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Week 10

Mirror neurons and the simulation theory of mind-reading

I think the primary issue that I take with this is that it seems like too low a level of simulation for it to work at the levels which my own mind, from experience, works every other day. The following will probably sound very left field, but I do have some background in this stuff, and with the sort of leaps people in the field will make. I think these guys are making too big of a leap about how high level processing works from some very low level data on pre-motor data. The way that I see it, these mirror neurons are not used so much for mind reading as gap filling. When you see me walking, for example, if you see me put one foot forward in a step, you expect there to be a corresponding motion of the body. If the body all of a sudden separates and the single leg walks away, that'd be flagged as weird in a nanosecond. However, if you saw only my leg, you would presume my body was at a certain place because of it, and I think this is the sort of data that comes out of these pre-motor neurons to be used for motor planning. This is the most conservative guess I can make given the data presented, and nothing they present has convinced me otherwise.

On a different note, I find their rather derogatory discussion of mind-reading theories hilarious on a number of levels, not the least being the arrogance of the authors. Moreover, I am firmly of the belief that when one has decided that either one law or another must binarily describe a phenomenon, it is without fail the case that both laws are in fact partially correct, and both are full of holes due to the mutual rejection. In particular, theory-formation theory ignores how those theories came to be (most likely simulation at a young age), and simulation theory ignores the fact that mental simulation given a set of atoms that generalize across people is essentially theory formation, since it is unlikely that the mind would (given current evidence) be so inefficient as to re-run the simulation of a situation every single time we encounter it. That being said, the open questions that they point out at the very end are in fact the very questions that to me jeopardize their conclusions, regardless of whether monkeys really do think or not.

Do the eyes have it? Cues to the direction of social attention

First off, I just love how neuropsych and neurobio people seem to think that the brain is made of boxes that talk to each other over directional pipes. Simplification and all that aside, it just blows my mind how people seem to take these things so seriously. I especially like the one in Box 1, because each of those boxes is a complete behavioral system that more than likely spans half the brain and probably have more interconnects than I could shake a dozen sticks at, and yet, directional arrows connect them. Perhaps that is the reason that I consistently fail to take them too seriously, so excuse my flippancy. Or more than likely, I am simply impatient with our slow movement out of this region of simplified clarity that has become the bases of many careers.

At any rate, I think a lot of the non-neurological points made here are also well supported by Guy Hoffman's work with Leonardo and non-verbal communication, and it would not surprise me at all if the brain in fact did have specialized areas for dealing with facial features. Humans have evolved as social animals for a long time now, and it is quite likely that the entire facial/optical behavior (and behavior detection) system has evolved to facilitate this and provide high-speed communication channels that could work well even back when humans could not speak very well. It also occurs to me that the eyes might be easier to see just because they provide the highest contrast regions within the face, and the eye does have built in feature detection systems that depend on contrast to function, though it's more a chicken-and-egg problem when it comes to finding out which feature caused the other to develop. As a last note, I found their "outstanding questions" section particularly interesting, because it asks a lot of questions about social interaction evaluations which I think are relevant open topics.

What imitation tells us about social cognition

Imitation is indeed the best form of flattery, but where this paper leads from there is somewhat less clear-cut. I do applaud the authors' attempts to reconcile neurobiology and psychology, though, because in all honesty, the facts of science must at least pass muster against the simple observed facts of real life before one can seriously consider them. I think there is also sort of an interesting question lurking in the statement that infants learn that others are "like them" by imitating. Particularly, I wonder if processing the imitative events forms the sense of self, or if the sense of self is correlated with the sense of others as other selves in order to somehow bolster the self. To put it simply, what came first? The imitation, or the self? It's sort of a deep question with implications about identity and self, and probably better addressed elsewhere at the end of the day. I also somewhat wonder how the infants know that they are imitating someone. It indicates that the brain already has some sort of an internal map of actions and states that it can use during even the very first hours of life outside the womb, because without such a map, it would be impossible to imitate at all. The paper states that this is the case, but how that map got to be there is the really interesting question to me. On the other hand, the mode of action seems to support my theory that the mirror neurons are used to do motor planning rather than mind reading in the larger scales. Besides that, I think the paper makes a number of interesting observations about psychology and behavioral science and attempts to tie them to tie them to neuroscience. While our understanding of how the brain works is quite infantile (pun intended), it is comforting to know that we are sometimes headed in the right direction as far as mapping real world observations to scientific theory.