

So You Want To Be a Social Neuroscientist?

April 01, 2003

In this guest column, Lisa Feldman Barrett, an emotions researcher who employs a wide range of methodologies, reflects on starting up a new line of expertise, with some tips for easing the stretch when bridging boundaries.

Susan T. Fiske
APS President

About thirty years ago, the cognitive revolution brought a new subdiscipline to social psychology. We called it social cognition, and we imported complex methods and theories from cognitive science to support and guide our understanding of social behavior, asking new questions about the social mind. More recently, we are beginning to apply cognitive neuroscience to the social mind, investigating links between mind, brain, and behavior. Some call this new, emerging subdiscipline social neuroscience. I've been applying these neuroscience methods to my research on emotional experience, which originated from a social psychology perspective. My extended foray into social neuroscience has challenged me in unexpected ways, so I'd like to offer a few reflections on the experience. Social neuroscience covers more methods than just imaging the brain, but imaging is my area of interest, so that will be my focus.

Become a Student, Again. Obviously a budding social neuroscientist has some learning to do. (Indeed, we academics boast we are learning all the time.) Yet, the almost complete immersion in studenthood took me by surprise. It was not just the time, mental effort, and repetition necessary to learn brain areas and their associated functions, but also the abdication of my scientific independence. Designing a fMRI study requires a level of help not seen since my graduate school days. And I've had to defer my scientific judgment to others who know better: perhaps unsurprising when learning a new field, but this one is so complicated I've required help in many domains. On the other hand, learning to analyze fMRI data has been less difficult than I'd expected, at least so far. Once you get past preprocessing, which can be quite involved, fMRI data are not that different from the intensive repeated measures data I've dealt with before. A solid background in multivariate statistics will stand you in good stead.

Gather Your Resources. Time, money, equipment, people – social neuroscience is a resource-heavy enterprise. An experiment takes longer, and so does data analysis. (And don't forget you're maintaining your behavioral lab simultaneously.) If your institution, like mine, has no magnet, expect to spend plenty of time getting access to one, relying on others to secure your imaging slots, and trying not to sound like a nagging child. Magnet time is expensive, and you'll be paying for participants, for consultants, and even for free time to sit down and learn. A good team of consultants is crucial. A committed, interested collaborator is even better, though these are hard to find in any domain. I am extremely thankful for the generous people who have worked through design problems with me, suggested readings, simply taken the time to talk during a busy day, and been genuinely interested in what a social psychology perspective

can bring to neuroscience investigations.

Be a Scruffie. In her column this year, APS President Susan Fiske described two kinds of psychological scientists – neats and scruffies. Social neuroscience requires you to be a scruffie, taking big leaps at the risk of being wrong, and changing your mind (or your research design) in midair. You'll need ego-strength to tolerate ambiguity: neuroimaging still has many mysteries, such as the relationship between blood flow in the brain and neural firing. Moreover, to do good science with a magnet, you'll need precise ideas about the psychological processes or mechanisms you are evoking in your participants. For example, a general hypothesis like "emotional memory is evoked" is not precise enough to be measured in neuroimaging. Instead, you would hypothesize about the specific learning and memory processes influenced by evaluative, autonomic, or attentional components typically associated with an emotional response. I've also learned, to my dismay, it is beyond the state of the art to manipulate brain activation patterns and measure resulting behaviors. My extremely patient consultants taught me that instead, you must manipulate behavior and measure blood flow, which relates to activation patterns. Thus, a social neuroscience approach might be useful for testing existing hypotheses, and it may prove even more valuable for discovering new ones.

Beware of Heuristics. We all rely on heuristics when making judgments in conditions of uncertainty, and there is plenty of inherent uncertainty in social neuroscience. Don't be unduly swayed by pretty pictures of brain activation, lest you fall into the trap of vividness bias. An attention-grabbing picture is worth a thousand statistics, but does it tell you something real? This can be determined only by comparing the pattern of observed activations to theory and hypotheses. This final step is often difficult, but it is necessary.

Rethink Your Metaphors. Cognition versus emotion. Controlled versus automatic processing. These familiar metaphors from social psychology might not transfer well to social neuroscience, since such categorical distinctions might not hold up at the level of functional brain systems. Is it fair to say that the amygdala "makes" something emotional (as opposed to cognitive)? Or that the prefrontal cortex "makes" something cognitive (rather than emotional)? Not really, because the amygdala and some areas of prefrontal cortex are involved both in the regulation of attention and in so-called emotional phenomena.

Cause Versus Correlation. At some level, neural activity causes behavior, but neuroimaging is currently more a tool for measuring correlations than causation. We manipulate behavior, and measure blood flow. The excitement and criticisms over the use of neuroimaging data in social psychology reminds me of those made when structural equation modeling (SEM) hit the scene about 15 years ago. When faced with this procedure, some of us reacted with glee at the prospect of extracting causal information from correlations (which, it turns out, we cannot do). Others thought of SEM as evil incarnate because it was so complicated that it seemed incomprehensible – unappealing, statistical hocus-pocus. Now SEM is part of our toolbox and taught to graduate students. And we know what it can do for us: We can compare an observed covariance matrix to a hypothesized one (based on some theory), and determine whether our theory could have produced that observed matrix. Even if the answer is yes, there is always the possibility that some other theory could do the same, or better. It seems to me that the same inferential rules apply for social neuroscience data: we can compare the observed neural activation pattern with what we expected based on our theory of what is occurring in the brains of our participants. Even if they match, it's possible that the brain systems in question are implicated in some psychological

process invoked by our paradigm that we had not considered.

I have heard some colleagues raise concerns that social neuroscience will change our identity as social psychologists. If we are interested in contributing to knowledge about the brain and how it works, are we still social psychologists? I find such discussions unhelpful, perhaps because I utilize sample methods and theories from various disciplines. But I believe I am a better scientist when guided by my interests and enthusiasm, and I don't allow identity considerations to dictate what I will study. My goal might not be to contribute to knowledge about the brain, but I might do so anyway. And if I am so lucky that such a nugget is my lasting contribution to science, then so be it. It is not as if we decide what our contributions are anyway. Our peers do.

With social neuroscience, we may be entering a new era with the potential to carry our field far in understanding the social mind and its relation to the brain. Of course, it could just be a fad. But already there is evidence that social neuroscience investigations can shed light on old debates, and perhaps force us to focus our theories less on abstract concepts (like "prejudice" or "emotion") and more on the component processes, and thereby aid theory-building.

Social neuroscience is exciting for its possibilities, challenging for its many new things to learn, and frustrating for its resource requirements on a scale unfamiliar to many of us. Whether or not it teaches us new things about the social mind, it will surely help us view our field in a new way. From my perspective, that definitely makes it worth the investment.

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Social Neuroscience Symposium

Saturday, May 31, 1:30 – 3:00 pm

Organized by the

National Science Foundation & National Institute of Mental Health

Participants

John T. Cacioppo, The University of Chicago

Matt Lieberman, University of California, Los Angeles

Nathan Fox, University of Maryland

A special Social Neuroscience poster session will be held in conjunction with this symposium.