(De)Localizing Social Neuroscience: Reconstituting the Social Brain within a Social World

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Abstract

Cognitive neuroscience has become one of the most cutting-edge fields in technoscience across the globe. Now entering an exciting era is a sub-discipline known as social cognitive neuroscience (SCN), or the biologically grounded complement of social and cognitive psychology focused on the neural basis of human thought and social behavior. Combining ethnographic fieldwork with concepts that have risen out of previous studies in the cultural anthropology of science and technology, this case study of the Social Cognition Laboratory (SCL) examines the everyday space, practices, and individuals that give rise to the contemporary world of SCN. By rendering science and technology cultural activities that may be critiqued through an anthropological lens, I orient SCN as a scientific subculture that is simultaneously enculturated. This exercise in the demystification of this dominating and popularly imagined discipline seeks to accomplish two goals. First, I illustrate the nuances inherent to this emergent field of “hard” technoscience, which seeks to shed light on aspects of the social world that have been historically subject to investigation by the social sciences and humanities. Second, I challenge prevailing, computer-based epistemologies of self and world produced by concepts and research in SCN. Addressing how these understandings are historically constituted, culturally constructed, and inherently fluid is critical in so far as brain-based notions of personhood continue to guide modern conceptions of self and the social world.
To my loving parents,
Thank you for never questioning my passions.
List of Figures

FIGURE 3.1 “AMERICAN SOCIETY” SCM ........................................... 63

FIGURE 3.2 SCM EMOTIONS ............................................................. 68

FIGURE 3.3 SCM STEREOTYPES ...................................................... 69

FIGURE 3.4 RAW DUKE COMMUNITY SCM .................................... 73

FIGURE 3.5 DUKE COMMUNITY SCM ............................................. 74
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Introduction
Constructing a Neuroethnography

“My imploded story insists on the inextricable weave of the organic, textual, [and] mythic... threads that make up the flesh of the world” (Haraway 1995: xii).

An Everyday Laboratory

Tucked away in a tiny basement hallway of the university’s lavish cognitive neuroscience research facility is the Social Cognition Laboratory. Both young and assuming, SCL occupies the first and smallest space of the four cognitive neuroscience laboratories hidden within the confines of this underground sanctum. To enter the narrow hallway leading to SCL requires that a visitor or research participant— a college student I’ll call “Mary”— dial the laboratory’s seven-digit phone number from the outside of a card-access-only doorway.

“Hi, this is Mary. I’m here for the 2:30 social decision-making study.”

“Sure. I’ll be right there,” the laboratory manager quickly responds.

Within seconds, Mary is led through the hallway and into the first door to the right. To an unfamiliar eye, the space before Mary is curiously plain—not at all the scene one might imagine upon hearing the words “neuroscience laboratory.” As this phrase typically evokes a set of predictable clichés—larger-than-life imaging machines, Matrix-looking electrode caps, even clear glass jars filled with preserved cerebral hemispheres and life-generating spinal cords—the space is perhaps even disappointing. That is to say, there is

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1 The Social Cognition Laboratory is a pseudonym for the primary field site of this ethnographic project. While I will also refer to its members, my informants, under pseudonyms, the university and research facilities through which I conducted this project will remain unnamed.
nothing particularly “sensational” about this neuroscience laboratory. Of course, when collecting brain data, participants are escorted to separate facilities that house spectacular fMRI scanners and MEG electrode machines, but the SCL quarters themselves boast none of these technologies. In truth, no cognitive neuroscience laboratory actually resembles this popularly imagined vision of what neuroscience is, or is supposed to look like. However, this sharp distinction between popular culture’s construction of neuroscientific fantasies and the unassuming space that reflects everyday reality opportunely positions cognitive neuroscience and the SCL laboratory as a subject and field site that warrant anthropological considerations.

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Macintosh desktops fastened to long countertops trim three walls of the main, rectangular room in which Mary stands. One of these walls has been painted a bright, ocean blue and decorated hastily with seemingly incongruous artwork—random hanging images including a photo of a newborn baby and painting of a dog. This artwork, of course, by virtue of its relation to specific individuals within the lab, hints at a kind of solidarity and intimacy that unites each SCL member under the common laboratory space. Overhead shelves are piled with stacks of academic papers and research-related knick-knacks: plastic golden trophies (left over from an old behavioral study), technical textbooks, and colorful manila folders. Other corners of the room house a printer, metal filing cabinet, and white erase board. Smoggy fabric carpets the floor.

2 Functional Magnetic Resonance Imaging; Magnetoencephalography
3 See further explanation in Footnote 4.
Between the entrance and the main space are two smaller experimental rooms separated by a white wall and one-way mirror. After completing the necessary pre-experimental forms, Mary is escorted to one of these two rooms, where she is presented with a laptop and rudimentary task instructions. The experimenter then leaves Mary to complete the experiment.

Back in the main room, the SCL researchers continue work on their respective research. Review papers, SPSS files, and Excel spread sheets decorate the computer monitors. For the most part, research time is silent (many of the researchers work with headphones in their ears)—but this social cognitive neuroscience laboratory is also quite social. In addition to intellectual, collaborative discussions on topics in social cognitive neuroscience, laughter from funny weekend stories and YouTube videos of endearing animals is habitual.

After an hour or so, Mary exits the experimental room.

“I think I’m finished—the computer screen said I should get the experimenter.”

“Great. There is just one last piece of paperwork you need to fill out.”

At this point, Mary is “debriefed”—a process that involves looking over a one-page document explaining the intentions of the experiment and a signature from the participant. If Mary is feeling curious, she may ask the experimenter additional questions about the intentions behind the study. However, she is free to leave at this point. And within minutes, the experimenter begins preparing for the next participant.

Mary represents one of the hundreds of research participants who have encountered the Social Cognition Laboratory, the university’s first and only laboratory of social cognitive neuroscience (SCN), or “social neuroscience” for short. SCN is an emergent
branch of cognitive neuroscience that combines paradigms in social psychology with techniques in cognitive neuroscience (with contributions from fields like developmental psychology, genetics, evolutionary anthropology, and behavioral economics). The chief purpose of the field is to investigate the biological underpinnings of the “social mind,” or the neural structures, mechanisms, and processes associated with human social behavior.\(^4\)

**Constructing a Social Neuroethnography**

Social Neuroscience is the subject of this thesis, and the Social Cognition Laboratory is the field site where I have based my ethnography. My project examines the world of social neuroscience as an alternative, imagined space through an exploration of the individuals and activities that construct—and sustain—the actual, everyday world. Combining my ethnographic fieldwork with concepts that have risen out of previous studies in the cultural anthropology of science and technology, this exercise in the demystification of neuroscience orients social neuroscience as a scientific subculture that is simultaneously encultured.

Though worth stating, the argument that social neuroscience can and should be subjected to cultural investigations is, at this point, redundant. The mere existence of fields like the cultural anthropology of science and technology—devoted specifically to conceiving scientific knowledge and communities as deeply cultural—highlights the

\(^4\) SCN spaces may seem especially basic or “everyday” compared to other fields within the cognitive neurosciences precisely because of its foundation in social psychology. Before turning to expensive neuroscientific methodologies that demand exhausting grant writing for university and national funding, social neuroscientists must ground their brain imaging proposals in relatively simple behavioral psychology experiments that require nothing more than a) a laptop computer or paper and pencil for recruited participants and b) enough computers and workspace for the laboratory team to complete their research and statistical analyses. The coincidence here is this everyday social neuroscience laboratory simultaneously seeks to shed light on the everyday social world.
widespread acceptance of this viewpoint. For decades, cultural anthropologists have pushed to bring the cultural anthropology of science and technology into conversation with the establishment of science and technology—and the associated fields of informatics and biomedicine. This effort was driven by the fact that unlike other academic disciplines, the hard or so-called “real” sciences have historically lacked their own hermeneutics.5 6

Understanding social neuroscience as encultured enables us to make critical reflections about everyday epistemologies of self and society that could not and perhaps would not be made otherwise. Cognitive neuroscience, the broader field of neuroscience of which SCN is a part, has become one of the most exciting, cutting-edge disciplines in science across the globe. Born out of the Cognitive Revolution of the 1950s, 1960s, and 1970s, cognitive neuroscience has become a fascinating subject of cultural inquiry in the way that its computer-based metaphors and larger-than-life brain imaging technologies are redefining personhood. Social neuroscience is built on the premise that these metaphors and technologies are not limited to explorations of the self, but also applicable to investigations of the self in relation to others. That is to say, SCN is also redefining the ways through which we understand society at large.

For me, this novel use of a hard, technoscience as a lens into the social world is riveting. Historically, the so-called hard and social sciences have been marked by distinct epistemological approaches. While the former can be described as “an experimental

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5 Throughout this project, I will primarily use hard science to refer to what many call “natural” or “real” science. For me, the latter two terms are largely problematic in the more fundamental hierarchies they imply. To clarify, my use of hard science refers to traditionally physical disciplines like biology, chemistry, physics, geology, and so forth. By virtue of its foundation in physiology, physics, and chemistry coupled with its increasing authority and presence, contemporary cognitive neuroscience is also considered a hard science.

6 See Emily Franklin, “Science as Culture, Cultures of Science (1995)
science in search of law,” the latter is perceived as an “interpretive one in search of meaning” (Geertz 1973: 5). And while the hard sciences have been an exploratory topic in the humanities, the Western scientific institution has not piqued interest in the humanities as a worthy (and possible) subject of interest.7

In this vein, social neuroscience is a pioneering example of a hard science built around the premise that socio-cultural and scientific spheres are connected and navigable on a singular plane. In spite of the essentialist threats this field poses to contemporary understandings of our complex social world—the risk of reducing social behavior to reductive models and constituting social behavior as biologically fixed or determined—I hold an optimistic view. At its core, social neuroscience is a compelling step in breaking down the hierarchies that have historically allowed hard scientists to distinguish themselves as separate and above their counterparts in the humanities. By exploring social questions through a new neuroscientific lens, we are also opening ourselves to new ways of understanding the social world.

The process of breaking down this historical binary, however, cannot happen overnight. It is an active, ongoing process that requires effort and reflection from those within and outside of the field. By the same token, unraveling the ways through which the encultured quality of social neuroscience—the traditions, beliefs, and assumptions that guide research in the field—has informed our understanding of social behavior and society at large is an equally important process. Here, I subject social neuroscience to a culture-
based critique in so far as to expose: 1) the encultured beliefs and naturalistic assumptions that anchor cognitive neuroscience to its high ranking position among prevailing ideologies of self and world and 2) the conundrums inherent to this reconstitution of social behavior as a scientific subject. Through this investigative study, I assert that although and precisely because a field like social neuroscience now exists, we must not ease the force with which we challenge notions of self, society, and the epistemologies that construct them. These ideas are fluid, continually shifting, and culturally constituted.

Chapter Overview

The questions that arise from this emergent intersection of science and social lend themselves to four corollaries. Each of the following chapters is structured around one of these subthemes. Drawing from my fieldwork-based exploration of these questions, I intend to shed light on the authoritative yet encultured ways through which SCN is guiding contemporary notions of self and society—and the considerations necessary to further these understandings.

(1) Where is science located? How are those sites isolated from the surrounding social world? How are social worlds reproduced within theses spaces?

My investigation will begin with an examination of the material SCL workspace—the laboratory itself. The notion of locality is important to consider because social neuroscience calls the spaces to which scientific and social worlds have traditionally been designated into question. In the first chapter, I demonstrate how social neuroscience

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8 My use of "science" here refers to what I have defined as the hard sciences or Western scientific institution. My use of "social" refers to the social sciences or humanities. I will use this construction—the science and the social—frequently throughout this project.
renegotiates these historically constituted spaces. The reproduction of the external social world within the internal laboratory space through SCN illuminates fundamental dichotomies like science/social, material/imaginary, and authentic/inauthentic, which draw further attention to the naturalized assumptions that underlie neuroscience-based notions of the social world. However, this renegotiation of historical space is unidirectional in so far as the scientific world is still protected within traditional institutional spaces. The purpose of this initial exercise is to highlight the ways in which social neuroscience most visibly operates under a Western, scientific hegemony, despite the “social” label. Understanding the embeddedness of SCN within this institution is critical in unpacking the naturalized assumptions that ground SCN.

(2) What kind of rhetoric characterizes SCN? How can we re-think the computer-based metaphors that distinguish the field?

Next, I shift focus to the one-directional flux of rhetoric in SCN. The language and metaphors that dominate social neuroscience—namely the information processing models and computer metaphor of brain function—are almost entirely neuroscientific. Acknowledging that social neuroscience is foremost a branch of neuroscience, I still argue that in order for a field of neuroscience to appropriately make claims about the nature of the social world—or at least recognize its own encultured existence—it must adopt a more social metaphor. By drawing parallels between themes in SCN and globalization discourse, I posit a new understanding of the human brain as a symbol of our highly globalized and increasingly socialized world. I argue that this novel trope lends itself to deeper understandings of the social brain while simultaneously showing how SCN technologies and the SCL subculture are extensions of the social world.
(3) *What epistemological traditions are put at stake through this interdisciplinary collaboration? Where can compromises be made?*

While the first part of my thesis aims to spell out the ways through which cultural values and prevailing assumptions fortify scientific authority, the second half is concerned with potential contributions of this cross-disciplinary initiative towards improved understandings of the social world. I begin with an examination of my own social neuroscience study as an example of how epistemologies that have historically guided the humanities are put at stake through the integration of reductive SCN models. Here, I investigate the value of the Stereotype Content Model (SCM), a theoretical tool in social psychology that categorizes social groups based on dimensions of warmth and competence (Fiske et al. 2002). For this experiment, I surveyed Duke University undergraduates about their perceptions of thirteen groups on campus (professors, health care providers, janitorial staff, etc.) and succeeded in producing a campus-specific version of the SCM. In this third chapter, I subject this model to an anthropological critique. Building on Certeau’s notion of the mapped city, I draw attention to inherent reduction of social world complexity through the construction of this model. Contrary to cultural anthropology’s opposition to reductionism, however, I insist that the simplistic nature of this model is actually useful in that way it makes societal prejudice visible, material, and subject to change. Adapting Spivak’s notion of “strategic essentialism,” I argue that the benefit of this kind of model can be understood as “strategic reductionism,” for the sake of a larger social mission.⁹

⁹ Thanks to my advisor Heather Settle for contributing this idea.
(4) Where must social neuroscientists be skeptical and cautious?

In the final chapter, I explore a crucial site where long-standing debates on philosophies of personhood are being stirred through by social neuroscience: the American courtroom. SCN, in addition to fields like behavioral genetics, have been conjuring questions of free will, human agency, moral accountability, and ethics in recent years—debates that are especially meaningful to judgments of criminal responsibility in the U.S. legal setting. Exploring the misinterpretation and misuse of neuroscientific evidence in the courts, I show that the U.S. criminal justice system is a space where reductionist ways of understanding should not be welcomed, as judgments made on the basis of these incomplete portraits can seriously alter the outcome of human lives. Here, I also demonstrate that the responsibility to combat the misuse of brain evidence —both in terms of research practice and courtroom application—chiefly rests on the shoulders of the SCN researchers (a pressing accountability that has already been recognized through the development of fields like neuroethics). I conclude with a brief comparison of the Western neuroscientific institution and the U.S. criminal justice system, rendering them historically separate cultural forces that pose clashing answers to the same fundamental questions about human existence (i.e. free will). This institutional contrast is important to consider on cultural terms and it underscores the way in which differentially encultured ideologies lend themselves to distinct understandings of personhood and society.

Methodologies and Informants

To answer these research questions, I performed an ethnographic study of the
Social Cognition Laboratory from August 2012-March 2013. My fieldwork is chiefly comprised of semi-structured interviews with members of the laboratory, reflections from weekly SCL meetings, and my own, independent study in social neuroscience.

While a popular discourse analysis and extensive literature review formed the framework for this project, my field interviews have given life and substance to this cultural account of social neuroscience. I interviewed 10 undergraduate, graduate, and post-graduate researchers in the laboratory, the majority of whom will be introduced in the subsequent pages under pseudonyms. Their unique interests in the decision-making, stereotyping, legal, and evolutionary facets of SCN have shaped a collective culture within SCL. The distinct academic backgrounds (social psychology, evolutionary anthropology, law, and so forth) and life experiences of these researchers have painted a diverse and comprehensive portrait of social neuroscience—not only in the context of my field interviews, but also at the weekly SCL group meetings.

Despite the breadth of my one-on-one interviews, these weekly laboratory meetings gave the best picture of this laboratory culture. “Lab meeting” functioned as a regular space for all members and interested parties to discuss thought-provoking publications, for SCL members to present individual research findings, and for the group to discuss new research initiatives. Most importantly, these meetings enabled me to gain a sense of both individual personalities and collective values through discussions of common interests and collaborative endeavors.

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10 See Literature Review for more explicit reasons for why laboratory culture can and should be subject to ethnographic investigations.

11 See Roots of SCN for a more comprehensive overview of the field and its primary research domains.
As both a member and observer of SCL, I also had the unique opportunity to construct and perform my own social neuroscience experiment, which I will specifically explore in Chapter 3. This third fieldwork component can best be described in a series of four stages: 1) devising my own campus-specific version of the Stereotype Content Model study 2) actually distributing the pen and paper surveys and recording the results; 3) statistically analyzing my research findings; and 4) reflecting critically on the anthropological significance of this model and process.

Collectively my interviews, weekly laboratory meetings, and independent research project provide the pillars for this ethnographic account of social neuroscience. Before delving into the actual chapters, however, I must outline the roots of SCN and provide a brief anthropological literature review so my research subject and method of critique may be situated within appropriate disciplinary contexts.

**The Roots of Social Neuroscience**

Social neuroscience is a cultural and historically constituted way of understanding humans as social beings. By this definition, the naturalized “truths” generated by the field are also the product of long-standing Western European and North American histories (McGee and Warms 2008: 532). The purpose of this brief historical overview is not only to contextualize the relatively short history of the named discipline, but to also to recognize that SCN-based knowledge like that of any other discipline must be continually considered and reconsidered as subjective outcomes of encultured histories.

The popularization of the phrase “social neuroscience” can be traced back to 1992, after US Congress declared the 1990s as the “decade of the brain.” Cacioppo and Bernston
published a paper titled “Social Psychological Contributions to the Decade of the Brain,” which articulated the pressing need for a “multilevel, integrative approach” to studying the biological basis of human behavior during the early imaging era and an exciting time in the history of neuroscience. “The brain does not exist in isolation,” they wrote. “But rather, is a fundamental component of developing and aging individuals who themselves are mere actors in the larger theater of life” (1992: 1019). For humans, the “theater of life”—throughout life—is foremost social. From an evolutionary perspective, it is precisely social cognition—our impressive ability to cooperate, plan ahead, and employ complex language systems—that has enabled our species to survive and develop into the socially advanced and dependent beings that we are today. Through novel brain-imaging interventions, scientists believed they finally possessed the tools to tap into that mystic and enabling mind space.

Twenty years later, social cognitive neuroscience has developed into its own academic field. Grounded in theory borrowed primarily from social psychology, but also developmental psychology, behavioral economics, genetics, and evolutionary anthropology, SCN offers a new, physiological dimension to the socio-cultural and psychological basis of emotion, cognition, and behavior—a popular triad used to define the meaning of social in the neuroscientific context. Primary research domains in the field have come to include emotion regulation, stereotyping, and social decision-making—which collectively work to illuminate the ways through which human beings navigate the social world.

Although SCN is actually decades old, the advent of functional neuroimaging in the early 2000s propelled the field through a phase of “rapid expansion” marked by several key milestones (Lieberman 2007: 260). The most important achievement came in 1999 and
2000, when funding from national agencies first became available to SCN (a critical launching factor for any emergent discipline). The first standalone meeting dedicated to the topic took place the following April (2001) at UCLA and was initiated through support from not only psychologists and cognitive neuroscientists but also individuals from fields like political science and anthropology. The first job-listings for positions with a specified focus on SCN were at Dartmouth in 2000 and Columbia in 2002, and by 2006, postings for social psychology jobs with a focus on SCN had become common in the academic circuit. Soon, undergraduate courses and graduate programs in SCN and related topics began appearing everywhere. Other major moments include the publication of the first volume of the Journal of Social Neuroscience in 2006 and the first annual review paper of SCN in 2007 (Oschner 2007: 44).

In addition to the specific history of SCN as an academic discipline in its own right, cognitive neuroscience is also a deeply inscribed product of even longer-standing histories. In the following paragraphs, I will briefly describe the origins of contemporary brain-mind philosophy, the now-debunked discipline of phrenology, and the Cognitive Revolution of the 1950s-70s, as they have largely contributed to contemporary beliefs in cognitive neuroscience.

The first written account of the brain dates back to the Edwin Smith Surgical Papyrus of the ancient Egyptians. Despite being the first to acknowledge the brain on paper, the Egyptians viewed the heart as the emotional and intellectual center of the human body—disregarding the role of the brain altogether. Aristotle, too, believed that that mind

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12 “Social Cognitive Neuroscience: A Review of Core Processes” (Lieberman 2007)
was located within the heart (Gross 1999). That is to say, the window into the mind was not always the brain. The prevailing understanding of mind and brain as separate but connected entities can be traced to Descartes (1641), who believed the mind and body were mediated through the pineal gland in the brain, or the “seat of the soul.” The mind, for Descartes, was the essence of self—a wholesome thinking object that “doubts, understands, [conceives], affirms, denies, wills, refuses...imagines, and feels.” And for psychologists and neuroscientists today, the brain is the material site through which very similar notions of that mind can be investigated. The difficulties associated with this Cartesian understanding are commonly referred to as a single “problem of consciousness.” In other words, can we truly ever “get inside” another’s mind? With the premise of cognitive neuroscience being that the brain can actually tell us something about the mind (or the psychological processes associated with it), solving this problem is a central premise for cognitive neuroscientific investigations.13

Moving past foundational philosophy, one of the most critical theories in the history of brain science is phrenology, the now pseudoscience that was at one point the most popularized “science” of the nineteenth century. Phrenology drew from both an anatomical and physiological premise to allocate distinct areas of the brain, specific dispositional attributes (domesticity, amativeness, sublimity, etc.). This tradition was one of the first in science to suggest that human behavior could be best understood through the purview of neuroscience rather than philosophy or religion. More importantly, although the theory is effectively debunked, underlying cortical localization has remained a lingering trend in the

13 See Meditations on First Philosophy (Descartes 1641)
cognitive neurosciences (although theories have shifted from regional nodes to network understandings of brain processes) (Gould 1981: 22).

The final historical moment I must mention is the Cognitive Revolution of the 1950s, 1960s, and 1970s—the intellectual and historical moment to which the birth of modern cognitive neuroscience can be attributed. In addition to a shift from behaviorism to cognitivism—the idea that internal mental states and underlying brain processes guide human behavior—emerged growing support for information theory (i.e. communication channel efficiency), the computer metaphor of the mind (which renders the mind and its “algorithms,” the software, and the brain, the hardware), and rapid developments in Artificial Intelligence (Labar 2012). These advancements, which drew interest through the 1950s and 1960s, helped sustain cognitive neuroscience as its own academic discipline during the 1970s. These theoretical models for understanding human behavior and cognition still dominate all domains of cognitive neuroscience, including social neuroscience, and will be subject to my own critique through the pages of this analysis.

Having provided some basic neuroscientific background, I will conclude my introduction with a brief anthropological literature review. In the following section, I intend to demonstrate my knowledge of the anthropologists and associated theorists whose work foregrounds this project while placing my ethnographic study into conversation with ideas that are guiding the cultural anthropology of science and technology.

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14 Behaviorism refers to a trend in psychology that effectively ended in the 1950s (with the emergence of cognitivism and in response to vehement efforts from forerunners of the Revolution like Noam Chomsky). Behaviorist believed that only directly observable behavior, not internal mental states, could be studied through science. Cognitivists not only believed in the existence of these mental states, but also that they could be tapped into and explored.
Literature Review

The cultural anthropology of science and technology can be traced back to the 1990s, when a widespread initiative supporting the study of science and technology (STS) (Jasanoff, Markle, and Peterson 1995) converged with 1970s-based feminist critiques of biological fact (Strathern 1972) (Weiner 1976) and challenges to the “thoroughly encultured generic conventions” of so-called real science that emerged in the 1980s. As I previously explained, this movement was largely driven by the lack of hermeneutics that has helped sustained the popular conception of hard science as “objective truth” rather than “a source of cultural values that are deeply felt” (Franklin 1995: 165).

In the context of this project, Harway (1985) and Latour (1987) are perhaps the most influential of these later theorists who sought to challenge generic, scientific conventions. Latour’s application of the black box metaphor to the mystic construction of scientific fact asserts that despite its supposed neutrality, science is a subjective process “in the making” that warrants unhinging and exposure. This idea, of course, is the foundational premise for this thesis. Latour’s concept of “inscription devices,” or falsely objective scientific visuals (charts, graphs, and in this case, functional brain scans), is also applied to this investigation of SCN. Haraway’s argument that the very growth of technology in this “informatics of domination”15 offers feminists and opportunity to engage beyond essentialist debates and truly question what it means to be female is also relevant. I loosely apply this notion to my own critique of SCN’s role in defining what it means to be a social

15 The “informatics of domination” refers to this technoscientific period of late-capitalist expansion in which historical, white, patriarchal hegemonies like the Western scientific institution itself are stronger than ever.
human being. These theorists, along with anthropologists like Traweek, Martin, and Dumit, whose works I will describe below, have proven that cultural anthropology does indeed have “the tools to understand ‘real’ science as a form of culture” (Franklin 1995: 165).

Following this understanding, there are two crucial aspects to this ethnography of social neuroscience: the study of science and technology as cultural activities and the ways through which the field of social neuroscience gives produces and reflects prevailing understandings of the social world (Downey 1995). In the context of this project, this means unraveling encultured social neuroscience epistemologies and technoscience-based notions of self and world. However, I did not come up with these questions on my own. These themes are the products of specific theoretical trajectories that have converged in recent decades, which I will describe in the following paragraphs.

Cultural anthropologists have taken to a myriad of sites in establishing the cultural anthropology of science and technology. Indigenous communities, urban hospitals, modern clinics—and scientific laboratories—have lent themselves to diverse works of ethnoscience. Traweek’s pioneering ethnography of high particle physicists (1989) first introduced the laboratory as a compelling community and field-site for investigating science as culture. Combining the Geertzian notion of “local words” with Latour’s concept of science-in-the-making, Traweek broadened understandings of “cultural” to simply mean “local strategies of making sense” (Traweek 1989: 1). For Traweek and those who followed suit through more multi-sited approaches (Gusterson 1995) (Rapp 2000) (Dumit 2011) (Roberts 2012), the common practices and shared values among local communities of scientists have functioned as a meaningful window into wider institutional beliefs and cultural norms.
Additionally, there are a few principal scholars I must mention, whose works have directly contributed to the understanding of science, technology, and biomedicine as actors that participate in the making of both physical and social identity. Martin’s (1995) examination of the immune system as needing to be “strong and flexible,” focuses on the ways in which this value-assigning, corporeal rhetoric is deeply cultural. In more recent works (2009), she has also shown how those under the diagnosis of bipolar disorder are often denied the status of being fully human and how notions of depression and mania are cultural products that exist outside the realm of medical diagnosis. Others also include Rapp (2000), who explored the social impact and cultural meaning behind the “geneticization” of family life through the growing availability of prenatal testing.

Interestingly, several recent works have dealt explicitly with the relationship between neuroscience, identity, and culture. While Martin (2000) was the first to warn of the dangers “neuroreductionist” thought poses to understandings of what it means to be human, it was Dumit’s (2004) comprehensive exploration of PET imaging technologies that more concretely addressed this threat.16 Dumit investigates how these brain-imaging machines—the precursors to contemporary fMRI scanners—have transformed how Americans view personhood. His previous work, surrounding the power of visual culture in the cognitive sciences (1995) has also examined PET brain scans as powerful scientific objects that help sustain scientific authority. Others like Reese (2010) have also added to anthropological discourse surrounding neuroscience and personhood. Reese calls attention to the concept of “neuroplasticity” that developed in the late 1990s and the way in which this now widely accepted theory of brain mutability has changed the meaning of being

16 Positron Emission Tomography
“neurologically human.”

I conclude my literature review and introduction with Downey and Lende (2012). Although their anthropological interest in neuroscience deviates from my own, they have coined a new discipline called neuroanthropology through which cultural anthropology and neuroscience can compliment one another. In this field, anthropology can offer brain science deeper, cultural explanations for observable differences in brain activity, while neuroscientific evidence of brain plasticity can show how culture and experience in turn sculpt the brain. While this endeavor differs from my “science as culture” approach to unraveling SCN, its existence is important in anticipating future conversations between the neurosciences and cultural anthropology. Most importantly, it offers a promising platform for imminent talks between the neurosciences and the humanities.

I will now proceed with my examination of SCN as it relates to prevailing understandings of self, society, and the epistemologies that construct them. As new disciplines emerge that seek to advance or further our understandings of these existential concepts, we must remember that these understandings are—and have always been—fluid and renegotiable reflections of deeply encultured values.
Chapter 1
Demystifying the Laboratory:
The Authentic, Material, and Natural in SCN

In spite of the rich, confusing, ambiguous and fascinating picture that is thus revealed, surprisingly few people have penetrated from the outside the inner workings of science and technology, and then got out of it to explain to the outsider how it all works.... As to the millions, or billions, of outsiders, they know about science and technology through popularization only. The facts and the artifacts they produce fall on their head like an external fate (Latour 1987: 15).

I begin this exploration of social cognitive neuroscience with the small laboratory space that has been designated to the Social Cognition Laboratory by the university. As I explained in the introduction, this space is quite ordinary—marked by filing cabinets, desk space, and several computers. Yet, despite its everyday feel, there are remarkable undertakings that occur within this space. Here, the brains of certain research participants are not imaged on the spot nor are their electrical brain signals “read” through fancy wires and caps. Although members of SCL certainly perform these tasks, they cannot be found in this space nor are the transformative operations that take place through SCL research limited to the high-tech brain interventions themselves. What makes the SCL grounds so fascinating, at least from an anthropological point of view, has to do with the reconstruction of social worlds and splintering of traditional boundaries that occur through the meeting of the science and social on this common ground. For me, this ground can mean the inside of the fMRI machine—which is certainly important to consider—but also one of the everyday experimental rooms in the SCL basement.
In order for SCN researchers to experimentally study social behavior and apply their research findings to wider understandings of the social world, they must recreate aspects of that world within the prescribed borders of an institutionally embedded scientific laboratory. And when social cognition is assessed while a research subject is placed inside a functional imaging scanner, those borders become even narrower. This creation of the social within the realm of the scientific lends itself to an interesting epistemological tension, as scientific and socio-cultural worlds have historically been rendered “separate” and culturally distinct. On the one hand, scientific worlds have been physically insulated within reputable university campuses and on protected government grounds. The localization of science to these confined spaces designated precisely for the production of science—coupled with a popular understanding of science as the pure product of empirical observation and logical reasoning—has led to the conception of science as a-social or a-cultural altogether (Downey 1995). The larger social world that encompasses these institutional bubbles, on the other hand, is perceived as deeply socio-cultural. Additionally, the knowledge produced about the sciences by the sciences and about the social world by the social sciences and humanities has also differed in method and style. While the former seeks to construct and solidify universally applicable rules, the latter seeks to question and probe prevailing categories of understanding (Franklin 1995).

In this first chapter, I apply Latour’s “first rule of method” for investigating science in action. He writes, “If the scientists we shadow go inside laboratories, then we too have to go there” (Latour 1987: 15). I begin my voyage in the physical laboratory to show how the tensions produced from renavigating the boundary between science and social worlds calls into question more fundamental binaries relating to the subjective nature of neuroscientific
knowledge itself. A more scrutinizing analysis of SCN laboratory research—the challenges of creating valid social experiments within the lab, the construction and interpretation of functional brain images, and the notions of self to which these processes contribute—highlights three fundamental beliefs that sustain the field. Grounded notions of the authentic, material, and natural, qualities of neuroscientific research, respectively, become undermined through an illumination of their counterparts: the inauthentic, imaginary, and technical qualities inherent to SCN research. Playing off the “localization” rhetoric often used in the cognitive neuroscience literature and exploring the material site to which SCL is localized, I intend to “delocalizing” the field from its authoritative position among epistemologies of self and world by exposing the subjective, constructed, and encultured qualities of SCN.

**Producing “Good” Social Neuroscience: A Question of Authenticity**

Social neuroscience, or good social neuroscience as the SCL researchers are often quick to point out, must strike a delicate balance between cognitive neuroscience and social psychology; it is the narrow overlay of a Venn diagram blending theories in social psychology with methods in cognitive neuroscience. And, as many of my informants expressed, it is presently difficult to find lead researchers who have sufficient training in both fields.

“There are still people who are very confused,” explained Carrie, a first-year graduate student in the university’s cognitive neuroscience program and the former laboratory manager of SCL. Reflecting on a social neuroscience conference that she had attended in 2012, she said she had noticed “tons of people” at the conference, “but the ones
who were doing good social neuroscience were just a handful.” The reasons why people are so confused, she said, has precisely to do with the interdisciplinary nature of the field—being sufficiently trained to think as both a social and hard scientist is rare (a problem which is also an underlying motivation for this project itself).

My initial response to her comment was, “So there is bad social neuroscience floating around?” But after a few moments, I added, “Well, what constitutes good research?” Again, Carrie began to answer these questions by describing the epistemological issues that arise from not only combining two separate disciplines, but also traditionally distinct ways of understanding. That is, although the a) technical skill set required to perform brain-imaging analyses and b) sufficient understanding of how to tackle social questions, must converge in order to produce strong SCN research, the paths to acquiring both kinds of knowledge are separate.

Carrie: I think there are a lot of problems with the ‘neuroscience’ in social neuroscience—people might not be good at doing fMRI, people might not understand how to analyze their results, but then again you see it from the opposite side. You see a really good cognitive neuroscientist trying to address “social” kinds of problems, but they forget what social means. They think that “social” is just looking at a face rather than something that is truly social.

In addition to highlighting the sub-disciplinary tensions inherent to an emergent, interdisciplinary field, Carrie’s answer underscores two critical points. First, her acknowledgment that functional brain imaging results are a product of subjective human interpretation and specific ways of understanding, anticipates the larger point of this chapter: to destabilize the perception of SCN knowledge as neutral and objective. Second,
her description of the “social” problem—understanding what social means and how to reproduce that in an experimental context—frames the first idea I intend to investigate: How do SCN researchers design “valid” social experiments within the lab? And how does the reconstruction of the social world within the laboratory space lend itself to questions of neutral and objective neuroscience?

“What is ‘truly social’?” can be answered through an exploration of authenticity. The authority credited to any field in science can be traced to an underlying belief that the affiliated research is “original, real, and pure” (Lindholm 2008: 2). One could also make the claim that by the same argument, every field of science is inauthentic (as science is the constructive product of interpretive steps and subjective thinking). Still, when considering SCN, the presumptive belief in authenticity becomes interestingly and especially problematic. For a social neuroscientist, all phenomena that take place in the everyday, social world can be considered authentically social. However, producing “truly social” contexts that are “original, real, and pure” is extremely difficult (if not impossible) when designing SCN experiments, both inside and outside of the scanner. Understanding how to make a social phenomenon a scientific object of study is precisely what Carrie was referring to when she described “good” social neuroscience and is something with which every SCN researcher struggles. This driving quest for that which is ‘truly social’ illuminates the inescapable inauthenticity inherent to the social paradigms implemented by this field. Exposing this reality is my first step in delocalizing SCN and rendering it encultured.

17 Here, I am exclusively using the notion of authenticity to refer to what SCN researchers perceive to be “real” social phenomena.
Another way to understand authenticity as it relates to the construction of “truly social” experimental designs is validity. Researchers approach the challenges of creating authentic SCN experiments through a concept known as external validity. Although the term somewhat speaks for itself—it refers to how applicable an experiment is to “real-life” situations—it can be further understood through three forms of realism: mundane realism (how likely laboratory events are to occur in the real world), experimental realism (how seriously research participants take the experiment), and psychological realism (the psychological processes employed in the experiment are the same used in real life) (Harris 2012). These three considerations work to legitimize popular paradigms, or symbolic recreations of “authentic” social situations, that are believed to elicit the same psychological processes that would occur in “truly social” situations. These designs include economic games, socialized computer games, decision-making tasks, and experiments that involve forms of deception. In this vein, one can understand the authenticity dilemma as stemming from an uncertainty about whether the symbolic act of replicating a “real” social scenario is, “really real” (Parish 2009: 143).

The first SCN study I recall reading explored the concept of social rejection through a deceptive, social computer game (Eisenberger, Lieberman, and Williams 2003). Participants played a virtual ball-tossing game with two other players depicted as cartoon characters on the computer screen (in actuality, these “players” were just a rigged computer program). The study involved three phases: 1) the participant watched the other two players toss a ball back and forth, 2) the participant was drawn into the game to join in the tossing, and 3) the other two players suddenly stopped tossing the ball to the participant. Not surprisingly, participants reported feeling rejected by the social exclusion.
More interestingly, neuroscientists found increased activation in the anterior cingulate cortex (ACC), a region of the brain that tends to activate in response to physical pain. The conclusion drawn was that at the level of the brain, social exclusion “hurts” in the same way bumping your arm against a wall might.18 A follow-up study demonstrated that individuals who show increased sensitivity to rejection in the ball-tossing game also show lower thresholds for physical pain, supporting the notion that emotion and physical pain share a common neurobiological basis (Banich and Compton 2011).

The virtual ball-tossing game is a fascinating case study for unpacking the neuroscientific quest for a “truly social” design. Unlike many other SCN experiments that require participants to monotonously view pictures, click buttons, and make arbitrary choices, the ball-tossing game is quite engaging, albeit virtual and deceptive (Is it “truly social” if the other players are rigged computer algorithms?). Yet, it is so obviously inauthentic in terms of its applicability in a non-laboratory context. Outside of the experiment (for which the participant receives some form of compensation), no adult would spend one hour engaged in such a dull task. That is, in terms of mundane realism, this experiment or “symbolic act”—like most others in SCN—is not very “real” at all. Most neuroscientists would agree that the challenge of creating a truly authentic social scenario inside of the laboratory is fruitless. Still, the consideration is important in so far as it keeps the scope of what scientists constitute as truly social in check (i.e. not simply “looking at faces”).

18 Researchers (Somerville, Heatherton, and Kelley 2006) who later probed this early study demonstrated that there are two separate psychological processes guiding this effect. They remodeled the paradigm to discriminate feelings of “surprise” from the expectation violation (the sudden and unexpected exclusion) and “pain” from social rejection. These feelings were found to be associated with activation in separate regions of the ACC.
If SCN experiments show little external validity in the mundane sense, how then are social neuroscientists able to draw inferences about the nature of human social behavior and the social world at large? The answer lies in the experimental and psychological validity of their designs—or rather, their belief that those realisms are valid.

Valerie, a second-year cognitive neuroscience graduate student in SCL, explained that she uses economic games frequently in her research because they tend to give scientists the best “measure of people’s ‘real’ behavior.” In the context of neuroeconomics, economic games refer to a series of paradigms used to explore the neural and psychological basis of human decision-making. A basic example is the Dictator Game (DG), which has been adapted in a variety of contexts, including the scanner. A research participant, the first player, is given an endowment (for example, a cash prize). The game requires that he or she allocate a portion of that sum to a second player, the purpose simply being to observe if and how much of the original endowment the participant shares. Social neuroscientists have manipulated this paradigm by changing identity of the recipient (will the participant share more with a Duke student than a UNC student?) and adapting the task to a scanner setting, where participants will press a button inside of a functional imaging machine to indicate the sum they wish to allocate.

Rating scales and questionnaires that have been commonly employed to assess opinions and attitudes in social psychology, Valerie explained, are not always the best measures of how individuals would really act in a truly social situation. “We use these economic games because we’re not asking them directly,” she said. “We’re measuring their behavior” (the implication being that any kind of observational or behavior-measuring strategy is the most valid approach). Valerie’s statement hints at two underlying
assumptions: first, that behavior in the laboratory parallels behavior outside of the laboratory, and second, that if participants are engaged fully in the task, then the experiment should evoke similar psychological mechanisms to those that would occur in a related, real-world scenario (for example, the mental processes associated with the decision of whether to ‘trust’ someone in the game should translate to trust decisions in everyday life).

Neither of these assumptions is grounded in known truths, however. Although they enable SCN research to guide wider understandings of social behavior, neuroscientists cannot know for certain how well their scientific observations about social behavior reflect behavior that occurs in a more authentically social realm. That is not to say that SCN findings should be discredited altogether. Intuitively and logically, published findings make sense in terms of lay understandings of social phenomena and neuroscientific research on the biological basis of behavior. The research produced by the field is also meaningful, evocative, and necessary for future advances in the brain sciences. However, the assumptions that ground this research are relatively hefty when considering how far and separate from social reality the laboratory and scanner seem to be (both physically and conceptually).

There are also limitations to the kinds of social behavior studies permitted by SCN. Presently, there is no method of obtaining reliable brain data outside of the laboratory or in a more “authentic” social setting. In addition to these obvious limitations, there appears to be an underlying and privileged sentiment that scientific and social worlds can only collide on scientific grounds (the unidirectionality to which I previously referred and will later revisit in the chapter). As Charles, the current laboratory manager (semi-jokingly) asserted,
“I just want to lock myself in my ivory tower and study human interaction.” Taking his words with a grain of salt, the image of the ivory tower also calls attention to the institutional forces that stand to protect the assumptions that sustain this wider belief in authentic SCN research despite inherently inauthentic social experiments.

**Constructing and Interpreting SCN Brain Images: Material vs. Imaginary**

Having explored the assumptions that ground notions of authentic or “valid” social paradigms, I now turn to the functional brain images produced through social neuroscience research in the SCL laboratory—the interpretation of which also demands a kind of belief that specifically draws in questions of the material/imaginary. That is, SCN research can be understood as both “fiercely material” through the central role of the physical brain and functional brain images, while also “irreducibly imaginary” through their association with brain activation and the psychological processes (Harraway 1995: xii).

The concept of materiality in SCN can be understood in two ways. First, there is the *biological material*. As the body of cognitive neuroscience literature continues to grow, social neuroscientists are making stronger claims about where social cognition occurs within the material human brain. Physical brain regions like the medial prefrontal cortex (mPFC), amygdala, and insula all comprise what neuroscientists now refer to as “the social brain” and are thought to work communicatively in driving a myriad of social phenomena including the psychology of stereotyping and aversive behaviors like aggression. Second, there is the written translation and circulation of the *scientific material*, through esteemed academic journals, at professional conferences, and in popular magazines. This later kind of material, which I will investigate further in the following chapter, can refer to the literature
itself or specific inscription devices like statistical curves, colorful bar graphs presented alongside data to support research findings.\footnote{Inscription devices are the graphs, diagrams, tables, and so forth that accompany data and function as “visual proof” in scientific literature (Latour 1987: 68). Latour argues that these are crucial in “recruiting allies” and persuading others to trust one’s research findings. See chapter 2.}

Interestingly, the functional brain scan is an image that represents both kinds of material. While social neuroscientists endeavor to create an authentic social inside the laboratory, they simultaneously venture to extract an immaterial mind from the acutely material brain of their research subjects—through more intensely material imaging machines. This process of extraction is the way through which SCN provides a neurobiological lens into the invisible mental processes that drive human social behavior. Not only is the concept of the mind an intangible, but the phenomenon of brain “activity” (the electrical firing of neurons) is also invisible to the naked human eye.

The notion that the mind and brain are somehow related can be traced back to Descartes, whose historical doctrine on mind-body dualism has sustained widespread trust in functional imaging research, both inside and outside of cognitive neuroscience.\footnote{See Introduction.} Annie, an undergraduate in SCL, said that when she thinks about the brain “there is the physical aspect” but there is also an immaterial, “religious soul sort of thing” that can be likened to the notion of mind. Modern brain imaging technologies are now suggesting this imagined soul—or however one who believes in a concept of mind chooses to understand it—can be materialized in a brain image. “I can’t quite say how one thing leads to the other,” Annie admitted, referring to the link between the soul-mind and measurable brain activity. “I just have faith that it does.”
The neuroscientific production of a material mind, however, is rooted in more than just “faith.” It is largely grounded in the physics of the natural world, as Natalie, another undergraduate researcher in the laboratory pointed out to me. Enrolled in physics courses during her past two semesters, she explained how understanding the physics of fMRI technology is critical to explaining how neurobiological activity can be materialized.\textsuperscript{21}

The fact that people have manipulated the rotation of atoms and the way they respond to magnetic fields, and related that back into how we can figure out which neurons are responding to what, I think is amazing. The people who have designed technologies like fMRI have incorporated their knowledge of how the physical world works in order to create this piece of technology that can interact with our body using physical laws to decipher more about our biological laws.

That is, on the most fundamental level, Natalie, explained, these technologies are grounded in the physical laws of nature. They are also rooted in particular histories of science—in physics, chemistry, biology, and anatomy—through which we have come to understand the physical world and our human biology. Still, Natalie’s practical explanation of functional neuroimaging is only valid in so far as it accounts for electrical brain activity. How are imaginary psychological processes also measured and materialized?

Revisiting Annie’s use of the word “faith”—in the neuroscientific process and resulting image—I return to the fundamental Cartesian belief shared by each and every

\textsuperscript{21} The physics of fMRI: A signal is drawn from hydrogen atoms, which are abundant in the water molecules found in the brain. In a magnetic field, these atoms absorb energy that is applied at a conventional frequency determined by the scanner and emit that energy at the same frequency until gradually declines over time due largely to the presence of deoxygenated hemoglobin in the blood stream. That is to say, a decrease in the presences of deoxygenated hemoglobin (an increase in oxygenated hemoglobin to replenish firing neurons) leads to increased image intensity or greater activation.
member of the lab: that the brain is the biological basis of the mind. In fact, when probed to reflect on this belief, as a belief, several SCL researchers actually responded defensively.

“I am very much determinist,” Natalie asserted. “I believe that it’s all biologically determined and that everything comes down to what neurons trigger onto others and which neurotransmitters are released. So it’s very difficult for me to understand why you’re asking me these questions.”

“The brain is what’s allowing us to do all of these skills,” said Kate, a first-year cognitive neuroscience graduate student in SCL. “Everything that’s driving this is essentially happening at the level of the brain.”

“The brain is the biological basis of the mind,” said Nate, a post-doctoral fellow in evolutionary anthropology who is also a member of SCL. “That is just how we [in the field] think.”

That is to say, there are two levels of belief at work here. There is the belief that the imaginary mind is materialized in the brain, which foregrounds the belief that material brain scans are a window into invisible psychological processes. These beliefs not only serve to legitimize the field and the research that comes out of it, they are very premise of the field itself. “The whole point of neuroscience is to explain the biological basis of a mind and the mind as the basis of behavior,” Nate asserted.

In this vein, SCN is truly a science that is “fiercely material” and “irreducibly imaginary.” As Valerie explained, “Everything psychological is simultaneously biological.”

Having explored the problematic binaries of authentic/inauthentic and material/imaginary in SCN, I now turn to the boundary of the natural/technological that becomes blurred through applications of SCN to understandings of selfhood.
Conceiving a Natural Self: Constructing Self Identity through Neuroscience

The nuances of natural/technological boundaries in SCN become especially clear when considering the ways cognitive neuroscience has come to guide understandings of human nature. As Natalie explained, there is something truly remarkable about the fact that machines guided by physical laws can be interfaced with human beings in a way that sheds light on the biological and, in turn, psychosocial aspects of the self. The knowledge produced from these processes—rooted in beliefs that social neuroscience experiments are real enough to make wider claims about social phenomena and that imaginary mental processes are anchored to a physical brain, whose own invisible activity can also be materialized—lends itself to a third form of belief. This is the belief that the way we understand ourselves through SCN is “natural,” despite the technological metaphors and methodologies that shape these understandings.

This way in which individuals take up the rhetoric of the field into their own self-description was explained by best by Annie, who articulated a life-long struggle with understanding her own abnormal “brain wiring.”

Annie: My brain chemistry is really screwed up in many ways. So I spent a lot of my life dealing with the interface between this physical thing that’s wrong with me and way it impacts the way I see the world. However, a lot of the people in the intro neuroscience classes really struggled with this idea of everything being physically rooted in these cells and these electrical signals, but for me it was just the reality of

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22 See Picturing Personhood: Brain Scans and Biomedical Identity (Dumit 2004); also “Brain Mind Machines and Technological Dream Marketing” (Dumit 1995).
me and my day-to-day life, because I had to do ‘this and this and this’ so that my
signals would be right and so that I would be myself.

Annie’s confession underscores the deeply internalized ways through which “our ways of
living are necessarily bound up with multiple aspects of technoculture,” specifically the
culture associated with SCN (Dumit 1995: 350). She has wholly adopted a (dysfunctional)
computer system brain rhetoric learned through both her studies in psychology and
neuroscience as well as in early encounters with the psychiatrists who deemed her brain
dysfunctional in the first place. Embedded within her reflection are profound existential
questions: How does she view the world? Is it different than the way people who are
“normally wired” see it? What does it mean to have the “right” kind of signals? Who is her
“true” self? And is that really her truest self if it requires therapy or medication? These
ideas illustrate an essential point: For those in close proximity to cognitive neuroscience
research—whether it be inside the laboratory or by medical diagnosis—these computer-
based concepts are more than discursive tools for exploring how things work; these people
have completely incorporated the rhetoric in their own understanding of how things—
their mind, brain, identity—naturally are. These understandings then feed into societal
perceptions of whom, or perhaps what, people are.

My interpretation of cognitive neuroscience as a field that has pushed the
boundaries of the human/machine interface through technological understandings of the
self was challenged by Nate, who asserted, “a bow and arrow is no different from an fMRI
machine,” from an evolutionary point of view.
“I think the human/machine interaction is actually pretty natural, because before the birth of machines, we actually called humans the species of technology,” he explained. “Humans evolved to be dependent on technology. So it is a part of human nature.”

Following this evolutionary line of thinking, it is reasonable and perhaps even expected that we have adopted a technological brain rhetoric from a science of the self so grounded in mechanistic tropes. That is, if we truly are the species of technology, then the fact that we have modeled the essence of human identity after it should come as no surprise (it is arguably, “natural”). Yet, the wider consequences of these shifting understandings of the biological brain are imperative to consider.

One critical implication of the naturalization of computer rhetoric onto descriptions of both brain and self is what Haraway calls “the problem of coding” (Haraway 1985: 164). Communications sciences and modern biologies are constructed by a common move—the translation of the world into a problem of coding, a search for a common language in which all resistance to instrumental control disappears and all heterogeneity can be submitted to disassembly [and] reassembly (1985: 164). That is, not only is the computer metaphor informing knowledge of how the human brain “naturally” functions—the “reality” of Annie’s day-to-day life—it is also sustained by a “common move” to decipher the human experience through a common language.

In the same way computer programs can be coded, decoded, and recoded, human memory, language, intelligence, and behavior are conceived as being subject to similar reworkings by way of the brain. When considering how a belief in a common code results in a search for a common brain language, imaging trends again come to mind. Adults with diverse life experience are placed inside of an imaging scanner, where their brain activity is
measured and collapsed across a pool of subjects. Individual difference or “heterogeneity” is disassembled and reassembled by way of data processing methods, and the human experience transforms into an essentialized, homogenized problem of coding and recognition.\textsuperscript{23} Pattern recognition procedures born out of fMRI analyses have supported a growing and popular belief in the readability and predictability of cognition and behavior from brain activity. Classification techniques have produced complex correlation matrices that are now allowing scientists to draw stronger inferences and make better predictions about social behavior. These concepts are the foundation for artificial intelligence—be it voice recognition software or humanoid robots—that further blur the line of natural/technical throughout the modern social world. That is to say, these approaches have not only allowed us to create more intelligent, social machines, but they have also contributed to the technological shifts in the way we believe both the human self to naturally exist (modeled after the rhetoric we use to speak about computers, machines, and robots).

\textbf{On to a New Symbology}

The act of inaugurating this project within SCL laboratory space has enabled me to demystify the deeply engrained values that qualify both SCL and SCN at large from its onset. Here, I have examined three forms of belief that drive SCN research: 1) the belief in the validity of social neuroscience experiments, despite their inherent inauthenticity; 2) the belief that the brain is the biological basis of the mind and that the materialization of brain activity can provide a lens into invisible thought processes; and 3) the belief that the

\textsuperscript{23} I explore these imaging processing steps in Chapter 2.
computer-based rhetoric used to describe the brain as the basis of self is reflective of the natural condition of the brain itself. In themselves, these beliefs are certainly cultural in so far as they are shared by members of SCL and guide the everyday practices that give rise to SCN research. These beliefs also function to empower and protect the authority of SCN, particularly as research in the field continues to influence lay understandings of self and society. Acknowledging these enabling qualities, however, is only part I in my larger effort to delocalize SCN.

This initial exercise is critical to my remaining chapters, as social cognitive neuroscience, like all of science, is far from objective truth. By illuminating the foundational beliefs and related practices that unite SCL researchers, I have demonstrated how SCL and the science it produces is encultured. Understanding this cultural subjectivity is critical, as it forces us to confront the fact that our conceptual tools for understanding the world are subjective and cultural, regardless of the place from which that knowledge comes. It also gives us an opportunity to deepen dominant understandings and even transform them.

My final point in this chapter dealt with the computer/machine rhetoric that has been adopted to explain questions of human nature and the social world. The salience of this rhetoric can be attributed, in part, to the popularity and authority of cognitive neuroscience, which relies heavily on the associated metaphors. But as I have insisted, recognizing the cultural qualities of SCN enables us to forcefully question these naturalized assumptions. In the following chapter, I cast aside the prevailing computer metaphor of brain function and pose a new, “social” symbology (for “social” neuroscience) to open up the possibility for new understandings that can enhance modern conceptions of self and world.
CHAPTER 2
From Computer to Globe: Towards a New Metaphor of Brain

In order for the theory of global cultural interactions predicated on disjunctive flows to have any force greater than that of a mechanical metaphor, it will have to move into something like a human version of the theory (Appadurai 1990: 598).

The brain and nervous system are certainly “our most cultural organs” (Downey and Lende: 2012). The inherently plastic and ductile qualities of these biological structures give way to a life-long construction, deconstruction, and reconstruction of underlying connections by dynamic and surrounding cultural forces. When considering both popular and scientific representations of the brain, a more rigid, technical interpretation of the brain and its function emerges. That is, to conceptualize the organ of the social mind, cognitive neuroscientists have adopted a distinct information processing and communication channel rhetoric born out of the Cognitive Revolution. Connection channels, receptor nodes, neural networks, signal firing, brain circuitry, synaptic wires, hormonally wired—these are the terms invoked by members of the field and in popular culture. These signifiers also underlie a well-known trope, which is the computer metaphor of brain function. Through this metaphor, the mind—and all associated functions—is believed to operate under a set of common logic-based rules, much like computer software (with the brain acting as the hardware).

The computer metaphor is unquestionably central to the way members of the cognitive neuroscience community approach questions relating to the biological basis of human psychology (and the way most Americans imagine the mind-brain relationship).
addition to a growing acknowledgment that this metaphor is outdated—the concept of neuroplasticity alone debunks much of its credibility—other metaphors can also be called upon to understand the social nature of the human brain. That is, buried beneath the contemporary neuroscientific jargon lies a more socio-cultural signifier—one that allows us think more deeply about the social brain in relation to the scientific processes that construct modern understandings of it; this is the post-industrial globe (of which the computer and everything associated with it are certainly a part).

When considering the disciplinary rhetoric alongside the avant-garde imaging technologies that have rendered SCN in vogue, the condition of our modern globe and processes of globalization occurring within it also emerge as tropes that can enhance notions of mind, brain and social cognitive neuroscience at large. That is, the transformation of time, space, communication, and travel associated with globalization discourse can also be likened to the conceptual and methodological ways of understanding the social brain. Here, I argue that in order for a field like SCN to make more forceful claims about the social world while also recognizing its own encultured existence as an extension of that world, a new symbology must be incorporated. Here I employ both general discourse and specific globalization theories—namely Harvey’s concept of time-space compression and Appadurai’s notion of technoscope—as theoretical tools for understanding not only conceptions and methodologies in SCN, but also the visual capital, or functional brain images, produced within the field.
Conceptual Shifts in SCN: A Broad Understanding of Globalization

Articulating the parallels between the globe around us and the sphere within us requires an overarching definition of globalization itself:

Globalization...refers to social, economic, cultural, and demographic processes that take place within nations but also transcend them, such that attention limited to local processes, identities, and units of analysis yields incomplete understandings of the local (Kearney 1995: 548).

From this basic definition, the concept of globalization can be loosely understood as a dynamic, large-scale shift from local ways of knowing and interacting to a more integrated and connected world, in most every respect. A more superficial but nonetheless useful definition characterizes globalization as the general “process of extending social relations across world-space” mediated by processes like “migration, commerce, communication, technology, and finance tourism” (Wikipedia 2013) (Kearney 1995: 548). This transformation—regardless of how it is specifically framed, defined, or applied—has been marked by a modification in worldview from “a two-dimensional Euclidian space with its centers and peripheries and sharp boundaries, to a multidimensional space with unbounded, often discontinuous and interpenetrating sub-spaces” (Kearney 1995: 549) (Harvey 1989). And, it is from this notion of spatial reconception that I will begin my examination of SCN through theories of globalization.

The spatial transformations associated with globalization curiously reflect modern shifts in understandings of the human brain. Previously localized brain regions like Broca’s
speech production and Wernicke’s speech comprehension centers are now being reinterpreted as looser, “discontinuous” brain regions that belong to a larger linguistic brain networks. 25 Broad concepts like “memory,” which was once thought to reside exclusively in the hippocampus, have been divided and stratified to encompass regions and structures that span the entire brain and also the “interpenetrating subspaces” neuroscientists refer to as sub-cortical regions (Andrews 2009; Purves et al. 2008).  

Despite its relatively recent establishment, social neuroscience has also experienced a similar shift. Previously isolated brain regions like the amygdala, insula, and medial pre-frontal cortex (MPFC) are not only implicated in social processes but are thought to communicate and cooperate as part of larger social cognition networks (fear, social dominance, stereotyping, and so forth.). SCN researchers are now trying to demarcate the enigma that once was the MPFC— or “social brain” as it is often referred to because of its consistent activation in most every social engagement—into more specific functional regions that are also part of these new social cognition networks. That is to say, the human brain has also undergone its own kind of “globalization.”

What is perhaps more interesting is the way through which this broad globalization discourse can be applied to trends within the neurosciences at large. When asked how cognitive neuroscience fits into the larger scheme of neuroscience as a whole, Annie described what she perceives as a disciplinary split.

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25 Broca’s area (1861) is located in inferior frontal lobe. Patients who suffer lesions to this area are said to have Broca’s aphasia (trouble with speech production). Wernicke later demonstrated (1874) that not all speech impairments are localized to the inferior frontal region. Patients who suffer lesions the superior temporal lobe are said to have Wernicke’s aphasia (trouble with speech comprehension). According to the Broca/Wernicke theory of language, the two regions are connected by a bundle of fibers known as the arcuate fasciculus. However, research has shown that these regions are not fixed (they can move within an individual’s brain over time) and vary from one person to another.
I think neuroscience itself is sort of divided field. Because there’s the neuroscience that looks at things on the cellular and molecular level, and then there’s systems neuroscience [of which cognitive neuroscience is a part]. The cellular and molecular neurosciences are very much like other biological sciences, but then when you start getting into the cognitive stuff you start entering this ‘weird space.’

Again, one interpretation of this “weird space” Annie refers to can be found within the basic globalization rhetoric—this is the “weirdness” inherent to newly navigating spatial shifts. Kearney writes that research and theory in globalization has “refocused attention from communities bounded within nations and from nations themselves to the spaces of which nations are components” (Kearney 1995: 549). Likening notions of brain cells and regions to sociopolitical concepts of communities and nations, respectively, trends within fields of neuroscience itself have also experienced similar changes. Popular intrigue has been refocused from the cellular and biological neurosciences to more systems-based cognitive neuroscience, which is specifically devoted to understanding larger brain networks and recently defined biological spaces.

**Methodological Shifts in SCN: Biological Technoscapes**

Turning from conceptions of the brain itself to the technological machines that have provided scientists a new lens into its function, I draw Appadurai’s notion of technoscape (1990). Technoscape refers to one of “five dimensions of global cultural flow,” that collectively distinguish the contemporary, globalized world. The concept deals

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26 The other four are ethnoscapes, mediascapes, financescapes, and ideoscapes. See *Disjuncture and Difference in the Global Cultural Economy* (1990) for further clarification.
specifically with the rapid configuration and flow of technology “both high and low, both mechanical and informational...across various kinds of previously impervious boundaries” (Appadurai 1990: 588). While Appadurai employs this concept in examining new distributions of technologies across geographic and political boundaries, I apply the term to the crossing of “previously impervious” biological boundaries by functional imaging machines.

Perhaps the most remarkable aspect of modern brain imaging technology is its ability to offer researchers a window into the activity of the skull-bound brain and immaterial mind, through entirely non-invasive methods. The brain, which was previously protected within the body from biomedical probing and scientific investigation, is now open to innumerable research exploits. This possibility for new understanding is especially exciting for SCN researchers who have the opportunity, for the first time, to explore the biological basis of human social cognition and behavior.

Nate framed this excitement in the context of desire among evolutionary anthropologists who seek an equivalent window into social cognition among other animals:

You can really see this desire to see what is happening in the brain in the field of [evolutionary anthropology]. Humans, we can tell them to sit still in the fMRI machine and do the task. But in terms of studying animals, there are very limited techniques for functional neuroscience. One of the only things we can do non-invasively is a resting state study. So you sedate the animals and they do nothing (that is functional imaging though, because the function is just sleeping).... We just are able to understand a lot more about humans.
Nate highlights an important but understated point. These machines, designed by humans for humans, are only fascinating and useful to social neuroscientists in the way they provide information about humans. That is, one reason why the non-invasive crossing of functional neurotechnology across biological barriers is so remarkable surrounds the fact that this kind of crossing cannot take place among any other species. However, this phenomenon is also remarkable precisely because the biological boundaries that are being crossed through SCN are human. The human brain and body are impervious by virtue of their materiality but have also been ethically protected from scientific exploitation compared to other animals. Historically, but especially in recent years, only patients with epilepsy, brain trauma, or other types of brain disease have been subject to live surgeries and brain dissection.

Through the application of Appadurai’s notion of “technoscape” across “previously impervious” human boundaries, we can better understand the historical and socio-cultural importance of these technological advancements in the brain sciences.

**The Production of Functional Brain Scans: Time-Space Compression**

Adopting another specific lens within the purview of globalization, I now turn to the concept of time-space compression (Harvey 1989) as it can be applied to the technological production of SCN research. The theory, which specifically deals with the rapid acceleration in economic turnover resulting from capitalist modernization, can be applied to more general changes in time-space imagery tied to the contemporary social world at large. New communication and transportation technologies have revolutionized the flow of ideas,
people, and capital. Information can be transmitted at increasingly rapid paces, while steering through completely redefined physical and virtual spaces.

On a more fundamental level, these rapid shifts in time-space perception have challenged long-standing notions of time and space as “‘real’ and objective. Harvey writes, “Neither time nor space can be assigned objective meanings independently of material processes, and it is only through investigation of the latter that we can properly ground our conceptions of the former” (Harvey 1989: 204). Here, I show how notions of time and space are rearranged and “compressed” through the “material process” of analyzing fMRI brain data, which gives way to scientific capital itself: the functional brain image.

In the same way contemporary anthropologists examine the flow of culture and ideas across the globe, cognitive neuroscience analyze the flow of blood across the human brain. The human brain requires a constant supply of glucose and oxygen for nourishment, and these nutrients are delivered via the blood stream. Measuring cerebral blood flow to exhausted brain cells has provided scientists with an indirect measure of neural activity and the “lit-up” images of functional activity. However, the ways through which researchers perform these measurements and construct theses images demand a literal reconstruction of both space and time.

To grasp the complexity involved in this calculated reshaping of brain space and experimental time, one must take a neuroscience-in-making approach. Here, I consider the ritualistic steps involved in this process. The superposition of neural activity onto brain

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27 The fact that fMRI measures blood oxygenation levels following cellular activation means that it is not measuring direct electrical activity. The main reason for performing time transformations is to adjust for this hemodynamic lag.

28 See Science in the Making (Latour 1987)
anatomy is not a task that the scanner can alone accomplish. It involves many stages of hefty intervention performed by the researchers themselves and through additional computer software programs. These actors are as equally important as the imaging machines in materializing the neurobiological basis of psychosocial phenomena. Here, I take the reader through five critical stages in producing a functional brain file (which later becomes the image itself):

1. The researcher, most often a graduate student or research assistant in the lab, must physically labor on his/her computer to “build” both structural and functional files, which are later “co-registered” and converted to a standard template. Here, they must also apply corrections and add filters to produce the clearest and cleanest files possible.

2. After this, they must build regressor models that synch brain activity with phases during the experimental tasks. In order to ensure that brain activity is matched to the right moments in the experiments, events must be recorded on Real Time (TR) and researchers must also account for the “hemodynamic lag.”

3. Next, functional, anatomical, and regressor information is combined and individual subject brain files are “smoothed” via pre-processing.

4. Subject files are then “collapsed” across experimental runs to form one representative file.

5. Now researchers can perform “contrasts,” or voxel comparisons, on the imaging data. As an fMRI image represents an activity difference between experimental and

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29 My complete knowledge of this process was obtained from a Fall 2012 SCN methods course (Harris 2012).
30 See Footnote 3.
non-experimental tasks, performing these subtractions are necessary for detecting activated regions.

6. Finally, statistical tests are performed on the processed brain data to test for significance.

Taking a step back, there are two main transformations produced from this effort—that of time, and that of space. Time is calculated through “Real Time” recording and accounting for hemodynamic lag, then condensed through subtraction. The compression of brain space through image production is even more vigorous. The 3-dimensional brain gets reduced to a 2-dimensional image, and multiple brains are collapsed to produce a single representative research file. However, time and space as it is represented by functional brain data is not simply “compressed.” The implications of this construction, or rather reconstruction, are that time and space are largely subjective and materially-produced concepts that interestingly symbolize wider transformation occurring across our globalized social world. Through this understanding, the brain is more strongly positioned as a symbol of the globe itself.

Although my primary intention in outlining this process was to demonstrate the compression of time and space that occurs as a result of each step, I must also acknowledge a secondary purpose. That is, understanding these stages as part of a ritual—as every SCL researcher must perform these steps each time they analyze functional brain data—is important in situating SCL as part of a larger SCN culture. A comprehensive understanding of the steps involved in properly analyzing brain data along with the practiced ability to execute them—part of what Carrie referred to as knowing how to analyzing your data—is
not only necessary for the production of valid research. It also grants an SCN researcher more solid membership within his or her community of neuroscientists.

**FMRI Scans and Capital: The Power of the Image**

Once materialized, the brain scan circulates as capital through esteemed academic journals, popular magazines, and into casual dinner conversations—to empower the scientists who produced it and their affiliated universities, the field of social cognitive neuroscience and the Western scientific institution at large, and the symbol of the brain image itself.31 In this respect, the functional brain image is the epitome of what Latour calls an immutable mobile—an inscribed scientific object that is easily transported as capital through scientific and popular networks. And the reason that this image can and does circulate widely —through this vast capitalistic global economy—is of course because of globalization itself.32

More provocative than the understanding of brain image as capital, however, is the power through which the brain image “draws and sustains” its capital within the wider cultural repository (Casper 1995: 188). This is, of course, the power of image itself, which has been described by many. Drawing from Barthes, Petchesky (1987) describes this power as form of deception:

> Whether moving or still, their ‘constitutive deception’ is as noted...the appearance of objectivity of capturing ‘literal reality.’ As Roland Barthes puts it, the ‘photographic message’ appears to be “a message without a code.”

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31 See “Forms of Capital” (Bourdieu 1986).
According to Barthes, the appearance of the photographic image as “a mechanical analogue of reality,” without art or artifice, obscures the fact that the image is heavily constructed in a context of historical and cultural meanings (269).

This idea of deceptive imagery is particularly compelling when considering the power of the functional brain image, which often gets misinterpreted as a “mechanical analogue” of biological and social reality by non-scientists. Nate explained that it is because of these misunderstandings that “you get media press saying that the brain region for aggression has been found or the brain region of ‘something something’ has been found—which is not true.” These brain areas, he explained, are also associated with many other behaviors. “You don’t know if they are responsible for downstream processes, or upstream processes, or anything else.”

Yet, when looking at a functional brain scan, there is a certain sense that the image can and should speak for itself; it is the science, it is the biology, it is the psychology—rather than a subjectively constructed representation of those things. So when a popular news article places presumptive text next to that image, we tend to believe that too. This is the persuasive power of functional brain images. But why is this case?

According to Nate, the answer is simple. “The perception of image is a pretty general human psychological process,” he explained. “Image is easier than text to process in the mind, and people are just naturally attracted to image. That’s why we have PowerPoint slides.”

Still the lay misconception that functional brain images are objective, “mechanical analogues of reality” is also problematic in the way that the disciplinary traditions and past
research that produced them go undetected. “But Science isn’t objective,” Annie asserted. “It never has been. The way researchers think about the brain and self definitely impacts the way they are going to research it, and write it up, and influence people in the future.”

As evident by the transfiguring steps needed to physically produce these images, circulating brain scans are “heavily constructed” and tied closely to historical traditions within SCN (i.e. the five-step analyzing process itself). Another example of how these scientific images are grounded in particular histories or “way of researching” can be found in the very selection of brain areas to analyze. That is, when performing an fMRI experiment, a researcher is not screening for differences in activity across the entire brain. Accomplishing such a task would be impossible. Rather, the scientist consults previous research and constructs plausible hypotheses for where attention to activity should be focused. Moreover, the types of statistical analyses performed are also further grounded in disciplinary-conventions and previous research. More generally, contemporary imaging traditions—most centrally, the concept of imaging itself—have developed from now-outdated PET technologies, popularized in the late 1990s. In these respects, contemporary brain images are just as much a product of mechanical distortions as they are products of legacies in the field.

This notion of the functional brain image as capital can also be tied to one last explanation of visual power—one that is slightly more mystical. A 2008 study performed by psychologists at the Colorado State University and UCLA found that when a brain image was presented with an article summarizing cognitive neuroscience research, participants scored the research higher in terms of “scientific reasoning” than when a bar graph,
topographical map of brain activity, or no image was presented. The study raises the question: What is so powerful about the functional brain image that makes it *more* powerful than any other scientific inscription device?

The answer requires that we revisit Petechsky’s point about images, but more specifically photographic images. The power of photographic images, above all other forms of image, comes from their ability to materialize and preserve what previously could not be. Through the materialization of social brain activity, functional brain images have become a more “magical source of fetishes” (Petechsky 1987: 269). The fMRI technology that enables the production of these images, as I explained in my discussion of technoscapes, allows these biomedical brain scanners to non-invasively permeate the human head, while transcribing the biological basis of the human mind. Part of the power or “magic” associated with any photograph is the way it allows us to reclaim the impossible—a deceased loved one or an old friend, for example. A functional brain scan similarly allows us to visualize that which could never previously be seen: living brain activity and its associated psychological processes.

**Delocalizing a Central Metaphor**

The point of this second chapter was not to say that this globe/globalization rhetoric *should* be implemented in cognitive neuroscientific discourse—just simply that it *could.* Although I demonstrated how this new symbology could be applied to understandings of both the neuroscience and the self, the implications of the metaphorical shift are greatest

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33 See “Seeing is Believing: The effect of brain images on judgments of scientific reasoning” (McCabe and Castel 2008)

34 See *Science in Action* (Latour 1987)
for the latter. That is to say, our computer/machine-based ways of speaking about ourselves, of human beings, are not fixed or “natural,” as I have demonstrated in the pervious chapter, but culturally constructed ways of understanding, based heavily in fields like cognitive neuroscience. Recognizing the encultured qualities of neuroscientific rhetoric gives way to two realizations. First, although we may believe we are the creators of our own selves, “identities are made in conditions and circumstances which are rarely of our own making” (Storey 2003: 80). The computer metaphor of brain function, albeit better understood, is not unique to the way cognitive neuroscientists understand human beings. The discourse has seeped onto popular understandings of identity such that when considered alongside that of similarly growing fields like genetics, which also relies heavily on computer/machine rhetoric, it prevails as the dominant and perhaps only way to understand oneself. This brings me to the second realization. Recognizing that self-identities are constructed and imposed opens up the possibility to question, modify, or supplement those understandings. As many scholars have warned, concepts like the computer metaphor lend themselves to deterministic, reductionist understandings of personhood: This is the idea that everything is rooted in the brain—wired and programmed much like a computer—and can be explained by studies of the brain. “It all comes down the brain,” several members of SCL echoed. By offering a new metaphor of brain and cognitive neuroscience, we see that our understanding of brain and self does not have to be fixed in one metaphor, especially one that threatens notions like free will and human agency, which I will examine in the final chapter. There are more negotiable ways of understanding that more accurately represent the fluid qualities of self and social world.

In this sense, I have effectively challenged reductionist approaches to personhood as
it is produced through concepts in SCN and cognitive neuroscience at large by literally changing the theoretical tools through which we understand it. However, the conceptual models employed in SCN, be them reductionist, are highly useful, and even necessary in many regards. In the following two chapters, I explore what is put at stake through reductionist approaches in SCN, when they can be considered useful, and where we must remain doubtful and cautious.
Chapter 3
Strategic Reductionism:
A Case Study of the Stereotype Content Model

Most of us have spent some time wondering how our brain works.... The brain, after all, is so complex an organ and can be approached from so many different directions using so many different techniques and experimental animals that studying it is a little like entering a blizzard, the Casbah, a dense forest. It's easy enough to find a way in—an interesting phenomenon to study— but also very easy to get lost (Allport 1986).

Despite posing the globe as a new symbol for the brain and modern globalization as a metaphor for the conceptual and methodological approaches to understanding it, the importance of globalization to the SCN community has already been established in recent years. Modern globalization has been a preeminent driving force for some of the best-known research on prejudice and stereotyping in the field (Cuddy et al. 2006). The everyday impact of globalization has justified the practical importance of this area of research to American and global society while demanding that scientists look deeper into the negative social repercussions of this force: the judgment, bias, discrimination, and so forth we often feel and show toward the new peoples with which we come in contact. In this chapter, I examine the Stereotype Content Model (SCM), a theoretical tool in social psychology that sheds light on stereotype formation and prejudicial attitudes among modern communities of people. Social neuroscientists including those in SCL have adopted the model as a platform for investigating the biological basis of the behaviors that result from these biased impressions. After first outlining the theory and its roots, I will subject

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35 See Fiske et al. (2002)
the model to a skeptical critique. Exploring this conceptual mapping of the social world (and resulting mapping of the human brain) through a theoretical comparison to Certeau’s mapped city, I draw attention to anthropological misgivings about this model as “reductionist” and scientifically sourced. Drawing from my own application of the SCM to the Duke community and compelling excerpts from my interviews with SCL, however, I argue in support of the model on both scientific and anthropological grounds, deeming it “strategic reductionism.”

**Understanding the SCM: Warmth and Competence as Universal Measures**

The stereotype content model is a psychological theory grounded in the belief that stereotypes—understood simply as widely held but oversimplified conceptions of people and things—possess two dimensions: warmth and competence (See Figure 3.1). These qualifying categories are believed to shape our impressions of all those around us, across and within contemporary globalized societies. The stereotypes produced from these appraisal criteria have described both

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36 Post-colonial scholar Gayatri Spivak coined the term “strategic essentialism” to describe the ways in which subordinate or marginalized social groups may temporarily put aside local differences in order to forge a sense of collective identity through which they band together in political movements. "(Spivak, 1990)

37 Adapted from Fiske et al. 2002
marginalized groups viewed as lazy or incapable and the most revered and respected individuals in American society. Through neuroscientific applications of this model, SCN researchers have shed fascinating light on the neuropsychological basis of dehumanizing prejudice, literally recharging dehumanization and other kinds of social prejudice with new, biological meaning.38 Here, I explain three central facets of the SCM: the social conditions that motivated the theory, the disciplinary roots of warmth and competence as social appraisals; and the construction of social group “clusters” from these central dimensions.

Globalization, Socialization, and the SCM

The SCM was developed in response to a growing recognition of the rapid socialization and simultaneous shrinking of the modern social world. The inventors of the SCM wrote:

As a result of modern globalization, encounters among people from different social categories are increasingly common. Moreover, as the number and range of social categories in society has increased, so has the gap between groups at the top and the bottom, creating further categorical divides. This increase is especially dramatic in the United States.... ordinary lives require forming efficient and effective impressions of incredible numbers of other individuals (Cuddy et al. 2006: 63).

This reflection on the changing condition of everyday life, particularly within the American landscape, underscores the overwhelming multiplicity and rapidly acquired complexity of

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38 See “Dehumanizing the Lowest of Low: Neuroimaging Responses to Extreme Outgroups” (Harris and Fiske: 2006).
today’s modern social world. The movement of people into foreign spaces and expanding locales has fragmented historically bound communities such that they now encompass “a range of social categories” learning how to coexist. Carrie underscored the cultural importance of studying the prejudices and social biases that have emerged out of these new interactions, through a simple example:

> You step onto a public bus, and, in a split second you decide to sit next to the woman who’s wearing a skirt and a business outfit rather than this male that’s sort of smellly-looking and disgusting. In that split second, you made a trust kind of decision rooted in some kind of social bias.

Using a public bus as the site for this basic anecdote, she highlighted the everyday and often implicit nature of these biases in American life. Just because people are not acting in loud or overtly prejudiced ways does not mean that ingrained and pervasive biases do not exist. “We have so many biases,” she added. “And we’re surrounded by all of these biases every single day.” A desire to more deeply understand the internalized impressions and subtle behaviors that qualify our social world drives many social neuroscientists to seek answers in the brain.

Carrie and others in SCL, devoted to studying the biological basis of these everyday judgments, insist that SCN can profoundly illuminate our understandings of this psychology. One of the most famous studies in SCN, which relied on SCM findings, explored the biological basis of social aversion to drug abusers and homeless individuals. FMRI imaging analyses revealed similar patterns of brain activity to members of these social
groups and to non-human objects (Harris and Fiske 2006). The implications of the findings were that “dehumanization”—literally lowering one’s status, as a human being, to the level of a pen—was the neuropsychological mechanisms driving averse behavior toward members of these groups. Of course, scholars across many disciplines have long invoked the term “dehumanization” in studies and descriptions of marginalized peoples—symbolically of course—but there is something quite profound about being able to say that dehumanization could be the actual neuropsychological mechanism in play. This landmark study also supports the notion that there is something deeply cultural about our brain itself—in so far as it can biologically capture a culturally constructed linguistic concept.

Nate explained, when studying the biological basis of these psychological processes, one needs also to consider the underlying evolutionary philosophy. In a discussion on the ways through which globalization and the rapid growth of new technologies has impacted evolutionary understandings of the source of everyday human interaction, Nate called upon the “‘misfiring’ hypothesis,” or evolutionary theory for “why we are nice to strangers.”

One way to interpret the fact that we are nice to strangers is to say that humans ‘evolved’ to interact with strangers—so there is a function. But, the misfiring hypothesis would say that, actually, humans evolved to be nice to people they know. But right now, it’s just happened that world has changed so fast, people around us, they’re not people we know. We’re just using the old psychology to deal with the new people.

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39 Upon viewing images these individuals, participants showed reduced medial prefrontal cortex (mPFC) activation, a region of the brain strongly implicated in social versus nonsocial cognition. This region was more strongly activated when viewing individuals who belonged to less marginalized groups.

40 This is part of the argument Downey and Lende make in Encultured Brain: An Introduction to Neuroanthropology (2012)
According to Nate, the attitudes and behaviors that guide our everyday social interactions have not “caught up” to the transformative processes that have given way to contemporary societies. Our old human instincts are still at work—a belief that largely explains why warmth and competence are considered to such robust appraisals of stereotype formation in psychology. Cross-disciplinary support of the SCM draws from the evolutionary significance of warmth and competence as adaptive strategies (Cuddy et al. 2006). From the perspective of human survival, these dimensions ask two key questions: “What are this person’s intentions?” and “How capable is he/she of acting on them?” The “basic and adaptive” nature of these considerations grounds the strongly defended belief that these dimensions are not only fundamental, but also universal. “They have evolutionary significance,” Kate asserted. “These aren’t arbitrary distinctions. They really seem to be the fundamental things that you size up about people.” The evolutionary basis of warmth and competence is an enabling argument that I will revisit later in the chapter.41

Warmth and Competence: A Framework for Society

Although the SCM only emerged in recent years, the notion of warmth and competence as the pillars of stereotyping can also be traced to classic studies in social psychology. In the context of everyday social relations, warmth indicates, “an accommodating orientation that profits others more than the self” while competence represents “self-profitable traits related to the ability to bring about desired events” (Peeters 1983). Early psychology research into social identity formation and person

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perception (Asch 1946) first demonstrated that the inclusion of the trait warm versus cold shaped impressions of a person otherwise described by competence-related characteristics such as intelligent, skillful, and determined. Later studies on prejudice (Allport 1954) undermined traditional understandings of the phenomenon as simple dislike or antipathy; that is, the feeling of prejudice can differ by group and be saturated by distinct emotions, despite a common, underlying animosity. That is to say, negative stereotypes are grounded in subtle (or not so subtle) forms of prejudice.

Building on these early theories, the SCM attempts to predict and conceptualize the differentiated prejudices that arise from these two appraisals, in a four-quadrant planar model. These four quadrants form the scaffold for four kinds of stereotypes associated with four specific emotions: pride, envy, pity, and contempt (See Figure 3.2) (Harris and Fiske: 847). As the SCM is understood by its initial application to social groups in “American society,” groups stereotyped as competent and warm (i.e. the middle class) elicit “in-group” emotions of pride and admiration. That leaves three remaining quadrants. According the model, “mixed stereotyping” gives way to modest prejudices that elicit feelings of envy (low

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42 Allport (1956) contrasted the stereotypes of Blacks as lazy and Jews as overly ambitious to show differences in perceptual affect. That is, both groups were mistrusted, but the source of that feeling differed starkly from one group to the other.

43 See “Social groups that illicit disgust are differentially processed in mpFC” (Oxford Journals 2006)
warmth, high competence) or pity (high warmth, low competence). Groups that fall into these categories include the rich and elderly, respectively. The most intense forms of prejudice, however, are tied to the final quadrant (low warmth, low competence). People like welfare recipients or drug addicts who fall into this category are thought to elicit feelings of contempt or disgust. The dehumanization study mentioned previously sought to explore the neuropsychological mechanisms behind attitudes toward and treatment of those who fell into this fourth quadrant.

**Mapping Clusters**

The SCM theory holds that the attitudes and behaviors in most any social context can be explained and predicted by “clustering” that occurs across the two-dimensional framework of this model (See Figure 3.3). Clustering simply refers to the clumping of social groups into larger groups that are stereotyped on the basis of similarly evoked emotions. These clusters have formed a kind of social map of how popular culture or society at large has come to view demographic diversity in the United States. The framework for this map has also been performed to understand perceptions of more specific communities (i.e. immigrants) and piloted on nontraditional collectives: animals, global corporations, and so
That is, the diversity among non-human categories to which we often ascribe human or social qualities (i.e. a pet dog is viewed differently than a snake or cockroach, certain brands are viewed as more “trustworthy” or “reliable” than others, etc.) has also proven to be “mappable.” Despite the remarkable efficacy of this simple, two-dimensional model in the way that it does make sense of the social world by way of visual-spatial organization, it also begs a serious anthropological conundrum. By making these psychological and social realities visible through forms of mapping, researchers are working to bring dehumanized individuals out of the margins while drawing attention to the popular biases that have rendered them stuck in the first place. However, can we, and should we, be reducing understandings of the social world to clusters that spread across a four-quadrant model?

Social Neuroscientific Mapping: An Exploration of Reductionism in SCM

Cultural anthropologists have also sought to destabilize social biases by questioning the beliefs and assumptions that justify the otherizing ways we treat certain groups and communities. Their method of choice: descriptive ethnographies and theoretical analyses of the communities and beliefs in question. As I have just shown, social neuroscientists draw attention to these discriminatory biases through the construction of psychological models and mapping of social phenomena onto the brain. While the latter can be thought of as “an experimental science in search of laws,” the former can be understood as an “interpretive one in search of meaning” (Geertz 1973: 5). This methodological and epistemological tension in the ways through which each discipline understands the social

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44 These are unpublished findings discussed in SCL and a talk given by Susan Fiske in Fall 2012.
world lends itself to critical questions that apply to both sides: What benefits are gained from the approach? What aspects of understanding are sacrificed?

The first of these questions can be answered quite simply. Anthropological accounts of society and culture arise from the premise that the complexity and depth of the subject must be preserved to the greatest extent possible. This endeavor is accomplished through the incorporation of field interviews, acknowledgment of personal subjectivity, and lengthy, theoretical explorations of observed social practices. This approach lends itself to more comprehensive and humanizing understandings of the social world. For social neuroscientists, experimentally produced models and brain mapping are viewed as valid heuristics that make the overwhelming complexities of the brain and social world more comprehensible. In fact, they are the visualization tools that present the very problem of complexity itself. As I explained in Chapter 1, the power of image—be it brain scan or dimensional model—is largely rooted in the fact that it is just easier to understand. “That’s why we have PowerPoint slides,” Nate said. For the average person, the weight of anthropological explanations, though purposefully heavy, can be difficult to take in or grasp. “That’s also what’s so great about this field,” Annie said. “People can get their hands around it and understand what it is. And our methods are what make [our investigations of brain and social cognition] really approachable.”

However, there are also meaningful factors at stake in this “neuroreductionist,” albeit easy to conceptualize, approach. 45 When considering the SCM, as I will examine further in the following paragraphs, the identities, histories, and cultures that qualify both

45 Although Martin (2000: 584) employs “neuroreductionism” as the notion that culture is entirely rooted in neurobiology, my use of the term refers to the reductionist models and approaches (be them of the brain or society) to understanding social behavior in SCN.
individuals and communities get cast aside. Moreover, the very act of creating a social map from the scientific ivory tower calls to mind important questions of power and knowledge. Who are the individuals producing these social maps? How do these imposed understandings shape our own understanding of the social world? How do these mapped representations of the everyday social differ from the lived experience of everyday social life? What understandings get lost? And finally, how do these social maps lend themselves to similarly reductive investigations and mappings of the brain? Drawing from Certeau’s exploration of the mapped city and my own experience performing a “Duke-community” SCM, I call attention to two knowledge gaps produced from this planar mapping of complex social worlds: the space and the system.

Before I delve into my analysis, let me first provide a brief overview of the study itself. From August 2012-March 2013, I surveyed more than 60 Duke University undergraduates on their impressions of 13 groups that comprise Duke’s campus: undergraduates, graduate students, research assistants, professors, administrators, secretaries, medical personnel, athletic staff, gardeners, construction workers, janitors, food service workers, and pastors. The initial purpose of this investigation was to obtain a perspective map of the larger Duke

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46 See Foucault (1980)
47 “Walking in the City” is an influential chapter written by French theorist Michel de Certeau (194), where he describes the strategies of institutional bodies (governments, corporations, etc.) in producing things like maps to describe cities. He contrasts the point of view from the World Trade Center to that of the street-level walker to illustrate how lived experience cannot be fully predicted or determined by the efforts of the organizing bodies.
48 Certeau argues that the city is “founded by the possibility of a three-fold operation”: the production of its own space, a synchronous system, and a universal and anonymous subject (Certeau 1984: 159). Here, I condense these three factors into two: the space and the system (which transforms into subject).
49 See Example Survey in Appendix.
community—the many and diverse occupational groups that enable the university to function as an institutional whole—from the undergraduate point of view, specifically. These groups were primarily chosen based on personal observations of daily encounters, but also on additional suggestions from my SCN advisor. Thirteen versions of the survey—one for each group—were created for this study, however, only three randomly selected versions were given to participants for completion. In addition to a consent form, participants were also asked to fill out a demographic survey, in the case that we wished to run more complex, demographic analyses on the data (which we have not). After compiling the collected data (logging numerical survey results on a single Excel file), several statistical analyses were performed on SPSS to yield the final scatter plot. Interestingly, and in line with the “science is subjective and constructed” argument I have been weaving through the pages of this project, I was given three versions of the model from which I could choose. That is, there were three very different clustering arrangements that resulted from the computerized data analyses. Most importantly, I could pick which one of the three made most “sense,” based entirely on my own intuition and experiences on campus (Figure 3.4 shows the version I selected.). Upon looking at this rough image, a rudimentary version of a SCM that has not been cleaned up or remodeled on Excel or SPSS,

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50 See Appendix for survey.
one can also see that the clusters did not form “neatly” themselves. An initially incoherent scattering of occupational groups was made coherent by physically demarcating clusters by drawings circles (Figure 3.5 depicts a cleaned version of the model). It was through this subjective, constructive, cultural process that my Duke-Community SCM was produced, and it is this example model that I will employ in my theoretical critique of the SCN below.

**Figure 3.5 Duke Community SCM**

**From Urban High-Rise to Ivory Tower**

I return again to the laboratory—the so-called “ivory tower”—within which science is performed and from which scientific knowledge is produced. In chapter 1, I quoted Charles, who declared, “I just want to lock myself in my ivory tower and study human interaction!” Though his statement was half-joking, there is something to be said about the kind of knowledge produced from this “ivory tower approach” to understanding. In “Walking the City,” Certeau argues that the everyday city is different than the official version, mapped by architects and urban planners. To envision this difference, consider two perspectives: that when looking down, atop a high rise building and that when walking through the city itself. These distinct points of view beg important questions of visibility and can be likened to the science produced about the everyday social world and the complex realities that distinguish that world. The ivory tower, or high-rise, point of view gives way to “imaginary totalizations produced by the eye” and sourced from a map laid
out by scientists themselves (Certeau 1984: 158). For the SCM, these totalizations are created through the reductionist mapping of the social world as four quadrants onto which selected social groups cluster. “Ordinary practitioners” or everyday experience, however, exists “below the threshold where visibility begins” (Certeau 1983: 158). Through the creation of maps like the SCM, the complexity and “strangeness” that characterize the everyday become lost. In this section, I use my own Duke Community SCM (and the experiences that produced it) to explore the everyday complexities that are put at stake—namely, the space and system—when SCN researchers map the social world from above, rather than within.

The complex social space that is the Duke Community becomes threatened through the mapping of the whole as an interaction between a finite number of constituent parts. This claim holds true even if that map was produced by way of the “scientific method,” (as was mine). This reduction in everyday complexity is chiefly driven by “the flattening out of data onto a plane projection,” or the obvious spatial transformation of an everyday, multi-dimensional world onto a two-dimensional scale (Certeau 1984: 159). The rationality implied by the framework of this model and subsequent mapping onto it also leads to the repressing of certain lived realities, or “compromising pollutions” that characterize the everyday community (Certeau 1984 159). In the case of the SCM, these compromising factors include the historical, political, economic, and institutional factors that give rise to these stereotyped perceptions. These aspects also provide more meaningful and comprehensive explanations for why these stereotypes exist and how they are lived each day.
Of course, people tend to ask these questions when analyses yield peculiar results—for example, the fact that Duke undergraduates viewed university administrators in the same low-warmth/low-competence cluster as food service and construction workers (refer to Figure 3.4). The SCM position of these latter two groups, whose jobs lie toward the bottom of the occupational totem pole, was more or less expected according to the model and the groups in question. Administrators, on the other, would have been thought to cluster along with undergraduates, graduate students, and professors in a high-warmth/high-competence cluster, as they are the individuals who lead the reputable university attended by the students being surveyed. Because this result did not match the prediction, I dug deeper into this relationship (if only out of my own curiosity): What kind of campus culture does Duke foster when it comes to administrator-student relations? Is this Duke-specific? Are there recent events that can explain this attitude? Is there a longer-standing history of antagonistic feelings? Is this just an experimental fluke?

And while these were important questions to consider, the more important question to my argument asks something different: Why do we not ask these questions about every group, about all positions on the map, and about every interaction? These are the complexities that are cast aside by way of this reductive model that outlines the space, producing “imaginary totalizations” that fail to present a complete picture, but that we perceive as the whole picture (Certeau 1984: 159). What is more concerning is that these “lapses in visibility” that often “reproduce the opacities in histories everywhere” (the fact that history tends to repeat itself both within this institution and outside of it) (Certeau 1984: 159).

The second reductive threat has to do with the transformation of the complex university system into a “universal and anonymous subject” that is both the Duke SCM, and
general SCM itself. That is to say, by mapping a pre-selected and limited number of groups onto the model, “it gradually becomes possible to attribute to it...all the functions and predicates that were previously scattered and assigned” to many different and “real” subjects (groups and individuals that are not necessary limited to their occupational label) (Certeau 1984: 159). The social space explored through the SCM, in any context, includes many more groups and factors than could ever be conceived or incorporated into the model. Yet, the Duke SCM, “like a proper name,” constructs the social interactions taking place between undergraduates and other occupational groups on campus “based on a finite number of stable, isolatable, and interconnected properties,” which despite ‘making sense’ are largely incomplete (Certeau 1984: 159). The transformation of the SCM itself into a truly “universal subject” —by way of evolutionary-grounded dimensions and “proven” adaptability in different contexts—also lends itself to this concern. Any community, society, social world, and so forth, is far more than the perceived positions and interactions of labeled actors across a grid.

**Strategic Reductionism**

Having established that SCM approach to understanding the social world is reductionist and totalizing in many regards, one might wonder why psychologists and social neuroscientists find it to be so useful, even powerful. What benefits can be gained from this type of model?

One of the best answers I received to this question came from Kate. As I stated earlier, Kate is first-year cognitive neuroscience graduate student in SCL who also has an in-depth background in evolutionary biology and anthropology. With theoretical models
like the SCM, she explained, it is essential to begin simple and compulsory to be reductionist.

Kate: I think when you're trying to understand something as complex as the brain, it’s impossible not to reduce because you're starting at an incredibly high level of complexity. I don't think we would get anywhere if we initially took an approach that allowed us to soak in all the complexity.

For Kate, the reductionism inherent to the SCM is particularly important in the way it can drive studies that incorporate neuroscientific methodologies. Brain function is far more enigmatic to social neuroscientists than the social world itself, so employing basic but evolutionary “robust” models for understanding phenomena like bias, prejudice, and stereotype formation is both helpful and necessary.

Kate: The general approach is to start very simple, and if you see there is a robust phenomenon, then people start asking more questions: Does this hold in other contexts? What about this? What about that? What about these factors? And it goes fairly quickly from very simple to complex, and I think that’s when further research is added on, so it’s still a reduced format, but at the same time I think that people would never ever get anywhere. It’s reduced as a necessity.

Kate illustrated an important point, which brings me to the conclusion and main purpose of this chapter: to demonstrate that in spite of truly reductionist models that show critical “lapses in visibility,” there is *strategic* or practical value to their use. Her comment is one that several SCL researchers, like Natalie, echoed during our interviews—that SCN is presently operating at an early stage in which the methodologies used and questions asked are still severely limited.
Natalie: I think [SCN] and even models like the SCM are reductionist—but they have to be. The brain is this whole complex organ, and scientists are literally looking at the way microscopic atoms respond to magnetic fields. Taking that amount of tiny and trying to zoom back out and actually say something about social behavior... it's a lot that most people just don’t understand.

The newness of the field not only lends itself to more abstract questions of the authentic, material, and technical qualities of the science, but also to more practical considerations: What questions can be asked? What level of complexity can be explored? What claims about social behavior can be made? In order to advance the field, to go “somewhere,” as Kate put it, researchers must start simple and build. This acknowledgment is the first part of my argument for strategic reductionism in the neurosciences, particularly as it is demonstrated by the SCM. That is to say, reductionism—reducing the mass complexity of the human brain to study and activation of just a few, targeted regions—is strategically necessary for the field to further itself and ask more complicated questions about brain function in the future.

The second part of my argument deals specifically with the SCM and the neuroscientific knowledge to which it has contributed. Although I have argued that the complexity and everyday realities that qualify social worlds become invisible through the construction of the SCM, certain subdued realities are also brought to light through this construction—namely, the marginalization of groups like substance abusers and homeless individuals, but also our campus food service and constructions workers who keep the university running daily (Who would prepare food for students on campus? What would it feel like to walk amidst broken buildings and dirty landscapes?). That is to say, by visually
demonstrating that these groups are viewed in a marginalized category—the low-warmth/low-competence quadrant—beside members of other constituent groups, viewers can more clearly recognize the attitudes or stereotypes that initially placed these individuals in that category. The fact that neuroscience studies have also “mapped” the brain activity associated with attitudes toward marginalized social groups and posed dehumanization as the driving psychological mechanism further supports my previous point. By making social prejudices visible by reductively mapping on both paper and the brain, social neuroscientists are strategically contributing to more concerted efforts to rethink societal perspectives and resulting behaviors, while also contributing to the advancements in their field.

Although I have just argued for reductionism in certain regards to SCN, I do believe a threat still exists—particularly in the way reductionism lends itself to deterministic claims. In the next and final chapter, I explore a site where both anthropologist and neuroscientists should not welcome or accept this tendency: the U.S. Courtroom.
CHAPTER 4
From the Laboratory to the Courtroom:
Neuroethics and Free Will in the U.S. Criminal Justice System

Does modern neuroscience deepen our ideas about determinism, and, with more determinism, is there less reason for retribution and punishment? Put differently, with determinism there is no blame, and, with no blame, there should be no retribution and punishment. This is the simmering idea that people are worried about. If we change our mind about these things as a culture, then we are going to change how we deal with this unfortunate aspect of human behavior involving crime and punishment (Gazzaniga 2011).

On May 25th, 2002, The Economist ran a cover story titled “The Future of Mind Control,” calling for a “public debate over the ethical limits to [cognitive] neuroscience” (The Economist: 2002). Although the article never explicitly used the word “neuroethics”—the term was coined only a few months later by philosopher Adina Roskies in a piece for the journal Neuron titled “Neuroethics for the New Millennium”—it controversially addressed the growing concerns that had developed in response to new “neurotechnologies” and diverse applications of neuroscientific methodologies. The most alarming passage reads:

If you want to predict and control a person’s behavior, the brain is the place to start. Over the course of the next decade, scientists may be able to predict, by examining a scan of a person’s brain, not only whether he will tend to mental sickness or health, but also whether he will tend to depression or violence.
Predict and control. This is the power of the brain technology, the article suggests—or at least the opportunity it provides to scientists as they continue to explore the boundaries and limits of free will and human agency. Today, the neuroscientific community still cannot predict with confidence whether an individual will “tend to mental sickness” or is predisposed to depression or violence. Yet, advances in neurotechnology continue to push the field in this direction, such that people—even intelligent, educated people—believe that brain-based claims about individual disposition can be made from SCN data. This tendency has become increasingly common within the U.S. criminal justice system. “If you look at neuroscientific evidence that has been introduced in the courts this way, it has just skyrocketed,” said Lindsay, a J.D. post-doctoral fellow in SCL.

When exploring how neuroscience can contribute to understandings of self and society, there areas were we should welcome “reductionist” tendencies—the SCM and its related brain research, for example. However, there are also places where we must maintain our skepticism; reductionist understandings can foreground grave misinterpretations about brain data, misinterpretations that can decide questions of life or death. That is to say, the modifier “strategic” is only appropriate when neuroscience is being applied carefully and productively. Here, I step away from the laboratory—from the discourse that surrounds it, from the rhetoric that describes, and from the mapping that goes on within it. I conclude with a new domain, described as the “moral barometer” of American society, where subject becomes defendant and data becomes evidence. The misinterpretation and misuse of neuroscience that takes place within this space—the U.S. courtroom—is a testament to the dangers SCN research can pose to understandings of self, society, and American culture at large.
The many investigations within this larger project—to demystify the world of social neuroscience, to question metaphors and pose new ones, and to deconstruct the scientific process and that maps that emerge from it—converge and become newly relevant when considering the grave ethical concerns surrounding neuroscience and the U.S. criminal justice system. In this final chapter, I will examine the factors at stake when we allow SCN to influence public opinion unchecked, showing that the responsibility to control this trend ultimately lies in the hands of those who produce and disseminate the science.

Why the Courtroom?

As an anthropological site, the U.S. courtroom is unquestionably relevant. Our legal system functions as a long-standing source of personal values and shared beliefs throughout American culture. In a related conversation with Lindsay, whose research focuses specifically on questions of neuroscience with the U.S. criminal justice system, I asked why she believed the courtroom had become a space where questions of free will, ethics, and moral responsibility have jointly emerged. Without hesitation, she explained that in terms of the courts’ basic purpose, to dole out punishment for bad moral behavior, my observation was actually quite well reasoned.

Lindsay: I think the courts acts, in a way, as our moral barometer. They brings up a lot of questions just in terms of what they do in terms of ethics and morality. So it’s not just following the rules, but it’s also how we interpret them, how we punish transgressions, how we create social order. I think that’s one thing that binds us together as a group, as opposed to moral beliefs, which everyone has their own. It’s
the philosophy of law. I think it brings everything together, and it applies to all people—not that everyone follows it, but you know what I mean, theoretically. Lindsay’s rich comment draws attention to several important aspects of the U.S. criminal justice system, the most important of which being the social order and common values it fundamentally prescribes. The introduction of neuroscientific evidence into the courtroom, however, has recently tampered with its effectiveness as a moral barometer. The misuse of brain imaging evidence and expert testimonies, as I will later explain, clouds judgments of moral responsibility. Moreover, increased reliance on cognitive neuroscience and behavioral genetics evidence alike is challenging long-standing notions of free will and human agency, upon which the very philosophy of law is based. In this way, this final chapter presents an interesting turn to the argument I have constructed through the previous chapters (that SCN is shaped by culture and is, by the same token, shaping cultural understandings of self and world). The caveat is that while SCN is certainly shaping popular understandings of personhood it is simultaneously threatening historically constituted ways of understanding concepts like free will and human agency, which are the platform for our modern legal system. I will explore the misuse and misinterpretation of brain science evidence and its implications on free will and agency in the following sections.

**Legal Misuse and Misinterpretation of SCN**

The misuse and misinterpretation of SCN research within the legal setting is a well-documented fact. The stark increase in the implementation of brain science evidence, as a means of absolving moral responsibility, has demanded that neuroscientists think twice about the applications and implications of their research findings, particularly in the way
they are presented to non-scientists. Carrie, who hopes to become an expert witness in psychology and neuroscience someday, explained that the visual power of brain scans, which I described in chapter 2, has shown particular salience in the courtroom context compared to other kinds of evidence.\textsuperscript{51}

**Carrie:** One thing that I’m looking at is how different kinds of evidence can bias responsibility and punishment judgment. So, if you present a jury with this evidence that a person has some weird abnormal brain scan, the jury is probably going to believe that the defendant couldn’t control himself because we have these folk psychological theories that this kind of scientific evidence maybe diminishes the person’s responsibility.

Carrie’s comment highlights a real and frightening fact: The persuasive power of functional brain images extends beyond cultural conceptions of self. The notions of free will and therefore criminal responsibility that are undermined through the incorporation of scientific brain images can determine the outcome of a human life. That is, the difference between first-degree murder and manslaughter rests on the attribution of responsibility by juries, which can be easily biased by neuroscientific evidence (Mauro 2012).

Lindsay elaborated on Carrie’s comment, describing how the U.S. courts are both fascinating and upsetting sites for studying the power of SCN research. “People are actually testifying about it,” she said. “They’ve done defenses looking at ‘risky behavior’ or ‘anti-social.’ They’ll have the expert come in and testify that, ‘When I gave him the scan, he showed low risk aversion, so he doesn’t understand things could be dangerous behavior.’”

\textsuperscript{51} This idea is similar to that explored in the the UCAL/Colorado State University Study referenced in Chapter 2.
And people will believe the expert. Lindsay’s point is important to consider, because it demonstrates that it is not simply the brain images that people trust—it is also the science itself.

**Neuroscience and Law: Conceptual Chaos**

The heated debates provoked by the integration of neuroscience into the courtroom are actually grounded in fare more than the persuasive power of the fMRI image and folk theories about what science can prove. Aside from these previously explored concepts, rests two other factors: first, a philosophical clash between neuroscience and law and second, significant methodological limitations of the SCN technologies themselves.

To examine the first factor requires revisiting the notion of free will. Lindsay explained that before jumping to questions of criminal responsibility, one must understand the contradictions associated with the junction of neuroscience and law, which make questions of neuroscience in the courts particularly problematic.

**Lindsay:** The concept behind law is that we have free will, so we can determine our own actions, and that’s why we can get punished for them. If we couldn’t do it on our own then we couldn’t get punished…. Now, neuroscience stuff is coming in and saying that this person was predetermined to act in this way, so it’s not their fault. So it’s a conflicting view I think, which is why it’s bizarre that the courts are using it because you can’t really argue both at the same time.

For Lindsay, who has been trained in law, the use of SCN evidence to lift punishment is especially curious. This is because its use, based in claims that free will is an illusion, contradicts the premise of law itself. Her point also underscores the power of the
neuroscientific institution in the way its own cultural authority can actually subvert longer-standing, socio-cultural institutions like the U.S. criminal justice system. “Everybody just thinks, ‘Neuroscience is cool!’ They just don’t understand that concept of law is that we have free will,” she said.

Lindsay went on to offer a more specific but equally grave conceptual flaw: the application of neuroscientific evidence to the notion of mens rea. She explained that in order to claim insanity or mitigation, one must prove that the defendant did not have full awareness of what he/she was doing at the moment of the crime (lack of mens rea). This theory is crucial to keep in mind when considering how neuroscience is applied, or misapplied, to this defense.

Lindsay: You can be incompetent to stand on trial, but that’s how you’re feeling during the time of the trial. Mens rea comes down to what you were feeling or experiencing the second you committed the crime. And that’s a huge part of law. So when people do neuroscience studies or genetic marketing, it makes no sense right? Because they’re looking at what someone thought on a Tuesday afternoon when they had tests done and scans done. Whatever task they give is obviously not going to be ‘kill someone,’ so obviously you can’t replicate it. And statistically it’s really bad because you’re comparing an individual to a norm, and that’s just wrong.

Here, again, Lindsay highlighted several crucial points, the broadest of which is simply that that misuse of neuroscience rests not only its misinterpretation by juries. The gravest misapplication is that to legal theory itself. As Lindsay pointed out, neuroscience cannot yet (and may never) make strong dispositional claims about a criminal’s past state of mind (the given experimental task is not going to be “kill someone”). This limitation is due
largely to the nature of the science and statistics, which can only draw broad inferences about populations based on data compiled from sample groups. Imaging technologies are far from making complex behavioral claims at the individual level.

The courtroom limitations of neuroscientific methodologies were also explained by Nate, who expanded upon Lindsay’s mention of “the norm” in SCN research. While recently applying for a collaborative research grant in SCN and evolutionary anthropology, Nate performed an extensive literature review on contemporary methodologies in neuroscience. He combed through each issue of the top-four neuroscience journals and the top-four science journals between July 2010 and July 2012 to determine whether a methodology presently existed for neuroscientists to study animals and humans outside of the laboratory. The short answer to his literature search was “no”—as of present, scientists cannot study the brain in non-laboratory settings. The details of his answer, however, were particularly meaningful when considering the contemporary relationship of neuroscience to law.

Nate: What this really means is that all of our current knowledge of brain function is based on laboratory animals—i.e. mice, chimps, and rhesus macaques—plus industrialized, well-educated, well-fed college undergrads. And this is our current knowledge of brain function.

Hippo’s comment illuminates the nature of cognitive neuroscience research and the fact that the limitations of the methodology alone make the transition of data from laboratory to courtroom unsmooth. Presently, we cannot draw conclusions about the control an individual has over their behavior based on subtle brain structure abnormalities, let alone functional responses to a given task. And the application of a body of literature primarily
drawn from laboratory animals and university students ("the norm") to criminal minds is, inherently, problematic. Yet, fundamental issues of the legal system such as criminal intent, accountability, insanity, and truthfulness are being revisited more forcefully through contemporary advancements in neurotechnology. New developments in the field make the possibility of individual reliability seem promising in the near future, however, people like Lindsay remain skeptical. "To be honest, I really doubt we'll ever be at the point," she said.

Regardless of when and if neuroscience evidence becomes sufficiently reliable to make forceful claims about criminal responsibility, the threat and manifestation of misuse and misinterpretation will persist. The important aspect to consider then is the solution, which does not begin with misinterpretation, but misuse. That is to say, when considering the persuasive power of neuroscientific inscription devices—the brain scans themselves—we cannot ask juries to question the image and science before their very eyes. Seeing is believing, and, as I have already demonstrated, much belief goes into the construction, circulation, and interpretation of brain images. "I think people perceive it to be the answer to all questions," Lindsay echoed. "But both you and I know that is absolutely not the case." Acknowledging this inevitable reality, neuroscientists can begin taking greater initiative and responsibility over their own research and ethical practices.

**Neuroethics and Beyond: Claiming Responsibility for Reductionist Misuse**

The ethical and moral implications of neuroscience both within the courts and inside of the laboratories have given way to a field called neuroethics. The mission of the discipline is two-fold: first, to examine "the ethics of practice" (the ethical considerations neuroscientists must make when designing studies and performing experiments) and
second, to inspect “the ethical implications of neuroscience” (the questions I have listed above) (Roskies 2002). While I have spent the majority of this chapter focusing on the latter point—the questions of free will and criminal responsibility raised by new neuroscience methodologies—I will switch gears for the remaining pages. The neuroreductionist presentation and interpretation of evidence—that individual data obtained from imaging scans and brain tests can absolve guilt or clarify questions of accountability—demonstrates that the courtroom is a space where reductionist approaches to understanding the brain should not be accepted. This misuse of neuroscientific evidence also begs the question of what must be done.

As I explained in the previous section, the responsibility lies in the hands of the scientists and has been self-recognized through the creation of disciplines like neuroethics.

“Researchers need to be really responsible and say, ‘Look here’s what behavioral neuroscience and genetics can tell us, and here’s what it can’t,” Lindsay said. “Because the average juror, or judge for that matter, isn’t going to know how to ask those questions.” That is to say, most everyone who is not a non-scientist is susceptible to the persuasive power of the brain scan. This acknowledgment is also why the weight of the responsibility rests so heavily on their shoulders.

After Lindsay made this comment, I asked if she could elaborate on the type of research neuroscience can faithfully provide the courts. She explained that scope of neuroscientific evidence should only reach so far as to compliment other fields or methodologies. She said there are some psychological courtroom theories—for example, one that claims witnesses perform poorly at cross-race identification—that are well
supported by brain science. “We can actually show that in the brain,” she said. “So it’s gone beyond something that’s a theory, and now it’s dependent on brain mechanisms.”

Being ethically and personal responsible, however, is the chief task for any brain science professional, be him/her a psychologist, psychiatrist, or neuroscientist. As Lindsay and Carrie both explained to me, expert witnesses are paid large sums to testify and require no more than access to a scanner. Carrie, who I described in chapter three as being interested in studying everyday social biases, explained that investigating how those biases become injected into the U.S. criminal justice system especially fascinates her. In fact, she hopes her research in SCL and graduate studies in cognitive neuroscience will prepare her to someday serve as an expert witness in courtrooms. Witnesses who posses comprehensive knowledge of cognitive neuroscientific theories and methodologies, the ability to explain those concepts to an inexpert jury, and an overall sense of ethical responsibility will only serve to benefit the system.

**Carrie:** I would want to be really well-versed in the neuroscience and psychology of the kind of biases I was describing earlier and be able to be an informed, expert witness that could help these poor people who get pulled in the wrong direction in the criminal justice system because of these biases that people hold. That would be awesome if I could somehow contribute to that.

These kinds of efforts, at present, are the best that members of the neuroscience community can individually make. Claiming responsibility for one’s research and sufficient knowledge of that science is the best way to prevent the continuation of this misuse. In the meanwhile, Carrie, Lindsay, Nate, and others all agree that allowing SCN research to contribute alongside other fields is appropriate, and even necessary given the fact that it
can enhance understandings in some ways. “This is focusing on being a compliment to other methodologies and not trying to stand too much on our own,” Lindsay said. “Because we’re not just there. So it’s not fair to throw someone under a scanner and say, “Now I get it!” The SCL members emphasized that SCN is still in its infancy stages, so external domains must not be hasty in eagerly welcoming the science.

The Same Fundamental Questions

I end my thesis not in the laboratory but in the courtroom because it is the space in which SCN has made the most recent and powerful socio-cultural impact. The legal questions raised through the implementation of neuroscience in the courts give way to deeper, anthropological considerations. That is to say, law, ethics, and morality ask fundamental questions about human nature, human belief, and human culture. This is the work of anthropology. Today, however, the way people are asking these questions is being pushed forward into the public sphere by fields like SCN and genetics. Earlier, I had expressed the idea that cognitive neuroscience is simultaneously shaping and threatening notions of free will and agency that historically constituted the meaning of being socially human. This claim is certainly true, especially if we consider the courts a cultural force that helped foreground these historical perspectives. Yet, rather than viewing neuroscience and law as fundamentally contradictory positions on the subject of free will, for example, I find it more interesting to view both has separate cultural forces that have begged the same fundamental question at distinct moments in time. It makes sense that in today’s world, and especially in the United States, where our criminal justice system is in decline and
science is on the rise, that long-standing questions of free will, agency, morality, and ethics are pressed not by the courts, but instead by the laboratories.
CONCLUSION
Navigating Two Worlds, Stumbling Between

*The purpose of anthropology is to make the world safe for human differences (Benedict).*

Several weeks ago, I delivered a PowerPoint presentation of this ethnographic study to SCL, my informants. And I am fairly certain that the talk I gave took everyone by complete surprise. Reactions were neither positive nor negative, more just confused about what I was doing in that room, parading as a SCN researcher among them.

As both member and observer of the laboratory over the past several months, my background in cultural anthropology and interest in cognitive neuroscience were interpreted by my fellow researchers as an overarching concern for “cultural neuroscience,” an emergent neuroscientific field interested in uncovering cultural influences on human brain function, or how socio-cultural environments lead to underlying differences in brain function. My thesis does not fall under the field of cultural neuroscience, however. In fact, that approach to cognitive neuroscience was never my intention with this undertaking. Yet, I had never before addressed my fascination with the encultured aspects of SCN in the presence of the entire lab.

I had a hunch that my presentation would take people by surprise. During my field interviews, the SCL researchers were not struggling to answer my questions, as I had perhaps imagined they would. Their ideas were sound, pensive, and insightful. I do, however, believe there was some confusion about why I was considering “hippie” topics like selfhood, the brain/machine interface, reductionism in the sciences, and so forth, in the

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52 This field is part of what Downey and Lende (2012) refer to as Neuroanthropology.
first places and how that was supposed to form the foundation of an undergraduate honors thesis.\(^{53}\) A practical answer would simply be that cultural anthropology was an unfamiliar domain, whose questions fundamentally differed from those asked by psychologists, neuroscientists, and even evolutionary anthropologists. In retrospect, I am fairly certain that their confusion stemmed from my own hesitations about what exactly I was trying to do, and then say, about social cognitive neuroscience through a multi-chaptered project in cultural anthropology.

During the initial months of writing, my behind-the-scenes thinking revolved around what it means to be a cultural anthropologist and what it means to be cognitive neuroscientist. This thinking seeped onto my writing. The first three chapter drafts I submitted to my advisors began with some version of the same anecdotal narrative about questions that could be explored through cultural anthropology that can also be explored through social cognitive neuroscience—but in distinct ways that were inherently at odds with one another—and how that dilemma was problematic and confusing to me.\(^{54}\) This pattern of finding myself “stuck” between two disciplines plagued my journey in constructing this project. Although this notion of epistemological difference is one I have both alluded to and explicitly explored in the previous chapters, it is an underlying tension I would like to explicate on a more personal level in these final pages. The existential crisis that sprung from this project became, “Why can't I be both a neuroscientist and cultural anthropologist?”

\(^{53}\) Charles referred to the themes explored in this thesis as “hippie sorts of questions” during my presentation to SCL.

\(^{54}\) Thanks to both Professors Solomon and Settle for kindly pointing this pattern out to me, early.
The Evolution of this Project

To explain how this crisis developed, I would like to begin with the moment I first conceived the relationship between neuroscience and cultural anthropology.

It was a typical first day of classes—one of the final days in August and the beginning of my sophomore year at Duke. Having shown up just minutes before class, I managed to procure one of the last seats in a back corner of Friedl 204. The course was “Medical Anthropology,” taught by Diane Nelson—my first anthropology elective at Duke and a safe choice for an anxious pre-med, experimenting with the “audacious” possibility of choosing the humanities as a collegiate course of study.

Class commenced with introductions—first the professor, then the students. And there was nothing extraordinary about the exercise: relay your major, relevant minors, and reasons for enrolling in the course. I thought, for several moments, about what I would say.

The first part of my answer was honest: “I’m taking his class because I’m a pre-med and want to explore new ways of understanding medicine and the body.”

The second part wasn’t: “I am studying cultural anthropology and neuroscience, because I want to better understand people on both the cultural and brain levels.”

To be honest, I fabricated the answer on the spot. I had been considering both neuroscience and cultural anthropology as potential majors and could not decide which would be more impressive to cite. So, I combined the two, literally, to produce the most relevant-sounding response I could formulate in just a few minutes.

Today, I can say the impulsive answer I delivered that late August morning planted an idea that I have spent more than two years of my college experience trying to unpack. My road to understanding, which inevitably led to the aforementioned crisis, has been
defined through two critical transformations: one that occurred last spring and another, just weeks ago.

The sequence of experiences that gave rise to my first epiphany—that cognitive neuroscience could be studied through the lens of cultural anthropology—were a total consequence of good luck and good guidance: a preliminary and failed attempt at an interdepartmental major combining cultural anthropology and neuroscience; an informal meeting over coffee with the Neuroscience Director of Undergraduate Studies who suggested I contact “social neuroscientist” Lasana Harris; an opportunity, one year later, to become a member of his lab; an ongoing dialogue with my then-advisor, Diane, who restructured my initially shallow research idea by showing me what it means to truly think like an anthropologist; and the more general ways my studies in Cultural Anthropology have led me to theorists like Latour, Haraway, and Dumit, whose work has repositioned my naive understandings of science, medicine, and technology in the context of culture. What was previously to me a method of research had become my subject of research.

My second epiphany came almost one year later, as I struggled to reconcile the epistemological differences between cultural anthropology and neuroscience. It became painfully difficult to engage myself as a student in both fields. This has been the greatest difficulty of writing this thesis, but more personally, of studying both cultural anthropology and neuroscience at Duke. This is—as I have repeated it several times before—what has felt like two clashing ways of knowing the self and understanding the world.

55 I had initially imagined my thesis as a joint venture between SCN and Cultural Anthropology, where I would attempt to explore some social “question” through fieldwork and brain imaging analyses
Cultural anthropology is a field that prides itself, even defines itself, on challenging naturalized, but socially constructed, ways of knowing—often by deconstructing the complex divisions and rules with which we pattern the world. As I became more engrossed in my studies in anthropology and this thesis, it became harder to not only study, but also believe in neuroscience. In addition my philosophical misgivings (e.g. Is there really a “language” region of the brain? Is there really such thing as a “social cognition network”? Is there really a biological basis to a symbolic term like dehumanization?), learning concepts in neuroscience became newly, and strangely, challenging for me. Each lesson was greeted with a similar philosophical crisis. Studying the black-box metaphor of the brain sent chills of Latour through my spine. “The Black Box isn’t the brain,” I thought. “It’s neuroscience itself!” Each paper I read, whether for lab or in class, felt guided, perhaps even tainted by an insuppressible need to undermine the science in front of me: who (which scientist), where (what institution), what (the legacy of the topic), how (overanalyzing the construing of data and graphs to acknowledge the inherent subjectivity of science itself). For a period of time last fall, everything about neuroscience felt flakey and fleeting. In other words, I was no longer “stuck” between two disciplines; I had become an anthropologist by virtue of constructing this thesis. This meant—to my genuine shock and surprise—that I was no longer a neuroscientist.

A Self-Transformation: How Did This Happen?

As I stated before, this thesis project has placed a heavy emphasis on the question of how a hard, techno-science and humanities-based, social science can “get along,” despite these fundamental, disciplinary differences. I ultimately argue that there are areas where
we anthropologists can and should be accepting—for example, in appreciating the value and contributions of the SCM— but also spaces like the courtroom where we *must* remain critical and cautious. To foreground these later cases, however, I first positioned social cognitive neuroscience as an encultured subculture. Through a new globe/globalization metaphor of brain I demonstrated that SCN is just as much a symbolic extension of the contemporary culture as it is bounded by its own set of cultural values, beliefs, practices, and assumptions, which I also exposed. By demonstrating the deeply cultural qualities of this prevailing technoscience, I intended to illuminate how SCN is a subjective and historically-constituted way of understanding and challenge misconceptions of its research as objective and neutral explanations of self and world.

Here, I would like to point out something I did not say and perhaps could not say in the preceding chapters: My intentions were never to discredit the field of SCN or the researchers I interviewed in SCL. I only realized that my intentions could be misconstrued in this way after my laboratory presentation, when Carrie responded, “At first I thought this was really cool and that you were defending us, but then you kept talking, and I wasn’t so sure if you were on our side or not.” I was mortified that my cultural analysis of SCL could be interpreted as an effort to discredit SCN and the passions of the members in my laboratory. That simply is not the case.

Addressing Carrie’s doubt is meaningful for two reasons. First, I want to be sure that no other reader view my stated intentions as anything but pure. Pushing boundaries, questioning beliefs, challenging assumptions, deconstructing everyday practices—that is all a part of cultural anthropology and what is meant by ethnography. The point of this exercise in demystification was simply to draw attention to the beliefs, assumptions, and
practices that make SCL and the research it produces, cultural. By situating SCL at the level of culture as opposed to separate and above it, I intended to destabilize the a-cultural power under which it operates. For any reader, as I previously stated, this examination is critical in realizing that our notions of self and world, be them produced by research in SCN or from descriptive, anthropological accounts, are not natural or “true” but rather culturally produced and always changing. That is to say, we don’t have to be wired machines; we can also be symbols of our fluid and rapidly transforming social world. For those in the neuroscientific community, specifically, this exercise in the demystification of neuroscience should not be viewed as a subversive endeavor. Instead, I hope it evokes feelings of humility—drawn from the recognition of cognitive neuroscience’s authoritative veil—and ethical responsibility, for the use and misuse of its research and methodologies in coming years.

Second, responding to Carrie’s misinterpretation brings me to conclusions on the significance of my personal transformation from anthropologist-neuroscientist into full-fledged anthropologist and that of this entire project: in order to acquire membership to and status within any encultured community, one must take on their approach to understanding and navigating the world. That is, the reason I could not longer be a neuroscientist was because I had come to fully adopt the beliefs, values, and assumptions of culturally anthropology. I had admitted myself as member of the cultural anthropology community, and by virtue of that membership, I could no longer claim full affiliation to cognitive neuroscience. My world-view has completely shifted.

Later on the day of my presentation, I bumped into Annie at coffee shop near SCL. She, like me, was anxiously working on her honors thesis, due just a few days later.
“I really enjoyed your presentation today,” she said. “I had no idea that was what you were doing. But I think it’s really fascinating to think about those things.”

“Thanks so much,” I coolly replied, secretly relieved that I had not rubbed my other informants, or at least Annie, the wrong way. “Was there anything specific you liked?”

“I was thinking back to our interview, and I had never considered the possibility of a mind that wasn’t rooted in the brain, or that there were other ways to understand the mind-brain relationship outside of the ways that we talk about it now.”

“Yeah, I think those are important questions to consider,” I replied, as I topped off my coffee cup and headed out the door. “Thanks again for all your help.”

I could have said more to Annie than the meaningless response I decided to give. I could have said, “Well, what you believe to be true is actually culturally and historically constructed” or something like, “The science you have spent the last four years devoted to is probably going to change in 100 years. In fact, we will probably view this imaging era in the same vein as 19th century phrenology. How do you feel about that?” These are my personal beliefs, which have developed through the work I have done on this thesis, but they in no way mean I think SCN is any less remarkable and valuable in advancing understandings of the brain.

Prior to this run-in and in union with the recognition of my own anthropological indoctrination, came the realization that it is precisely because members of SCL believe in their science that are so driven and passion about the research that characterizes it. Albeit subjective and enculturated, this research is furthering and deepening understandings of self and world. If SCN researchers viewed their field through the critical and probing lens to
which I subjected it, they would not be neuroscientists. They would be anthropologists—the point being, that we need both.

This thesis demonstrated to me that finding deeper meaning in life—of self and of world—requires that we challenge prevailing beliefs and recognize our own embeddedness within cultures and subcultures. We must also embrace the fact that our ways of understanding are multiply constructed through various institutions and discourses. If anthropology’s intention is “to make the world safe for human difference” then we must also protect the diversity that exists among ways of understanding and accept too that there are many ways of knowing (Benedict). Although I call myself an anthropologist now, I cannot predict the experiences that lay ahead of me. And despite my embeddedness within anthropology, my world-view will forever be shaped by my collegiate studies in neuroscience. There is no right or wrong way to understand oneself and the world through which we navigate. However, it is important to recognize we are never “stuck” and that our navigation compass is always changing.
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Appendix

Duke SCM Survey

Please answer the following questions by circling a number on the scale. Remember, we are not interested in your personal beliefs, but in the beliefs held by Duke University undergraduates at large.

Study Questionnaire- to be given to members of the Duke community, primarily undergraduates.

1. As viewed by Duke University undergraduates, how competent are (*)?
   1 (not at all)  2  3  4  5 (extremely)

2. As viewed by Duke University undergraduates, how efficient are Duke undergraduates?
   1 (not at all)  2  3  4  5 (extremely)

3. As viewed by Duke University undergraduates, how capable are (*)?
   1 (not at all)  2  3  4  5 (extremely)

4. As viewed by Duke University undergraduates, how confident are (*)?
   1 (not at all)  2  3  4  5 (extremely)

5. As viewed by Duke University undergraduates, how independent are members of (*)?
   1 (not at all)  2  3  4  5 (extremely)

6. As viewed by Duke University undergraduates, how trustworthy are (*)?
   1 (not at all)  2  3  4  5 (extremely)

7. As viewed by Duke University undergraduates, how warm are (*)?
   1 (not at all)  2  3  4  5 (extremely)

8. As viewed by Duke University undergraduates, how sincere are (*)?
   1 (not at all)  2  3  4  5 (extremely)

9. As viewed by Duke University undergraduates, how competitive are (*)?
   1 (not at all)  2  3  4  5 (extremely)

10. As viewed by Duke University undergraduates, how intelligent are (*)?
    1 (not at all)  2  3  4  5 (extremely)

11. As viewed by Duke University undergraduates, how prestigious the jobs typically held/achieved by (*)?
    1 (not at all)  2  3  4  5 (extremely)

12. As viewed by Duke University undergraduates, how economically successful will Duke (*) be?
    1 (not at all)  2  3  4  5 (extremely)

13. If (*) get special breaks, this is likely to make things more difficult for people like me.
    1 (strongly disagree)  2  3  4  5 (strongly agree)

14. The more power members of this group have, the less power people like me are likely to have.
    1 (strongly disagree)  2  3  4  5 (strongly agree)

15. Resources that go to members of this group are likely to take away from the resources people like me have.
    1 (strongly disagree)  2  3  4  5 (strongly agree)

* Groups included: undergraduates, professors, graduate students, administrators, food service workers, janitorial staff, gardeners, research assistants, medical personnel, athletic staff, secretaries, pastors.