



The Job Market

Peering Inside the Social Brain

What makes it possible for people to love, hate, help, or betray one another? How do we decode facial expressions? How do we understand and regulate our own emotional experiences? How do we separate the self from the other, make moral judgments, or decide how much

money to save for retirement? What causes some people to turn to religious extremism, heroin, or politics? How does the brain fail those with social deficits such as autism?

Over the past decade, the social neuroscience career trajectory has evolved quickly.

Questions like these sit at the junction of our social, emotional, and biological realities, and they drive the young but rapidly growing field of social neuroscience.

Until a few years ago, the idea that science could elucidate the neural foundations of social phenomena as complex as love, friendship, and trust “just basically seemed ludicrous,” says Janine Simmons, chief of the National Institute of Mental Health’s (NIMH’s) program for affect, social behavior, and social cognition. Such “big questions” motivate many scientists to study neuroscience or psychology, she says – but soon they realize that the ability to address such questions is limited by technology. “It’s just recently that people have not been laughed at for taking on these more complex questions,” she says.

Scientists seeking to understand the neural mechanisms underlying social cognition and emotion have drawn on a variety of methods, including studies of patients with neurological damage and single-cell recording of brain activity in nonhuman animals. These research tools have proven valuable, but it was the ready availability, starting about a decade ago, of functional neuroimaging technology that fueled an explosion in social neuroscience.

An exciting field, with limitations

When it became available for social science research, functional neuroimaging – which enables scientists to observe the brain in action – immediately appealed to social psychologists, and it immediately started to yield robust results. “Every year there is some finding that fundamentally shakes up how I think about the social brain,” says University of California, Los Angeles, social psychologist Matthew Lieberman. “Within a very mature field like cognitive psychology, you’re not going to see that. That’s exciting – it makes you want to get out of bed in the morning and see what you’re going to learn.”

Neuroimaging, says Boston College social psychologist Lisa Feldman Barrett, allows scientists to tease apart the neural “ingredients” of complex psychological processes, which is hard to do by studying behavior alone. “Imagine that you wanted to study how bread was made and all you could do was taste bread,” Barrett says. “You couldn’t really watch how the ingredients interacted with each other. You wouldn’t really know much about how bread was made, and you’d have to guess a lot.” The combination of behavioral and neuroimaging studies, she says, continues to provide a window into otherwise invisible mental processes.

Still, any careful researcher will tell you that functional neuroimaging has important limitations. One is that no single technology can reveal instantaneous changes in the activity of individual neurons, or even small populations of neurons, throughout the whole brain. Another is that the most widely available methods – functional magnetic resonance imaging (fMRI) and event-related potentials (a variation of electroencephalography) – reveal only how brain activity and behavior are correlated; their ability to demonstrate cause and effect is limited. Consequently, researchers need to be careful not to ascribe causality without justification, cautions University of Virginia social psychologist James Coan. “The critical issue is good logical theory and logical arguments about what the data are showing. Technology is not going to save us from that.”

Another hazard for scientists armed with shiny new techniques is a tendency to miss or ignore what has come before. Dartmouth College social psychologist Todd Heatherton notes, “It’s all too sad to see neuroscientists thinking they invented a concept, such as people working harder in the presence of others, when we have known about social facilitation for more than a century.”

Rapid growth



(Stuart Wolpert, UCLA)

Over the past decade, the social neuroscience career trajectory has evolved quickly. When Harvard University social neuroscientist Jason Mitchell was starting out, he says that “there was all sorts of anxiety about whether what we were doing was even going to gain any kind of toehold in the field, or whether it was some weird, freakish sideshow.” Scientists often had to book magnet time in the middle of the night when busy hospitals could spare the equipment. “I joke with my students about how I had to walk uphill both ways to get to the scanner,” he says.

Those days are long gone. As the cost of high-resolution brain scanners dropped over the course of the 8 to 10 years, universities snapped them up for research. “Every year there would be twice as many scanners as the year before,” Mitchell says.

The field’s scholarly footprint has grown with the number of scanners. Today, the field boasts two scientific societies (the **Society for Social Neuroscience** (<http://s4sn.org/drupal/>) and the **Social and Affective Neuroscience Society** (<http://www.socialaffectiveneuro.org/>)), and two specialist journals (**Social Neuroscience** (<http://www.psypress.com/social-neuroscience-1747-0919/>) and **Social Cognitive and Affective Neuroscience** (<http://scan.oxfordjournals.org/>)). Stand-alone meetings draw hundreds of scientists. Social neuroscience research regularly appears in



(Barry Richmond)

Janine Simmons

Matthew Lieberman

high-impact journals such as *Nature*, *Science*, and *Neuron* and has been a subject of intense -- if sometimes insufficiently critical -- interest from the popular media. Four of the five recipients of this year's **Janet Taylor Spence Award for Transformative Early Career Contributions** (<http://www.psychologicalscience.org/observer/getArticle.cfm?id=2661>) are social neuroscientists.

Job opportunities in social neuroscience have expanded, too. Most top psychology departments in the country have hired at least one social neuroscientist, and many departments have hired several. In addition, a number of universities have hired a cluster of scholars working in the closely allied field of neuroeconomics, which deploys neuroimaging methods to study economic behavior.

Heatherton predicts that as more universities build imaging centers, the demand for scientists who use neuroscience methods to study social psychological questions will increase further. And even now, "There are more good jobs than there are qualified people available for those jobs, in part because the best candidates are still receiving training," he says.

At the same time, the field is becoming more intellectually sophisticated and more challenging. "Our students have to be smarter and work harder than we did," Lieberman says. "There's going to be less and less low-hanging fruit, and when you go and interview for a job, there might be someone sitting in the audience who actually knows something about this work and can evaluate it."

Still, no formal social neuroscience graduate programs exist in the United States, although many universities have developed informal training tracks. The best, Heatherton says, provide interdisciplinary training by blending deep, expert, classical social science training with training from neuroscientists in imaging techniques. Less ideal are training programs in which social psychologists or economists provide the imaging training, or in which neuroscientists who aren't trained in social psychology or economics are responsible for training others in those fields. Even after the most rigorous interdisciplinary graduate training, it's often necessary to seek a postdoc to fill in gaps.

Learn more about social neuroscience

Listed here are a few important papers in social neuroscience, which have increased our understanding of a range of social phenomena, including knowledge about the self, fear, social exclusion, and inferences about others. Access from the publisher's site may require a subscription or site license. Some papers are also available on the authors' Web sites.

Kelley, W. M., Macrae, C. N., Wyland, C. L., Caglar, S., Inati, S., & Heatherton, T. F. Finding the Self?: An Event-Related fMRI Study. *Journal of Cognitive Neuroscience* (<http://www.mitpressjournals.org/doi/pdf/10.1162/089989290260138672>), 14, 785 (2002).

Adolphs, R., Gosselin, F., Buchanan, T. W., Tranel, D., Schyns, P., & Damasio, A. R. A mechanism for impaired fear recognition after amygdala damage. *Nature*, **433**, 68 (<http://www.nature.com/nature/journal/v433/n7021/full/nature03086.html>) (2005).

Eisenberger, N. I., Lieberman, M. D., & Williams, K. D. Does rejection hurt? An fMRI Study of Social Exclusion. *Science*, **302**, 290 (2003) (<http://www.sciencemag.org/cgi/content/full/302/5643/290>).

Mitchell, J. P., Macrae, C. N., & Banaji, M. R. Dissociable Medial Prefrontal Contributions to Judgments of Similar and Dissimilar Others. *Neuron*, **50**, 655 (http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6WSS-4K00CW1-H&_user=10&_coverDate=05%2F18%2F2006&_rdoc=1&_fmt=high&_orig=search&_sort=d&_docanchor=&view=c&_acct=C000050221&_version=1&_urlVersion=0&_userid=10&md5=9337a6597a64a6a48ab7f) (2006).

Building collaborations

Cutting-edge social neuroscience demands expertise in a wide range of fields, from social psychological theory and measurement to neurobiology and physics. The only way to achieve the necessary breadth without sacrificing depth is to build stable, interdisciplinary collaborations. "If you tried to do everything yourself, you'd just go crazy," Coan says. "The old model of the young faculty member who goes out and establishes his or her name with a theory and publishes a bunch of papers, ... a person just can't do that without jettisoning their quality of life."

The best way to become interdisciplinary is to become expert in one area first, then learn from colleagues in other disciplines, says social psychologist John Cacioppo of the University of Chicago in Illinois. "If you're not an expert in something, you have very little to offer an interdisciplinary group. Over time, you can become an expert in multiple areas."

As in any multidisciplinary field, communication skills are essential. "You have to learn to speak many scientific languages, because neuroscience is itself a multidisciplinary kind of field," Barrett says. For example, some neuroscientists work on rats, she notes, others with clinical patients, and still others on normally functioning brains. Even though her own work doesn't include nonhuman animals, she has to be able to read that literature and understand it. That isn't easy because, for one thing, parts of the brain are not labeled consistently across species. "It's not like somebody published a list of translations. You have to learn this along the way."

Cacioppo points to one more skill that's essential for doing team science: a tolerance for feeling ignorant. "There's a real level of tension that you have to be able to put up with as you learn," he says. "You feel like you're an expert, and then you dive into something you know nothing about. That's hard."

People and other vital resources



"It's not just about access to a magnet. That's the easy part," Coan says. More important is access to people: collaborators, students, and technical staff.

It's also important to work in a department that rewards scholarship in a way that's appropriate to the interdisciplinary nature of the field. "If I'm requiring someone to publish by themselves, I'm interfering with great interdisciplinary research," Cacioppo says.



(Mark Karlsberg)

Lisa Feldman Barrett



(Courtesy, James Coan)

James Coan

The time to find out what resources a department can provide is when you're interviewing. "Places that can support this kind of work know what it needs," Coan says. Be firm about your basic needs. If your department doesn't already employ technical personnel for neuroimaging, for example, "You need to negotiate a startup package that includes technical staff for at least 3 years. Then you need to get right on that grant-writing horse and ride away."

Money

Compared with other areas of behavioral science, social neuroscience is well funded. The National Institutes of Health have provided more funding for social neuroscience than any other public or private funder, and in the last several years, at least half a dozen NIH institutes have issued requests for applications specifically in social neuroscience.

The National Science Foundation also has a significant investment in social neuroscience, which it funds through its social psychology and cognitive psychology programs. Private funders such as the **Templeton** (<http://www.templeton.org/>), **Rockefeller** (<http://www.rockefellerfoundation.org/>), **McDonnell** (<http://www.jsmf.org/>), and **Dana** (<http://www.dana.org/>) foundations have embraced areas of social neuroscience from the study of positive emotions to examinations of pandemic disease transmission.

Social neuroscience researchers successful in winning NIH grants tend to demonstrate interdisciplinary strength, NIMH's Simmons says. "In my ideal world as a program officer, what you would get is either individuals or groups of people who bring incredible strength in the historical depth and theoretical framework of social psychology together with what we know about how neurobiological systems and circuits work," she says.

Simmons also notes that scientists applying for social neuroscience funding at NIH institutes should demonstrate that they've been careful in designing experiments, that the studies they propose are feasible, and that they are aware of the limitations of neuroimaging methods. Because NIH does not yet have a study section dedicated specifically to social neuroscience, she recommends spelling out what gaps in the literature your proposal helps fill and why it's important to do so. "Because this field is new, people may not know what's new and what's not new," she says.

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