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Jean Decety & Julian Paul Keenan

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Social Neuroscience: A new journal

Jean Decety, Editor

The University of Chicago, Chicago, IL, USA

Julian Paul Keenan, Deputy Editor

Montclair State University, Montclair, NJ, USA

In the past decade a new and exciting academic domain has expanded to scientifically explore the biological mechanisms of social interaction.

This rapid growth is reflected in various ways, including new graduate programs, handbooks (e.g., Cacioppo & Berntson, 2005), text books (e.g., Frith & Wolpert, 2004), as well as special issues of different journals, e.g., *Trends in Cognitive Science* (2004), *Neuroimage* (2005), *The Journal of Cognitive Neuroscience* (2004), *Neuropsychologia* (2003), *Biological Psychiatry* (2002), *Journal of Personality and Social Psychology* (2003), and *Political Psychology* (2003). Given the flurry of interest in this new field as well as the dramatic increase in the number of empirical papers that report social neuroscience data and theories, we thought that it was time to create a new academic journal specifically devoted to disseminate research and ideas.

With roots in many disciplines, including but not limited to neuroscience, social psychology, developmental science, economics, and cognitive psychology, social neuroscience has come of age.

WHAT IS SOCIAL NEUROSCIENCE?

Social neuroscience may be broadly defined as the exploration of the neurological underpinnings of the processes traditionally examined by, but not limited to, social psychology. This broad

description provides a starting point from which we may examine the neuroscience of social behavior and cognition.

However, we see this definition as a guide, rather than as a rule and, as such, we see this field as inclusive, rather than exclusive. The behaviors and cognitions studied under the umbrella “social” are diverse. From complex human interactions to the most basic animal relationship, social research is an expansive, diverse, and complex domain. Likewise, exploring the neurological underpinnings allows for equally assorted and varied lines of research. The combination of the areas reflects such diversity, in which research is performed in domains as wide reaching as the maternal behavior of knockout mice and endocast examinations of early *Australopithecus*.

Guiding social neuroscience research, whatever one chooses as the definition, should be our desire to understand the complex and dynamic relationship between the brain (and its related systems) and social interaction. Historically, these fields (i.e., neuroscience and social psychology) would weakly interact, with few formal ties between the two. However, and not unnoticed by ourselves or our suspected readership, when the fields do combine, the resulting research is inevitably exciting and meaningful, not just to academics, but to the general public as well.

Correspondence should be addressed to: Julian Paul Keenan, Director, Cognitive Neuroimaging Laboratory, Associate Professor, Montclair State University, 219 Dickson Hall, Upper Montclair, NJ 07043, USA. E-mail: socialneuro@montclair.edu and Jean Decety E-mail: decety@uchicago.edu

These underlying concepts are difficult to research. For instance, many social psychologists emphasize situationism (based on the belief in the significance of the situation) as opposed to personalities, although many recognize the combination of situation and personality as the best predictor of social behavior (Fiske, 2004). While the former aspect need not to be underestimated, it is not so easy to set ecological valid situations in the lab. Theoretically, assessing personality traits and correlating them with task performance and biological markers should pose no great challenge. These constructs, however, are rarely stable and they are dependent on so many mitigating variables that designing experiments remains a challenging process. It is often these mitigating variables that open up the field to other disciplines. Therefore, defining the “social” aspect of social neuroscience as including only the field of social psychology limits the true definition. From the ancient Greek and Egyptian philosophers to modern day mathematical and computational modelers, studying social behavior and cognition is an inclusive endeavor. This point is made clear when one casually surveys the educational background of a social neuroscientist. Further, the collaborative efforts in this field exist between biochemists and philosophers, anthropologists and neurologists, physicists and sociologists. While clichéd, it is true that social neuroscience succeeds because ideas exchange so freely.

One main challenge of social neuroscience is that social psychology and its related disciplines involve psychological constructs, such as moral dilemma, empathy, or self-regulation, that are difficult to map directly onto neural processes. These constructs often need to be deconstructed (Cacioppo, Berntson, Lorig, Norris, Rickett, & Nusbaum, 2003). Further, given the complexity of social interaction in humans, social neuroscience research needs to combine and integrate multiple-level analysis across different domains (Ochsner & Lieberman, 2001). Social neuroscience requires a system approach rather than a single level of analysis. We strongly believe that social and biological approaches when they are bridged can achieve a more accurate understanding of human behavior.

Ralph Adolphs has written an authoritative introduction about the foundational issues of social neuroscience (2003) that can serve as guidelines for state of the art research in this new field.

WHAT ARE THE TOOLS OF SOCIAL NEUROSCIENCE RESEARCH?

The tools of the social neuroscientist are seemingly limited only by the imagination of the researcher. From WADA tests and split-brain studies to performing MRIs on chimpanzees and examining the hippocampal volumes of voles, social neuroscience encourages and invites creative uses of traditional methodologies and the development of new techniques. Those who perform research in our field become inventive, either by choice, necessity, or a combination of both. Such manipulations are not only our future, but our historic past as well. The saying, “It is a poor craftsman that blames his tools” is particularly relevant here. As our tools advance, we need not lose sight of the creativity of experimental design or how theoretical considerations can guide our next advance.

The development of functional neuroimaging, including positron emission tomography (PET), functional magnetic resonance imaging (fMRI), event-related potential (ERP), and magnetoencephalography (MEG) hold tremendous promise for the understanding of social cognition (Raichle, 2003). The task of functional brain imaging is to identify multiple regions and their temporal relationships associated with the performance of well-designed tasks. However, the real question is whether the function of these areas can be associated with computation (i.e., elementary operations) that is useful in the analysis of mental functions (see Posner, 2003). For instance, the right inferior parietal cortex, at the junction with the posterior temporal cortex (TPJ) seems to be not only involved in theory of mind (Saxe & Wexler, 2005) but also in distinguishing the perspectives of the self from those of others, an ability that is relevant to knowing the contents of other people’s minds can be different from our own (Decety & Grèzes, in press). Thus the basic computation performed by this region may be related to lower level processing of social relevant signals, and may be not specific to mental state attribution per se.

One drawback of neuroimaging research is that it can be perceived as the new phrenology (see Uttal, 2003) and it may give an oversimplistic account of the neuroscience of social cognition and behavior. With neuroimaging, there are gimmicks and trends, claims that extend beyond the research, and debates that can reach

fever pitch levels over seemingly mundane differences. While hardly unique to our field, we encounter the danger of labeling parts of the brain as the “love center” or the area responsible for psychopathological behavior. In this sense, we are certainly flirting with a new phrenology. Therefore, we agree with our sensible colleagues who remind us to replicate and rely on all of the tools at our disposal.

Ironically, fMRI has been particularly plagued by these problems (and in some cases continues to be) because so many researchers realized its amazing potential. Early fMRI studies often took on the form of, “let’s throw the subjects in the scanner and see what happens”. Criticisms were harsh, and often justified. Yet, over the last decade, we have seen this technique mature and without those early studies, which often involved social questions, there would have been little interest in investing the technique. As unimaginable as it may have been 10 years ago, there are now countless fMRI scanners in the basements of psychology buildings. The maturing of fMRI has been exciting and wonderful to observe, and as social neuroscientists, it has helped address many questions previously unanswerable.

Functional MRI has become very popular with both the scientific communities and the general public. However it would be misleading to think it is the only neuroimaging tool. Certainly other neuroimaging techniques provide their own advantages. The spatial resolution in multiple dimensions puts fMRI in its own class. Yet, ERP research continues to be valuable because it too has its own advantages including temporal resolution and flexibility. PET and MEG carry their own advantages as well and, like fMRI, each has advanced social neuroscience. Anatomical MRI also plays a role in social neuroscience as does computerized tomography (CT).

The appeal of neuroimaging is clear. Humans can be non-invasively tested in various situations including on-line interaction with another partner, experiments can be designed, variables can be manipulated, studies can be replicated, etc. Yet, the disadvantages are significant. No technique has high spatial and temporal resolution (single-cell methods, which are invasive and limited in testing populations, require extensive a priori knowledge of where to look within the nervous system). In addition, most neuroimaging data are correlational and on their own they generally do not describe the causal role of the regions in a more general network.

Lesion studies in non-humans can fill the gap in establishing causal relationships. Thus animal studies are important and, in many senses, they remain the core of the field. Because of the variability of neuroimaging studies and methods, we deem this technique more important today than ever before. However, many of the social behaviors we are interested in, such as language and sexual behaviors, differ so significantly across species that these studies also limit our understanding.

Human case studies, as well as psychiatric, neurological, and psychological conditions can be additional methods for advancing our understanding of social neuroscience. These patient studies allow us to observe the relationship between social behavior and neurological systems. These studies often serve to spur neuroimaging research, or confirm the correlational findings of such research. While these studies are difficult (and many times impossible) to design with precisely manipulated variables, they too add to the tools of investigation for the social neuroscientist. Transcranial magnetic stimulation constitutes another approach to investigate the causal role of a region, and in many cases it can help to establish or confirm behaviors observed in patients. By employing a “virtual lesion” or creating a “virtual patient”, this technique can provide valuable information. Limited by penetration depth and spatial resolution, this technique should also be seen as one of many tools for understanding the complexities of brain–behavior relationships.

People and sexually reproducing animals need each other in order to survive, almost assuredly from the individual perspective, and as a certainty at the species level. It is clear that an assortment of social mechanisms are adaptive and that such mechanisms lend differential reproductive benefits. The individual that successfully passes on to future generations adaptive social neural mechanisms may secure a reproductive advantage. Yet, the variability of such abilities and capabilities and the proximate and ultimate origins of such abilities remain somewhat mysterious. In our species, the environment changes so rapidly that these relationships remain difficult to map. Yet, gaining an evolutionary perspective allows for a broader understanding of our current state. What may have been adaptive in one environment may not be so in another.

The gene encodes information that is usually (but not always) beneficial for the survival of the

organism. DNA gives rise to brains, and brains give rise to behavior. Certainly the field of social neuroscience owes its past, but more importantly its future, to this field. Genetics continues to expand into our field in inventive and meaningful ways. The future will bring us inventive twin studies, correlational genome examinations in humans, and more exciting knockout studies. We, like many in the field, are particularly excited by the role that genetics will play in our future.

THE IMPACT OF SOCIAL NEUROSCIENCE

Beyond the clear impact of social neuroscience in various academic domains, including education, for which we are all excited, we must carefully consider how society uses research findings from social neuroscience. There is a tendency in public journals to report over simplistic interpretations of complex issues. As Wolpe put it, “history has shown us again and again that society tends to use science to reinforce the moral assumptions and biases of the cultural moment. There is clearly a role for a thoughtful social neuroscience, where findings become part of considered policymaking around controversial issues. For example, research into addiction has provided new perspectives and tools for policymakers willing to use them. But if scientists are not clear about the scope and nature of their work, eager policymakers can seize preliminary and speculative findings and implement programs unsupported by the science itself” (Wolpe, 2004, p. 1032).

Importantly, Farah (2002) has raised a number of neuroethical issues for the future of neuroscience that should be of concern to all of us. Social neuroscience is already starting to track the neural signatures of sophisticated mental states such as truth versus lie, veridical versus false memory, style of moral reasoning or the likelihood of aggressive behavior. As social neuroscience develops, it will certainly challenge our ways of thinking about responsibility and blame, and have an impact on social policies. However, we must truly be responsible in this domain as well. While we should never have our research guided by politics, or other external pressures, we should apply the same standards to ourselves. Again, these issues are not unique to social neuroscience, but they are concerns

certainly worthy of consideration as this field expands.

It is a pleasure and an honor to serve as members of this great community. The field has housed some of the most brilliant and dynamic academics, and it continues to attract the brightest scholars and thinkers. We look forward to where this field is headed, attracted to its future by the richness of its past. We also look forward to the growth of *Social Neuroscience* and, as such, we look forward to each reader's contribution, be it through reporting of research, debate, or passing on a copy endlessly that eventually winds up in the hands of a student, inspiring him or her to enter the field. We thank all of you and we wish you continued success.

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