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LETTER TO A YOUNG SOCIAL COGNITIONIST

January 7, 2010

Dear YSC,

You enter the rabbit hole of psychological science as I step into the 30th year of my own disappearance down that chute. Although three decades separate us, so much of the adventure remains the same. You and I are obsessed by the same questions. You and I are persuaded that the mind, as it defines and is defined by the social world, is the single most exciting object of study. You and I share the hope that our discipline, by giving a more accurate view of our species and others, will yield a better future.

In spite of these similarities, you have something extraordinary within your grasp that didn't exist when I first trained. For you, it is possible to look directly at the physical residence of the mind. And because of this, you will find answers that could not be imagined by the likes of me. Although it is true, even trite, that every generation is afforded new methods, new technologies, and therefore new discoveries, I write because I believe that direct access to the brain to understand social cognition is no ordinary advantage. It's a game changer.

We know that by the early decades of the 17th century, astronomers had changed their thinking quite sharply, and had done so for one reason. Four hundred years ago to this day, Galileo took a metal tube with two lenses, turned it toward the sky from a tower in Padova, and discovered that the "fixed stars" near Jupiter were not so fixed; they were actually orbiting that planet! But how could this be, if all heavenly objects revolved around the earth? Converging evidence arrived from a series of other critical observations: contrary to Aristotle's exhortation, the moon's surface now appeared to be terrestrial rather than smooth, the phases of Venus showed that it must circle the Sun and not the Earth; variations in sunspots suggested that this ball of fire rotated on its own axis; and to top it all, the foggy streak, known as the Milky Way turned out to be composed of multitudes of stars invisible to the naked eye. These simple yet profound observations (no experiments with manipulated variables here), *permitted only by direct observation of physical forms in physical locations*, gave us a radically different view, not only of the universe, but of our place in it.

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Richard Panek, author of *Seeing and Believing: How the Telescope Opened Our Eyes and Minds to the Heavens* (pp. 11-12) says of Galileo that on the night of the first significant discovery on January 7, 1610:

> . . . he returned to it [the telescope] now, as he often had returned to it, because under magnification the Moon yielded surprises—discrepancies between how it had appeared since the beginning of time and how it actually, apparently, was . . . What Galileo had been observing wasn't simply impossible to see without the new tube of long seeing. It was impossible, period.

The story of the telescope captures our imagination because a simple device, literally a metal tube and two pieces of glass completely changed the mind of one genius and then all others. Seeing literally changed believing. The tale of the telescope, more than any other great story in science, had been my touchstone long before I knew a tube to scan the brain would become available in my lifetime, and it has become even more so during these past 15 years as social neuroscience has emerged.

To us it is clear that the complexity of the physical universe out there is no greater than the psychological one in here. Can direct exploration of the latter be any less exciting? Can it teach anything less significant? One might argue that the comparison isn't relevant because the telescope gave us direct access to the very thing in which we are interested whereas direct access to the brain isn't getting us to the thing of interest to us which is the mind (and not the brain per se). That is correct, and therefore it is quite reasonable to be skeptical of what we learn from such techniques because inferences are still in play and careful inferences is what many critics charge isn't the strong suit of social cognitive neuroscientists.

Moreover, you will, if you choose the path of social cognitive neuroscience, want to give special thought to the quality of humility, because it will not come easily. There is, with every new technology that promises the Moon, Jupiter, and Venus, the accompanying belief that others who are not in your orbit are passé, even lesser. What can I learn, you might secretly think, from the fuddy duddies who do experiments with paper and pencil? Well, what you can learn from them is that with nothing more than paper and pencil, like the tube and two pieces of glass, creative minds have already allowed us unimagined views of ourselves, and have done so without having to worry about quenching.

Social psychologists in particular have had an interesting attitude towards the fads that have come and gone during psychology's first century. Their earliest forays were into areas other psychologists didn't just ignore but explicitly rejected. Understanding the mind was a crucial part of the enterprise of social psychology from the start, as they asked how the outside affects the inside. But recall that these were also the decades when psychology had lost its mind, so to speak, and studying cognition of any kind wasn't only an unfashionable thing to do, it was almost illicit. What is remarkable, as I have pieced together the unwritten history, is that social psychologists didn't shout about the importance of studying the mind. They didn't write reviews of Skinner's books, they didn't thump their chests about the importance of plans and goals.

Instead, without a fuss, they just went about their business, as if clueless to the fact that understanding cognition was prohibited, because of their firm belief in the importance of understanding the mind. Because of their clear sense about what was important, we have Kurt Lewin's ideas about the stages of mental change, Fritz Heider's work on the causal structure of perception, also, his "Psychology of Interpersonal Relations," arguably the work that gave birth to the field of social cognition, Leon Festinger's gigantic contribution to understanding dissonant cognition and dozens of others who studied attributions, attitudes, beliefs, and values about self and other, us and them. You are the descendants of people who didn't give a damn about what was hip and turned out to be on the right side of history.

Bob Abelson once told me that he would pick Fritz Heider up at the New Haven train station and drop him off at Clark Hull's über-behaviorist lab, week after week. Bob was befuddled as to why this brilliant cognitionist found anything of relevance in the dull Hull, and politely asked Heider why he bothered making this trip from Amherst week after week. Heider responded, "Of course they are completely wrong, but they are so enthusiastic!" This, to my mind, is among the great qualities of the early social cognitionists. They would not, in their own work, comply with the ban on cognition, but they also weren't closed to ideas that seemed wrong-headed. Who knows what of interest lay buried in the fractional anticipatory goal response! That sort of openness only comes from a deep humility about what any single perspective can teach and makes for a tolerance I can't seem to muster!

As we know, the revolution eventually came, "Got cognition?" buttons were handed out on the streets, a "Study of Thinking" hit the bestseller list, and all was well in Psychologyland. But now, social psychologists turned their attention to yet another unfashionable topic. The new pariah was affect/emotion, which was viewed by the new kings of cognition as something that interrupted an otherwise well-functioning cognitive system. And again, as history tells us, the warm and the wet of human experience, the study of emotion, eventually migrated to the center of the field.

I use examples from what must seem to you to be the Pleistocene! But I do this to remind you that we come from people who didn't follow the beaten path, because you may soon travel one that is becoming well-trodden; one that is being showered with attention and resources from the government, from universities, from the journals, and the media. It is exactly for this reason that you may want to be skeptical, to remember to hop off every now and then, exhale the hubris, and then get back on.

With that I turn to the reason for writing to you—to talk about why you should be pleased that you can, if you should choose, travel the highway of social neuroscience.

My first encounter with neuroscience came early, in the mid 1990s. Liz Phelps was my colleague at Yale and she was in that first generation of cognitive psychologists to be trained also as a neuroscientist. On a few occasions Liz had suggested that we might want to image the neural basis of racial attitudes, but I didn't quite see the point of it. It seemed to me that we had a perfectly reasonable behavioral measure, the IAT, that was teaching us a lot and at a very fast pace. What did I

need a magnet for? But the IAT provoked an interesting concern, voiced in this odd way: Whatever this task is detecting, it can't possibly be an *attitude* or *preference*. Whatever it is, it doesn't *feel* to us like an attitude. So stop calling it that, they argued, unless you can show that it has some "warmth" to it, like an attitude should.

I was dumbfounded. Why had similar concerns never appeared in response to similar assumptions and a similar task, evaluative priming? It seemed that the great work of Russ Fazio and John Bargh had assured people that what they had measured, using similar logic, was indeed an automatic *attitude*. But now there was doubt. Was it because the stimuli they used in the early studies were socially neutral (words like "pizza" and "preacher" as primes, words like "beautiful" and "awful" as targets)? Did this response to the IAT—that it wasn't tapping an automatic attitude or preference—arise from these psychologists' own encounter with their automatic preferences? (Our stimuli were black and white faces.) What was the reason for this discomfort? All of a sudden, Liz's proposal about imaging racial attitudes seemed ideal.

The structure we would focus on, the amygdala, was well mapped out; robust animal models and striking patient data had established its role in fear conditioning. If activity in this brain region was related to performance on the IAT measure of race preference, we would indeed have a useful piece of evidence about just what the IAT was tapping into. With little effort, the first study showed nice convergence: the larger the IAT race bias, the greater the activation in the amygdale to black versus white faces. This first study didn't involve the most sophisticated design and it certainly didn't resolve most questions. But it changed the nature of the debate, at least as I encountered it. Nobody asked me that question (is the IAT really revealing an automatic attitude?) again. I have often wondered why that single imaging study, using a paltry dozen subjects proved more persuasive than the far more robust behavioral data we already had. But it did, for both the right and wrong reasons. And that's worth knowing.

Critics are undoubtedly correct that neuroimaging has much to work out, many mistakes to recover from. But the critiques, even the ones that are legitimate, do little to dampen my sense of the prospects for social neuroscience in the future. In my own work, it has been obvious that continuous collaboration with neuroscientists will keep me on my toes, will teach me things I cannot learn otherwise, and that it will always be a part of the work I do.

Contributions come in varied ways and I bring up a few that fall into obvious categories of ones I've learned from. First and foremost, I know that a common criticism of neuroimaging studies is that they simply tell us where something happens in the brain and this is poo-pahed as low-level stuff that ought to be relinquished to some technician trained in physics to sort out, but of no deep interest to us. There is no question that identifying the brain location of a psychological process is hardly our end goal, but I do find this to be a strange criticism. For understanding anything, the first step is staking out the most basic properties of the thing of interest, and location is among them; locations are informative (ask any astronomer, physicist, or biologist). There is far more than that that drives our interest, of course, but how can we deny that this is a necessary step. I will go out on a limb and argue that they are even worthy of publication! Converging evidence of a single location for differentiated tasks that claim to tap into a single construct is

deeply pleasing because it is indeed teaching us something more than just where something happens. I for one am not persuaded by the criticism that a particular paper "only tells us what lights up." (If we were to start thinking about publication as a report and not as a reward, the benefit of studies that are primarily mapping out location will be obvious, giving them no more and no less importance than they deserve.)

What is remarkable is that even so early in social and cognitive neuroscience, far more important ideas than mere location have been born. Again, tastes will dictate what we find appealing but to me the shining examples are studies that took existing debates that were unresolved and moved them an inch in the direction of one or another perspective. The imagery work of Steve Kosslyn is such an example, in which he showed that visual imagery is like visual perception; that we see pictorially that which isn't there. I will say this more than once: this didn't *have* to be the case. But it was, and the data from neuroimaging made a nontrivial contribution to our understanding of how we see.

Likewise, research on placebo effects had run into trouble with some work questioning whether placebos do anything "real." Then came the work of Tor Wager, Ed Smith and colleagues showing that placebos reduce brain responses known to be involved in the subjective experience of pain (right anterior cingulated cortex, anterior insula, and thalamus) and that the difference between control and placebo conditions in reported pain correlated with the neural activity in these regions! Studies like these provide evidence that the expectation of an event, the mere belief of what is to come can modulate the experience of it and the brain is one location where such effects can be observed. Again, it didn't *have* to be this way, but it was, and the data from neuroimaging give us one more ounce of confidence that expectations provoke physically different reactions than the absence of expectation would have.

As another example, we have seen from even the earliest indications in social neuroscience that what may appear to the reasonable mind to be quite distinct processes may actually share neural real estate. For example, the same regions that seem to subserve the act of thinking about another's mind, of "mentalizing" (mPFC, temporo-parietal junction, and medial parietal cortex) also seem to be involved in mental travel through time and space—thinking about the past or future compared to the present, and navigating through space.

Evidence of a shared basis to otherwise divergent phenomena demands the exciting inferential work of a detective. Jason Mitchell has offered the speculation that what may be the common denominator among seemingly disparate tasks like mentalizing, prospection, and spatial navigation is thinking about worlds other than the present one. Tests of such ideas become readily possible when we have a single lens through which we view these seemingly different processes.

From what I have seen, social neuroscience has a built-in capability to continually provide counterintuitive answers to questions. Who would have thought that physical and psychological pain would be subserved by the same neural processes? Who would have known that the central processes of social cognition are so basic they resemble the brain's activity when it is doing nothing, seemingly at rest? And who could have intuited that making sense of another's mind, thinking about past/future events and spatial traversing would share common processes? I dare to say that in the future, data will guide theory far more than the other way

around and social neuroscience will have assisted greatly in making that wholly desirable trend possible.

The study of social cognition is as old as social psychology itself. Indeed, questions of mental concepts like attitude, belief, and self were studied in the earliest years of the 20th century. Yet early psychologists never addressed whether social cognition is a mere subset of something we might call "generic" cognition, or a distinct process that was sufficiently significant to our evolution to be granted some degree of brain localization.

On the question of the uniqueness of social cognition, my own thinking, based on intuition and a commitment to the simplest account possible, led me to assume that person perception would be neurally indistinguishable from object perception; from the brain's point of view, understanding another's mind would engage the same processes as perceiving another's body, or even an inanimate object. I figured that if you ask me what Ada Lovelace thought, how tall Ada was or how sophisticated her program for the Analytical Engine, the brain should engage the same processes to generate answers.

So it was an easy bet for me to take with Jason when he proposed exactly this question, arguing that it was at least conceivable that social cognition may not overlap with other forms of cognition, that thinking about the minds of others may not overlap with thinking about the physical qualities of others. In the studies he and others have done, the answer seems to be pretty clear: I was wrong. Some central aspects of social cognition, especially the act of thinking about another's mind, clearly recruit unique regions in medial pre-frontal cortex (mPFC). These regions are inactive when not mentalizing, and even when we try to figure out the inner workings of an inanimate object like a sewing machine.

Besides the result itself, which I am partial to because it helped to correct an error in my own thinking, this work also showed that processes that intuitively seemed to be similar (making judgments about another mind or physical qualities) engaged different mechanisms. Social neuroscience allows fundamental questions to be posed (such as is social cognition unique?) and makes the answers to them be within reach.

These first 15 years of social neuroscience have shaped my thinking in various ways. I refer not so much to the particular facts presented, although these have been plenty important, but more to what they tell me at the next level up. Social neuroscience has, most of all, allowed for the evolution of a new style of science, of how to pose questions, fit the emerging pieces and make sense of them as scientists laying out the early terrain of a science often have to do. It does so, refreshingly, without demanding convoluted theories to be tested in every project. You can pose a question, look at what the data show, and change your mind. Here are some examples of what I mean.

Imagine the frustration of listening to two sides endlessly debate a difference in theory with no possibility of empirical resolution (if you can't call one to mind, it's only because you haven't been around long enough!). One example comes from a piece of the debate about mental imagery—is it an analog or propositional representation? Although there are always those who remain unconvinced, the mental imagery debate surely cooled off by several degrees after imaging data became available. The debate may continue, but it's surely a different debate now that we know that mental imagery evokes a similar pattern of brain activation in V1 as does actual perception.

Because such debates as the one about mental imagery are old, even centuries old, and neuroscience evidence about them is new, we can see more obviously how a new technology resolved an old question. In the future, as new issues with potential for such debate arise, they may get resolved before they ever turn into debates—because the issues will fizzle before they materialize, we will nary be aware of the routine power of direct access to the brain to resolve theoretical disagreements as they even emerge.

Here's another example: Imagine that we had been engaged in a debate about whether empathy is a reaction to or the actual experience of another's state. There is already sufficient evidence that socially sharing in the emotions of others activates neural structures that are present during a first-hand experience of the same emotion. The data didn't *have* to come out that way. But they did, and such evidence will allow us to avoid debates about what the characteristics of empathy may or may not be, swiftly and more compellingly than our intuitions would have allowed.

Finally, where existing theory is sound, social neuroscience may be tremendously valuable in cementing it and thereby convincing dissenters of its truth. Consider for example the single biggest ignorance we face. Just today, as I finish writing this letter to you, I received a stack of evaluations of a talk I gave at an American corporation to people who are stuffed to the gills with all sorts of formal education. I don't know about you, but I always swoosh through the nice things people say and linger gloweringly on the bad:

> I did not appreciate Professor Banaji's bias on evolution. She made several comments throughout the lesson implying that human beings evolved. Although evolution is a theory, most scientists present this concept as a scientific fact/law (some scientists recognize that this is not a fact). Scientists should strive to present only facts and make sure they emphasize when ideas mentioned are only theories.

This is not an atypical comment. I receive at least one from any group of a few hundred people. The sadness that comes from reading these words 400 years after the first evidence that we were not placed atop a special planet, and 150 years after learning that we are not a special species, is real. It is not a lonely view in many places including the United States. In 2008, 44% of Americans believe that "God created human beings pretty much in their present form at one time within the last 10,000 years or so"; some of our doctors believe this, our judges believe this nonsense as many elected officials do; I have known deans in universities who believe such nonsense. We need some serious optimism to keep going, but I blame us in part for this situation. We haven't done anywhere what we could to use our science to defragment disorganized minds. Social neuroscience, because it removes some of the fog by showing the isomorphism between behavior and mental states is one source of evidence that is compelling.

We now have more direct accesses than before to this lump of grey tissue that uniquely forces confrontation of the most sacred questions about our morality, perception of self and other, us and them, the experience of pain and empathy. Just as the moons of Jupiter, the trajectory of Venus, and the blemished face of the Moon told a story that was eventually impossible to deny, so too the evidence about who we really are, one observation at a time, will change minds about our

nature and our capacities. In this movement towards understanding, social neuroscience will be a helping hand.

Instruments matter. Galileo, with telescope in hand, didn't suffer the same fate as did Bruno or Copernicus. But remember also that the Vatican didn't come around to agreeing with Galileo until the late 20th century, more than three hundred and fifty years after they first could have. I cannot say to you that social neuroscience will not go through its own pains, its own confrontation with rejection and ridicule and political demands for quick applications at the expense of sound basic research. The federal government that funds us has its own cadre of Cardinal Bellarmines! But remember too that these are still early years. You are like the astronomers in the decade right after the 1610 discovery. What did those people know? Not much more than that Venus wasn't paying its expected homage to Earth! But what these early astronomers surely knew was that they were the fortunate ones; that they were there at the beginning. What these early astronomers surely felt was that something amazing was afoot. And so it is for you. You too know you are the fortunate ones, present at the beginning. You too feel something amazing is afoot.

Sincerely yours,
Mahzarin Banaji
Cambridge, MA

P.S. I thank Wil Cunningham, Richard Hackman, Steve Lehr, Jason Mitchell, Jeff Sherman, and Ed Smith for commenting on this letter before it was mailed. As a letter, it contains little more than my own idiosyncratic view of things, and should be read as such. If you'd like to write me back, please mail to mahzarin_banaji@harvard.edu

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