of expression

varies widely among species, and that it has coevolved with measurable changes in the brain.

At the physiological level, we know almost nothing about neural structures in other animals that may be homologous to those implicated in human social cognition such as the superior temporal sulcus (STS) and right temporoparietal junction (TPJ). This is in some ways surprising, since comparative research has gleaned considerable information about other, related aspects of brain function. For example, electrophysiological studies have revealed detailed, multimodal sensory maps of the cerebral cortex in diverse mammals (Kaas, 2002). Furthermore, comparative work has identified molecules and primitive neural circuits that contribute to affiliative behaviors across a range of vertebrates (Insel, 2010). However, whether the cortical circuitry that supports high-level social perception in primates evolved recently to fit the specific needs of primate, or possibly human, society, or whether it is a more general feature of the mammalian brain, is presently a matter of speculation.

It is worth pointing out that there is one other mammalian species whose cortical mechanisms of social perception have been studied: sheep. Sheep are social animals that readily recognize faces and interpret facial expressions of their conspecifics, even when presented on a computer monitor. Single-unit electrophysiological recordings have revealed that neurons in the sheep temporal cortex exhibit selectivity for faces that bear a striking similarity to those observed in monkeys and humans (Tate, Fischer, Leigh, & Kendrick, 2006). While this observation does not imply that sheep possess a human-like potential for mind reading, it does at least raise the question whether the sheep homologs of the human STS and TPJ might be involved in some form of social monitoring.

Could advances in social neuroscience ultimately bear on our understanding of the evolution of consciousness? Possibly so – if consciousness and social perception are indeed fundamentally interlinked. The fact that we can presently only speculate on the cortical systems supporting high-level social perception in animals calls attention to the fact that more work needs to be directed toward comparative social neuroscience. As we learn more about the types of neural specializations in different animals, we may slowly gain insight into the evolution of our own social brain, and, if the hypothesis in the accompanying article is correct, into the neural circuits that lie at the heart of our conscious experience.

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