

In the last issue of [Neuron](#) (65, 6), a "Special Feature: Reviews on Social Neuroscience," of unique interest to cognitive and social scientists, "a series of reviews [most of them freely available online] highlighting exciting research in the field of Social Neuroscience, which seeks to understand how the brain mediates social behaviors, and conversely, how social behaviors influence brain function. The reviews in this issue reflect the diverse and interdisciplinary nature of the field, ranging from the analysis of social interactions in "simple" model systems to the study of complex human behaviors."

From Chris and Uta Frith introductory "[Overview](#)":

"We have two suggestions as to what the special feature of human social cognition might be. One idea is that humans have an automatic (unconscious) drive to constantly update the difference between their own knowledge and the knowledge of specific others. Such a tendency is critical to the human drive to share novel information with others (Fitch et al., 2010). Such sharing, and indeed any useful communication, depends on knowing what other people don't know.

The other idea is that much human knowledge is represented in the explicit (conscious) form that is needed for sharing experiences. In other words, there is a special form of human communication where we are aware that we are sending and receiving signals (Sperber and Wilson, 1995). This means that, when we receive a signal we make a distinction (among other distinctions) between unintentional and deliberate signaling. We know that unintentional signals may have more veracity than deliberate signals because deliberate signals can be manipulated by the sender for the purposes of deception. On the other hand, we can use deliberate signals of communication to teach others. Both informal and formal teaching are the building materials of culture and serve to multiply learning from others (Gergely et al., 2007). This multiplication of experience over many generations may be the secret to the success of Homo sapiens."

Here are the abstracts (and an illustration):

"Conceptual Challenges and Directions for Social Neuroscience" by Ralph Adolphs, freely available [here](#)

Summary: "Social neuroscience has been enormously successful and is making major contributions to fields ranging from psychiatry to economics. Yet deep and interesting conceptual challenges abound. Is social information processing domain specific? Is it universal or susceptible to individual differences and effects of culture? Are there uniquely human social cognitive abilities? What is the "social brain," and how do we map social psychological processes onto it? Animal models together with fMRI and other cognitive neuroscience approaches in humans are providing an unprecedented level of detail and many surprising results. It may well be that social neuroscience in the near future will give us an entirely new view of who we are, how we evolved, and what might be in store for the future of our species."

"Primate Social Cognition: Uniquely Primate, Uniquely Social, or Just Unique?" by Richard W. Byrne Lucy A. Bates, freely available [here](#)

Summary: Primates undoubtedly have impressive abilities in perceiving, recognizing, manipulating, and predicting other individuals, but only great apes seem to recognize the cognitive basis of manipulative and cooperative tactics or the concept of self. None of these abilities is unique to primates. We distinguish (1) a package of quantitative advantages in social sophistication, perhaps based on more efficient memory, in which neocortical enlargement is associated with the challenge of social living; from (2) a qualitative difference in understanding, whose taxonomic distribution-

including several distantly related species, including birds-does not point to an evolutionary origin in social challenges and may instead relate to a need to acquire novel ways of dealing with the physical world. The ability of great apes to learn new manual routines by parsing action components may have driven their qualitatively greater social skill, suggesting that strict partition of physical and social cognition is likely to be misleading.

"Social Interactions in "Simple" Model Systems" by Marla B. Sokolowski, freely available [here](#)

Summary: Deciphering the genetic and neurobiological underpinnings of social behavior is a difficult task. Simple model organisms such as *C. elegans*, *Drosophila*, and social insects display a wealth of social behaviors similar to those in more complex animals, including social dominance, group decision making, learning from experienced individuals, and foraging in groups. Although the study of social interactions is still in its infancy, the ability to assess the contributions of gene expression, neural circuitry, and the environment in response to social context in these simple model organisms is unsurpassed. Here, I take a comparative approach, discussing selected examples of social behavior across species and highlighting the common themes that emerge.

"Social Cognition and the Evolution of Language: Constructing Cognitive Phylogenies" by W. Tecumseh Fitch, Ludwig Huber and Thomas Bugnyar, freely available [here](#)

Summary: Human language and social cognition are closely linked: advanced social cognition is necessary for children to acquire language, and language allows forms of social understanding (and, more broadly, culture) that would otherwise be impossible. Both "language" and "social cognition" are complex constructs, involving many independent cognitive mechanisms, and the comparative approach provides a powerful route to understanding the evolution of such mechanisms. We provide a broad comparative review of mechanisms underlying social intelligence in vertebrates, with the goal of determining which human mechanisms are broadly shared, which have evolved in parallel in other clades, and which, potentially, are uniquely developed in our species. We emphasize the importance of convergent evolution for testing hypotheses about neural mechanisms and their evolution.

"Genetics of Human Social Behavior" by Richard P. Ebstein, Salomon Israel, Soo Hong Chew, Songfa Zhong, and Ariel Knafo, freely available [here](#)

Summary: Human beings are an incredibly social species and along with eusocial insects engage in the largest cooperative living groups in the planet's history. Twin and family studies suggest that uniquely human characteristics such as empathy, altruism, sense of equity, love, trust, music, economic behavior, and even politics are partially hardwired. The leap from twin studies to identifying specific genes engaging the social brain has occurred in the past decade, aided by deep insights accumulated about social behavior in lower mammals. Remarkably, genes such as the arginine vasopressin receptor and the oxytocin receptor contribute to social behavior in a broad range of species from voles to man. Other polymorphic genes constituting the "usual suspects"-i.e., those encoding for dopamine reward pathways, serotonergic emotional regulation, or sex hormones-further enable elaborate social behaviors.

"The Challenge of Translation in Social Neuroscience: A Review of Oxytocin, Vasopressin, and Affiliative Behavior" by Thomas R. Insel, freely available [here](#)

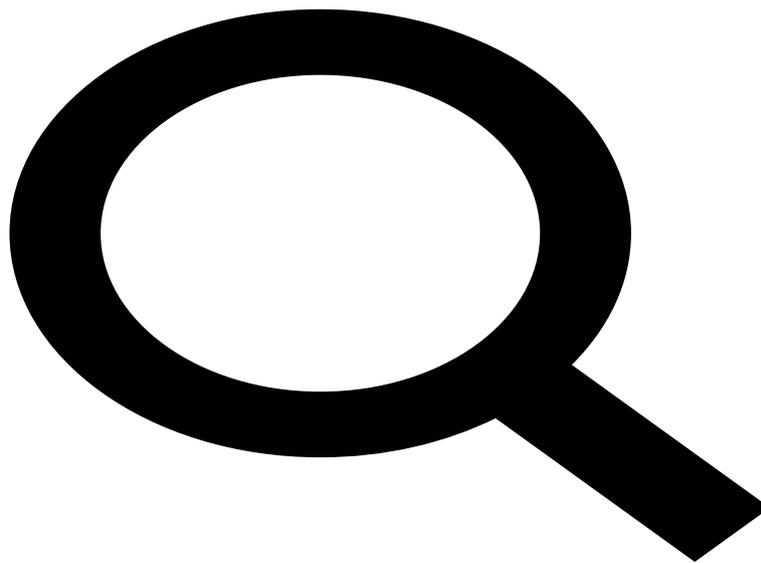
Summary: "Social neuroscience is rapidly exploring the complex territory between perception and action where recognition, value, and meaning are instantiated. This review follows the trail of research on oxytocin and vasopressin as an exemplar of one path for exploring the "dark matter" of social neuroscience. Studies across vertebrate species suggest that these neuropeptides are

important for social cognition, with gender- and steroid-dependent effects. Comparative research in voles yields a model based on interspecies and intraspecies variation of the geography of oxytocin receptors and vasopressin V1a receptors in the forebrain. Highly affiliative species have receptors in brain circuits related to reward or reinforcement. The neuroanatomical distribution of these receptors may be guided by variations in the regulatory regions of their respective genes. This review describes the promises and problems of extrapolating these findings to human social cognition, with specific reference to the social deficits of autism."

"The Developing Social Brain: Implications for Education" by Sarah-Jayne Blakemore, freely available [here](#)

Summary: This paper discusses the development of the human social brain. First, I will argue that social cognition is uniquely important and describe evidence that social interaction plays a critical role in early brain development. I will then discuss recent research demonstrating that the social brain undergoes protracted development and that adolescence in particular represents a period of reorganization of the social brain. Finally, I will attempt to draw out potential implications of this new research for education policy and for human wellbeing.

Incidentally, Blakemore's article begins with an excellent illustration:



She writes: "Humans are an exquisitely social species. Take the photograph shown here (Figure 1), which shows an English soccer player, Michael Owen, having just missed a goal for Liverpool Football Club. The photograph beautifully illustrates two aspects of the social brain. First, it shows how rapid and instinctive social responses are. Within a split second of Michael Owen missing the goal, nearly everyone is making identical arm gestures and has the same expression on their face. The other aspect of the social brain this photograph illustrates is our ability to read other people's gestures and faces in terms of their underlying emotions and mental states. Without having to ask you have a good idea of what they are thinking and feeling at this precise moment in time."

"Humans, Brains, and Their Environment: Marriage between Neuroscience and Anthropology?" by Georg Northoff, freely available [here](#)

Summary: How do we define ourselves as humans and interact with our various environments?

Recently, neuroscience has extended into other disciplines in the humanities and social sciences, questioning the existence of distinct disciplines like anthropology, which describes the relationship between humans and their various environments. However, rather than being incorporated into neuroscience, anthropology may be considered complementary, and a marriage of the two disciplines can provide deep insight into these fundamental questions.