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- [Home](#)
- [About Neuroanthropology](#)
- [Bibliography](#)
- [Popular Posts](#)
- [Web Resources](#)

### Thinking about how others think: two ways?

Posted by gregdowney on February 9, 2008

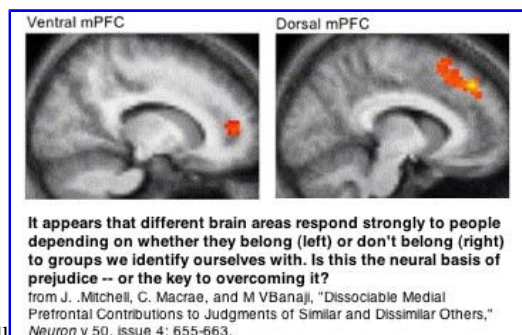


Jason Mitchell and Mahzarin R. Banaji, of Harvard University, and C. Neil Macrae, at the University of Aberdeen, published a fascinating piece in *Neuron* in May 2006, 'Dissociable Medial Prefrontal Contributions to Judgments of Similar and Dissimilar Others' ([abstract on PubMed](#) or [pdf download here](#)). I came across the article through the Mind Matters blog in a piece by Stephen Macknik (director of the Laboratory of Behavioral Neurophysiology at the Barrow Neurological Institute in Phoenix), entitled [How Harvard students perceive rednecks: The neural basis for prejudice](#). Both the original article and the blog post by Macknik are worth checking out.

In the experiment, the team headed by Mitchell showed the subjects photographs and asked the subjects questions about the beliefs, feelings, or attitudes of the people in the pictures. Subjects were told the pictures were of either 'liberal northeastern' or 'conservative Midwest fundamentalist Christian students' after doing a survey which determined which group the subjects were most like. The categories for the photographs were false, the pictures being taken from dating websites and randomly assigned to either of the groups. The photos were reassigned for each subject, and gender, age and other distinguishing marks controlled for (or likely just avoided by the original choice of photos). In other words, college students were being told that other 'college students' were either 'like them' or 'different from them,' with (apparently) no visual cues for either identity. The research team was interested in what parts of the brain were being used in attempts to 'mentalize,' that is, to perceive the thoughts, motives or perceptions of others.

In particular, the researchers discussed that slightly different parts of the medial prefrontal cortex (mPFC) are used when trying to mentalize, depending upon whether the target of observation is believed to be similar or dissimilar (should I write 'the Other' to prove I'm a cultural anthropologist?) to the self. Specifically, a more ventral (front) part of mPFC is used when 'mentalizing' about others perceived as similar, as opposed to a higher (dorsal) part of the mPFC used to deduce the thinking or feelings of others when confronted with photos of people thought to be 'unlike' themselves. The difference is significant because the different regions suggest that these perceptions are being accomplished in distinct fashion.

... simulation theories of social cognition suggest that this [ventral] region should be specifically engaged for mental state inferences about others perceived to be similar to oneself, since mentalizing on the basis of self knowledge can only take place if another person's internal experience is assumed to be comparable to one's own. As such, this hypothesis suggests an important "division of labor" in the contributions made by different subregions of mPFC to mentalizing. Whereas ventral mPFC may be expected to contribute to mental state inferences about similar others, the dorsal [upper or top] aspects of mPFC—more traditionally associated with mentalizing tasks—should be specifically engaged by mentalizing about dissimilar others, that is, individuals for whom overlap between self and other cannot be assumed.



As Macknik summarizes, the research hypothesis was demonstrated: 'Heightened activity in the ventral mPFC was associated with mentalization of self-similar people, whereas dorsal mPFC activity was associated with mentalization of self-dissimilar people.' The result is interesting for a number of reasons (I'll get back to these), but specifically because the ventral mPFC is also used to reflect on one's own thoughts, suggesting that, with 'self-similar' people, subjects were engaging in a thought process more like simulation (assuming that the person in the picture 'thinks like me'). According to Mitchell, Banaji and Macrae, the dorsal mPFC may have been identified in earlier studies because these experiments 'may have inadvertently isolated a subregion of mPFC that contributes specifically to mentalizing about relatively dissimilar others' because the stimuli were often cartoon and storybook characters, geometric shapes, and historical figures. In some situations, the subjects used both portions of the mPFC:

... when the participant pondered the subject in situations where an outsider was believed to behave in the same way as the participant would,

activity in dorsal and ventral mPFC was equivalent. For instance, virtually all college students enjoy going home for Thanksgiving, irrespective of background, so a conservative student would recognize that even a liberal probably loves Thanksgiving, and his brain would set aside their differences when it came to that situation. [from [Macknik](#)]

Stephen Macknik links the research to prejudice and stereotyping, suggesting that the difference between the way that we perceive the thoughts or feelings of others is one source of the difference in treatment of, or sympathy we feel towards them (although there is not suggestion from this research whether or not the projection of our own emotional states is more accurate with self-similar others than with self-different others).

The study adds valuable perspective to our understanding brain dynamics associated with stereotyping and prejudice. It shows, for instance, that the recognition of a common interest or trait in an “outsider” has the potential, at a brain-based level, to make that outsider seem less foreign and threatening. Prejudice may in part arise (and be easily aggravated) when people assume that members of an outgroup do not have corresponding mental states, due to their different backgrounds. Without a self-referential basis to mentalize individuals from an outgroup in a specific circumstance — without the opportunity, in other words, to recognize the things they have in common — perceivers may rely heavily on stereotypes to predict the mental states of outgroup members.

The research is interesting on a number of levels, a few of which I’d like to get in to in this posting (not least of which is Macknik’s translation of ‘Midwestern conservative fundamentalist Christian’ into ‘redneck’ in the title of his piece — hey, careful with that term there, as this Catholic anthropologist from Missouri will tell you). The research seems to me to part of a whole emerging nexus of research that suggests the gap between self and other, in the brain, is not nearly so great as some cognitive theories of perception would have us think. Like the research on mirror neurons (discussed [here](#), [here](#), and [here](#), among other places on this blog, although I *swear*

I’m not obsessed), the research by Mitchell and colleagues suggests that simulation, or what Gallese has called ‘resonance,’ is a widespread process in the brain, in which the brain associates closely actions or emotions, whether they are done by the self or others (unless, as in the Mitchell experiment, some factor inhibits it, such as the perceived gulf with ‘people not like me’ in pictures).

But there are some interesting wrinkles in this equation, as in the discussion of previous research in the Mitchell article. According to the authors:

Recent work by Völlm et al. (2006) has suggested that ventral mPFC may be particularly engaged when perceivers make inferences about the affective aspects of another person’s mental states (e.g., feelings, desires, and motivations), whereas dorsal mPFC subserves inferences about both affective as well as “colder,” more cognitive mental states, such as beliefs and knowledge.

That is, the neural ‘division of labor’ may not just self-similar/self-different, but also cross-cut by the task involved, whether the subject is being asked to ‘mentalize’ cognitive states or act with what one might call ‘empathy,’ focusing more on affective states. This suggests to me that the division of labor is more subtle, that it might involve understanding others’ states if we can project ourselves in compelling ways or if we need to do a bit more abstracted process in order to understand their perspectives (although I did find it interesting that the time to draw conclusions in the experiments was very similar). That is, conceivably, the two systems are not just turned off or on passively depending upon the task, but are driven, in part, by our holistic perception of what we are doing.

The research design is also interesting in this respect because of the absence of any identifying cues for similarity or difference other than the information offered by the researchers. That is, the story told to the subjects about the identity of the person in the photo shaped the parts of the brain that they used to perceive that person and the way that their brains went about trying to ‘mentalize’ the thoughts, perspectives, or feelings of that person. Presumably, in most natural cases, there would be more information, and it would be perceptual and visceral to a much greater degree than the story told by the researcher. For example, differences in speech patterns, appearance, or other physical traits would accompany the assumption ‘this person is different,’ perhaps recruiting more parts of the brain into the perceptual task. In other words, the stimulus in the Harvard-Aberdeen team’s experiment is — at least in my opinion — pretty minimal. A natural situation might include other ‘person is different’ perceptual inputs that would generate a more extensive neural network. But this difference in the way that mentalizing was attempted (remember, we don’t know if either was ‘successful’) was cued by a belief, instilled through the narrative of the experimenter.

But let’s also take a closer look at the research design. Like most basic psychology research, it was conducted on undergraduates, in this case at Harvard. A number of interesting things occur to me. Firstly, not all Harvard undergraduates are ‘liberal northeasterners,’ in fact, some of them are Midwestern and, to some degree, likely ‘conservative,’ ‘fundamentalist,’ and ‘Christian.’ However, they are all at Harvard, with the socialization that goes on there, not only the inculcation of liberal values (if you believe universities are liberal), but also the experience fundamentalist kids might have of their reception in Harvard. Moreover, it’s an interesting axis of differing political views to work across — liberal and northeastern compared to conservative, Midwestern, and Christian. It’s not symmetrical, for one thing. What about the Christian, liberal Midwesterner? And what about whether being at Harvard might make one inherently ‘conservative’ of certain forms of social exclusion and hierarchy? And do all populations allocate neural resources in the same way as Harvard students? That is, might someone who assumed strongly that everyone has the same ways of thinking (call them ‘cross-culturally naïve’ perhaps) always use ‘simulation’ processes to mentalize the *thoughts* of others, rather than the pattern of emotional simulation that Völlm’s team found? Or might other groups share less sensitivity to difference? Or more?

I don’t want to get bogged down in this critique, as it seems to me that it does not undermine the fundamental (not ‘fundamentalist’) point that the researchers make, which is that our beliefs about how similar a person is may influence the way that we go about trying to perceive, deduce, empathize, or mentalize that person’s state. My point is simply that the research tends to naturalize the self-similar/self-different distinction in this one test population, when I think both that it might be more variable across groups and that it might be very unstable even in a single person’s perception. Shift the conditions of the experiment slightly — contrast all the test photos with ones of people ostensibly of a different ‘race,’ tell them all photos are of homo- or heterosexuals, or tell them they’re all Giants’ fans — and you might get a rapid re-assignment of the task of mentalizing from one type of brain process to another. In fact, the researchers do a great job of highlighting this by shuffling the photos in each trial, demonstrating that it’s the perceptions of the subject (including those established by explicit communication) not the traits of those in the photos.

My reservations undermine the authors’ (or Macknik’s) conclusions in any way, but the shift in mentalizing mechanism seems to me to be a very subtle form of stereotyping, built purely on projection rather than on any qualitative, perceivable difference in the targets of the perception. Could a narrative instill in a person a very broad tendency to interpret most other people using one system or the other (and thus, perhaps, being more likely to use simulation as compared to something more experience distant)? I would assume that it could, especially if that narrative was more pervasive, repetitive, and long-standing than the experimental stimulus. For example, would an ideology of ‘the psychic unity of humankind,’ or a religion that posited irreducible differences (such as, say, a ‘clash of civilizations’ view of the world), cause a person to consistently use one way or another to perceive different people

(simulating or deducing)? Could a brain be trained to more frequently 'simulate' another's feelings (sort of like a neural empathy training), or to tend not to project one's own feelings or thoughts onto another (like a de-sensitization program)? If so, we have another example of the way that cultural ideology, social institutions, and large-scale phenomena might affect the way that a brain responds to an identical stimulus in different ways.

The researchers and Macknik are all correct; this research is a fascinating example of the way that stereotyping affects perception at a very material, brain-based level. But we still have so many interesting questions to ask if we recognize the plasticity of these systems, something that the researchers have shown so well by manipulating how the brain uses different perceptual systems with minimal stimuli. The result may not be terribly surprising, but it is very suggestive — and sobering.

## References

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## One Response to “Thinking about how others think: two ways?”



1. [dlende](#) Says:

[February 9, 2008 at 12:29 pm](#)

I like your statement, Greg, that “conceivably, the two systems are not just turned off or on passively depending upon the task, but are driven, in part, by our holistic perception of what we are doing.” I find this approach—that specific brain function is shaped by what we are doing and experiencing overall in that moment—a crucial component to understanding the varied functions that the mesolimbic dopamine system provides. What it does depends on what the rest of the brain is doing, and what the rest of the brain is doing depends on what the person is doing and on the environment (in a rich sense) that is impacting him or her.

I also would go back to something you commented earlier about the Language and Color post, “It’s not just that ‘language’ makes the distinction; it’s probably also that people using the language get lots of practice making the perceptual distinction.” Practice matters in the plasticity and function of the brain, as you keep reminding me (thankfully!).

To take another example, your comment on the Puzzles and Cultural Differences, “To me, the answer to the profound differences is MUCH more likely to lie in the area of spatial perception, habitual forms of graphic representation, motor-perceptual skills, and the like. To link visual perception to some very abstract over-arching single-sentence description of ‘Asian culture’ (which, of course, is itself already a nearly impossible synthesis of the cultures of over one-half of the world’s population) is a tragically bad explanatory strategy.”

The importance of practice and of how distinctions are made in the “real world” matter. I was struck by the links from this research to some of what Lance Gravlee works on with the perception of racial differences. Is it actual skin color (measured scientifically)? Or perceived skin color (i.e., put in a racial category)? What matters more—skin pigmentation or social classification? Gravlee’s work clearly documents that it is the social perception that is more determinative, even in domains that many want to reserve for “biology.” As his 2005 article shows, “Social classification, but not skin pigmentation, is associated with systolic and diastolic blood pressure through a statistical interaction with SES, INDEPENDENT of age, gender, BMI, self-reported use of antihypertensive medication, and skin reflectance (emphasis added).” For more on his work, see: <http://gravlee.org/>

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