On Social Attribution: Implications of recent cognitive neuroscience research for race, law, and politics

Interpreting the world through a social lens is a central characteristic of human cognition. Humans ascribe intentions to the behaviors of other individuals and groups. And, humans make inferences about others emotional and mental states. This capacity for social attribution underlies many of the concepts at the core of legal and political systems. The developing scientific understanding of the neural mechanisms used in social attribution may alter many earlier suppositions. However, just as often, these new methods will lead back to old conundrums. Cognitive neuroscience will not make the hard problems of social judgment go away.

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The social attribution task is a standard way of distinguishing people with autism from neurotypical people (Klin 2000). When a video clip with moving geometric objects is presented, neurotypicals will describe the large triangle as chasing the smaller triangle, with the big circle intervening to protect the smaller triangle and the large triangle getting very angry. With this interpretation, the neurotypical person is making a "social attribution"; they are interpreting the video as depicting a scene of social interaction among agents with beliefs, intentions, and desires. In contrast, the person with autism will often say thing like "the big triangle is rotating clockwise at a faster rate than the small triangle and the big circle collides with the larger triangle." The autistic person in this case is making a physical attribution. Philosopher Daniel Dennett (1987) sets up a similar framework when he says that we can take a physical stance (e.g. the rock is falling because of gravity), a design stance (the hour hand sweeps because of how the clock was built), or the intentional stance (the man wanted to hit the ball).

This capacity for social attribution in humans is a phenomenal achievement and allows us to do amazing things as individuals and as groups. However, making a social attribution is fraught with bias (often unconscious) and risk. We easily get it wrong. Law students are well taught when they learn that nearly all evidence is circumstantial and that drawing inferences about intentions of individuals or groups can be very difficult. However, the law as far back as Hammurabi and Moses invokes concepts of intentionality as central to the notions of legal, moral, and social responsibility and often dismisses merely physical acts as being beyond the purview of legal consideration.

Inquiries over the past few decades have attempted to reveal the physical attributes that enable these social attributions. In particular, recent work has explored the brain activity that is correlated with social attributions. What then do we do with this new evidence emerging from

cognitive neuroscience, and other fields yielding insights into the neural substrates of our mental processes? This paper briefly explores the developing understanding of social attribution in the light of new evidence from cognitive neuroscience and related disciplines. After laying out some of the basic concepts, the paper examines social attribution in the context of race, law, and politics, arguing that it is very easy to make a social attribution when one is not warranted or to make a physical attribution when concepts of responsibility might not be so easily waived away. Cognitive neuroscience, for all its fascinating insights, will not make the hard problems of social judgment go away.

Social Attribution through Theory of Mind

Theory of mind – the ability to attribute mental states to ourselves and others -- is one component of social attribution. When we ascribe intentionality to another, we are postulating a mental state based upon behaviors or other evidence that we have observed. Rather than just believing that a person did something because they were compelled by some physical law (e.g. falling towards the ground) or because they were designed (e.g. by a deity, evolutionary forces, or a mad scientist), we sometimes infer that a person meant to do the thing they are doing. Computer simulations have shown that this ability to consider how another might think about something is evolutionarily adaptive and drives the evolution of cooperative behavior in a social group (Orbell et al. 2004). Being able to contemplate our own reactions and the reactions of others enables humans to perform mutually advantageous and complex behaviors.

However, theory of mind is not an inherent part of social phenomena. We have no reason to expect that bees, ants, and other social insects ascribe intentions to the other members of their colony. And, we would be quite surprised to find out that the various cells in a slime mold had a

mental state of their own, much less made inferences about the mental states of the others around them. Nonetheless, theory of mind does not seem to be an exclusively human phenomenon.

While we cannot know for sure whether chimpanzees and gorillas (or other humans for that matter) have conscious experience, we do know that they engage in some behaviors that are parsimoniously explained by a capacity for theory of mind (Premack and Woodruff 1978) (but see Heyes 1998). While theory of mind is believed to be an extremely sophisticated cognitive ability, it may not even be confined to primates. Corvids (e.g. ravens, crows, and western scrub jays) exhibit some behaviors that are consistent with a capacity for theory of mind. For instance, western scrub jays cache food to keep for future consumption, steal the cached food of others, and are known to re-cache it when others observed their original caching. However, the re-caching behavior is altered depending on who observed them doing the hiding (Dally, Emery, and Clayton 2006). This and other behaviors have led some to conjecture that scrub jays make inferences about the intentions of other scrub jays.

In neurotypical humans, the ability to make inferences about the mental states of another appears to involve the medial prefrontal cortex of the brain (a region directly behind the middle of the forehead)(Amodio and Frith 2006). For instance, subjects who are attempting to cooperate with another in an economic experiment will have higher neural activity in the medial prefrontal area than when they are playing against a computer (McCabe et al. 2001). One of the most fascinating findings about the medial prefrontal cortex is that the same portions of this brain region are used for a wide range of tasks involving perceiving another person, contemplating their mental states, and reflecting upon one's own mental state.

Social Attribution through Mirroring Others

In some ways it is not surprising that the brain regions we use to think about our own mental states are the same ones we invoke in contemplating the mental states of others. One of the most intriguing discoveries in contemporary neuroscience has been the identification of "mirror neurons." First described in rhesus monkeys, these neurons are active both when an individual performs a behavior and when they observe another performing that behavior (Rizzolatti and Craighero 2004). This mirroring between identical brain regions of individuals does not merely reflect the observed behavior of others; affect and cognition appear to be mirrored as well (Carr et al. 2003). For instance, a brain region known as the amygdala will respond when a person is experiencing fear, but also when they are observing a fearful expression in another (Adolphs et al. 1994).

Adam Smith's (1759) "Theory of Moral Sentiments" relied upon this kind of "fellow-feeling", and contended that we often echo the emotional reactions of others and are motivated by this compassion. Recent work bears Smith out. Brain regions we engage for feeling our own feelings also engage when we encounter others (Craig 2009). For instance, the individuals most likely to engage in egalitarian behaviors are those who have the greatest activity in the insular cortex of their brains as they encounter people who are poor or rich (Schreiber et al. 2010).

Social Attribution through Social Evaluation

Mentalizing and mirroring are not the only kinds of social attributions that the brain makes. We also evaluate the kinds of social interactions that others are having. Primates, such as chimpanzees, appear to observe the behaviors of others in their social group to evaluate the potential gains and risks of alliances (de Waal 1998). In humans, the network of brain regions known as the default mode network appears to be involved in social evaluation (Iacoboni et al.

2004). This network is highly active even at rest and typically decreases in activity when a person engages in a cognitive task (Raichle et al. 2001). However, a variety of social evaluation tasks stimulates this network and causes it to increase in activity beyond the resting baseline.

Personal moral judgments are one type of task that appear to engage areas in the default mode network (Greene et al. 2001). A paradox in ethics is that people will express more reluctance about pushing a physically proximate stranger onto the trolley tracks to save five people further down the track and much less reluctance about pulling a switch on the train line to divert the train from hitting five people down the track, but killing one person who is standing on the track the train is diverted to. Despite the fact that in both cases one person can be sacrificed to save five, experimental participants do not judge them the same. The evaluations we make of others are related to our perceived social proximity and we are more willing to sacrifice those who appear to be distant from us (Cikara et al. 2010). Our willingness to sacrifice socially distant others can be increased by ingesting oxytocin, a neurotransmitter that facilitates many forms of social bonding, but also exacerbates the rejection of social outgroups (De Dreu et al. 2011). Also fascinating is that people with damage to the medial prefrontal region are willing to make the utilitarian sacrifice of the proximate person and have short response times for that judgment (Ciaramelli et al. 2007).

Social Attributions of Racism

One measure of the cognitive complexity of a mental task is the amount of time it takes for a person to do that task. In the context of racial attitudes, it has been shown that many White subjects have longer response times when they are asked to identify if a positively valenced word can be appropriately used to describe a house (e.g. "Beautiful") while an African American face is simultaneously flashed on the screen for a time so brief that it is not consciously observed.

The response times are shorter if the word is negatively valenced (e.g. "Ugly"). The theory is that negative implicit associations triggered by the subliminally presented African American face conflict with the positive associations of a word like beautiful and thus demand additional cognitive effort.

Longer response latencies in this Implicit Association Test (IAT) correlate with elevated activity in the amygdala (Phelps et al. 2000), which has been interpreted as suggesting a subconscious threat response. Intriguingly, while these implicit racial attitudes correspond with spontaneous responses (e.g. a greater likelihood of mistakenly shooting an unarmed African American in a video game), explicit self-reported racial attitudes correspond with deliberate race related decisions (e.g. deciding whether an African American was guilty of a robbery after reading a description of the evidence in the case)(Dovidio et al. 1997). Furthermore, increased activity in the brain's ventrolateral prefrontal cortex while participants explicitly categorized the racial identify of a face appeared to correlate with diminished activity in the amygdala (Lieberman et al. 2005), suggesting that controlled mental processes can dampen down automatic reactions.

While the IAT has sometimes been described in the popular press as a potential racism detector (Kristof 2008), the full breadth of research shows that racial attitudes are far more complex. We know that two sets of distinct neural and cognitive processes underlie many social phenomena (Lieberman 2007) and this appears to be the case in racial attitudes as well. The automatic negative reactions described in the IAT studies often achieve their effects by striping out context and presenting disembodied faces on a plain background, or using abstracted phrases. Putting individuals into a context can effectively "erase" the cognitive value of the stereotype (Kurzban, Tooby, and Cosmides 2001). When contextual cues help identify people who violate

social norms (e.g. criminals, gang members, homeless people), those cues override the implicit associations and alter the pattern of activation in the amygdala and medial prefrontal cortex (Schreiber and Iacoboni 2012 (forthcoming)). Given that these explicit and implicit attitudes appear to have some independence and that implicit racial attitudes can be trumped with trivial manipulations, any attribution of racist attitudes or intent ought to be seen to require more subtlety than we often invoke.

Social Attributions in the Law

Although casual social attributions may often be relatively crude, legal systems embody a fairly nuanced approach, appropriate given the central role of intentionality to laws on crime, torts, contracts, and legislative intent. In some cases, liability is ascribed even in the absence of intent. "Strict liability" has applied traditionally for cases like owning a wild animal. No matter how cautious you are, if your pet tiger gets out and mauls someone, you are liable. A middle ground on this intent continuum is negligence where you are liable if a reasonably prudent person would not have done as you did. Next is recklessness or deliberate indifference, where you didn't intend the act, but your actions were more than merely negligent. The law distinguishes all of these from typical intent to do an act or knowledge to a substantial certainty that the outcome would occur as a result of one's actions. It is interesting to note, however, that the legal concept of intent does not end with mere intent, but rather offers higher levels of punishment as a consequence of premeditation (as in the case of the death penalty for premeditated murder). And in certain circumstances (e.g. prison guards shooting inmates), we require a finding of a yet higher standard of intent, malicious and sadistic, to adhere liability.

The finder of fact, typically the jury, is asked to attribute a mental state to the participants in the actions that give rise to the case. In every case except strict liability, the finding of intent

must necessarily be based on circumstantial evidence. In the context of race, some have offered strict liability theories of guilt, arguing that anyone who is White benefits from the system of injustice based on race and is thus a racist (Tatum 1999). However, employing the label "racist" in a strict liability context (e.g. unwittingly benefiting from broad social injustice) risks undermining the moral opprobrium that attaches to malicious and sadistic acts (e.g. a neo-Nazi who takes pride in the slow death of an African American dragged behind his pickup truck). The law readily provides nuances for distinguishing between these two extremes, but using a single term for both hazards equating them.

It is also interesting to note that while the law provides a complex understanding of intent, the typical intent continuum framework does not easily incorporate the recent research identifying distinct sets of explicit and implicit mental processes. The law acknowledges that we may have certain states where our ability to act with conscious intent is impaired, leaving us in a "diminished capacity." And, the law of evidence typically makes exceptions for "excited utterances" that are believed to be more trustworthy precisely because they are not deliberate responses. However, in general, the law presumes that conscious and deliberate thought underlies our actions.

When a court asks a jury to render a verdict, they are typically asked to engage in a social attribution. They are presented with a mix of evidence about the actions of the parties involved in a dispute and the jury members are requested to make inferences about the beliefs, goals, intents, and emotions of those parties. A substantial portion of the law of evidence pertains to what kinds of evidence can be considered in making those inferences because our legal system recognizes the frequency of errors in attribution. As far back as the law of Moses certain inferences were allowed only upon the testimony of two witnesses. And our modern Miranda

law precludes introducing certain statements into evidence unless they were made after knowledgeably waiving the right to counsel. Once all the evidence has been admitted, the jury is tasked with not only determining "facts" such as the mental states (trustworthiness, intentions, etc.) of the parties, but also the application of the law to the facts as the jury has decided them.

It is noteworthy that the American legal system puts the power and responsibility for making social attributions into a "jury of your peers." Once a jury has determined the "fact" of a particular mental state, trial judges and higher courts are largely constrained by this finding. A court will only undermine that determination in the most extreme cases when, as a "matter of law" (the domain of the legal authority), legitimating such a finding would be impossible.

Social Attributions in Politics

Our ability to make moral judgments may have evolved in the context of judgments about situations we were intimately familiar with, but now it is extended to contexts that are rather remote. People who are knowledgeable about national politics appear capable of utilizing their default mode networks to make judgments about issues of national politics (Fowler and Schreiber 2008). They also engage the premotor face area of the brain while looking at the faces of political figures, suggesting that perhaps they are using mirror neurons in an empathic response (Schreiber and Iacoboni 2005). However, political novices are not able to use their default mode networks, do not use mirror neurons in the premotor face area, take a longer amount of time to report their political attitudes (Schreiber 2000), and report attitudes that are ideologically and temporally inconsistent. Philip Converse (1964) interpreted this inconsistency as evidence of "non-attitudes." But this interpretation may go too far. While someone with autism may truly lack an ability to make certain social judgments, the political novice who is not

making stable judgments about issues of national politics may be quite sophisticated in their evaluations of the politics of the office, family, and community (Schreiber 2007).

Conclusions

We are entering a new era in social attribution and we have new evidence that we can bring to bear in making and interpreting those attributions. Functional brain imaging allows us to understand the neural mechanisms that underlie cognition, affect, and behavior. But, the old problems in making social attributions are still hard problems. While there are instances where imaging can let us do crude "mind reading" (Shirer et al. 2011), inferring a person's mental state is still hard to do and we always do so with a great likelihood of error. And, the law still holds people responsible for crimes, not brains (Morse 2006).

Using this new evidence properly requires caution. Unfortunately, evidence from brain imaging can cause us to believe scientific claims that we would otherwise recognize as specious (McCabe and Castel 2007). Perhaps it is easier to mistake brains for minds when we can see correlates of neural activity. This tendency appears related to both the fallacy of misplaced precision (Fischer 1970) and the overprecision bias (Haran, Moore, and Morewedge 2010). We tend to overestimate the precision of our own knowledge claims and to give greater credence to numerically precise (but perhaps wholly inaccurate) measures. And, we deeply desire the certainty that direct evidence of a mental state would provide. For now, courts have wisely restricted the use of functional imaging evidence and set conservative thresholds for its admission (Miller 2010).

Nonetheless, given that the task of social attribution is both extremely difficult and extremely important for societal function, bringing additional evidence to the table may provide new opportunities to improve on these attributions. In cases of impaired brain function, we are

developing a better understanding of what the implications of neurological problems are for mental capacity. Our understanding of the human brain as composed of integrated modules is helping us to recognize that our self-perceived unity of consciousness is more illusory than we believe (Kurzban 2010). If the vast bulk of our own mental processes are beyond our own awareness (Eagleman 2011), then this brings deeper questions about our ability to ascribe intention. And, if behaviors can be predicted with some reliability by measuring brain activity (Falk et al. 2010) or altered in predictable ways by neurochemical changes, does this shift us deeper into the realm of Dennet's physical stance?

Surprisingly enough, the act of reading research that suggests that the physical or design stances are more appropriate than social attribution can cause diminished neural activity in brain areas engaged in cognitive control (Rigoni et al. 2011). Furthermore, unethical (Vohs and Schooler 2008) and anti-social behavior (Baumeister, Masicampo, and Dewall 2009) increases when reading such research. It is easy to take both the physical and design stances towards an object (e.g. "the clockmaker used the motion of the pendulum to drive gears and run the clock"), and many believe that it is logical to take all three stances (physical, design, and social) in some cases (Dennett 2003). As we reconcile the rapidly developing scientific results with our ancient intuitions about deep questions of morality, intent, and responsibility we may find more compatibility than appears at first impression.

Taking the design stance towards the evolution of social attribution, we may conclude that it serves a number of critical functions that allow complex sociality to survive (Baumeister and Masicampo 2010; Orbell et al. 2004). In such a case, we will want to tread lightly as we revise our ethical framework around these new insights. In everyday life, we seem to be good enough at attributing intentions to others. The new evidence emerging out of neuroscience will

constrain and perhaps inform those attributions. But, we ought to be careful consumers of this new data. And, we ought not to be seduced into thinking that old questions of responsibility, morality, or legality will be easily swept aside by activity on a brain image. It will be a long struggle to appreciate this new work, but it is sure to be an interesting one.

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