GU4241 Seed Papers
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Class 7: Empathy & Feeling Understood
In the Morelli et al. (2014) study, the researchers were able to confirm behavioral findings from the past and infer new emotional connections to felt understanding. I found particularly noteworthy the impact of the individual trait characteristic "Rejection Sensitivity" on felt understanding. While these results are theoretically anticipated, this learning can have a profound impact on how we understand and empathize with one another.

Looking to the fMRI scans, having the knowledge that feeling understood activates regions related to reward and social connection, could also have profound implications in various settings. In the Washington Post piece written by Zaki et al. (2020), for example, political campaign hopefuls are already leaning on this insight through persuasion tactics such as "deep canvassing".

In clinical settings, or even in relationship settings, these findings could inform those who are seeking to make a better connection with their colleagues, peers, partners, and so on. By searching for connections that foster a feeling of understanding, peer-to-peer relationships are likely to improve over time.

With that said, I could see situations where two individuals bring such differences that a mutual understanding is difficult. In that case, is there opportunity in searching for some connection? Or is it healthier for both parties to search for people who are more likely to offer shared understandings? When are mutual differences too much to overcome?

Class 6: Insights from Mental Health Conditions
In Sippel et al. (2021) researchers found that individuals with PTSD showed impaired SWM and associated neural abnormalities (hyperactivation in the dorsomedial subsystem, the default network). I'm interested in digging deeper into the idea that people with PTSD have a form of generalized handicap that causes excess cognitive strain, and thus increases a reliance on default networks, resulting in poor performance on SWM tasks. What is a potential experiment for determining whether harmful social experiences *cause* SWM? How might researchers alter the DMPFC function, as Sippel et al. suggest?

I found the Moieni et al., (2015) research to be interesting — that subjects sensitive to social disconnection show increased pro-inflammatory responses to endotoxin as well as up-regulation of multiple genes related to inflammation. And highly fascinating regarding the theory that adaptation to up-regulation of pro-inflammatory genes may exist due to socially isolated individuals needing protection against infection. I'm curious about the conclusion to these findings:

> *"…our results in a human sample extend these animal findings by showing that greater sensitivity to social disconnection may lead to great proinflammatory activity to endotoxin."* (Moieni et al., 2015, p. 340)

Is it possible that the casual direction works the other way? That the proclivity to inflammation in subjects leads to sensitivity to social disconnection? How is directional causality inferred in this study? How might researchers introduce an instrumental variable to better predict causality in this case? For example, the researchers state in the conclusion that "social disconnection-related differences in basal inflammation levels observed in other older samples may not yet be evident in this young, healthy cohort" (Moieni et al., 2015, p. 341). Is it possible that the explanation for younger subjects showing little to no differentiating relationship between inflammation effects and social disconnection is that age is positively correlated with awareness of socially disconnected affect? To be fair to the authors of the study, they do disclose the limitations in causal direction.

Class 5: Assessing your own mind

Wilson and Gilbert (2003) provide a fantastic review of affective forecasting. Of particular interest to me is the concept of impact bias and in particular durability bias. The tendency to overestimate the enduring impact of negative events can keep many of us from going after our goals.

Expectation effects is particularly salient as well. It was interesting to learn of experimental findings on how affective forecasts can alter the actual emotional experience of an event. I would be curious to learn more about expectation and the concept of self-fulfilling prophecy. In my experience these concepts are relatively new to psychology and neuroscience, but it is not uncommon for prominent leaders, pro athletes, and others at the top of their profession to call out the value of conscious expectations effects in practice (Novak Djokovic visualizing success to win a tennis match, for example). Is there an experimental design where researchers could test the average impact of performance when subjects believe they will succeed, when they believe they will fail, or when they approach a test with neutral expectations? Can people consciously call on the principle of post decisional dissonance reduction to inform decisions that improve outcomes?

Emotional evanescence and the ordinization neglect are important learnings. Consider those who have a proclivity for material gains who, upon achieving those gains over time, come back to a baseline level of happiness. I know there have been studies to support this finding, but I would be interested to learn more about the personality traits and affective conditions of those who are more (or less) aware of their own ordinization neglect.

Lastly, in what clinical or policy areas might we find barriers due to the tendency for people to rationalize, reconstrue, or minimize bad outcomes. Consider the Gilbert and Rinksy (1999) study on faith and cookies as a foundation.

Class 4: Mentalizing Strategies

Setting a foundation — simulation theory (the mirror system) contends that one way for inferring the mental states of other people is to imagine one's own thoughts, feelings, or behaviors in a similar situation (Mitchell, 2005). Alternatively, the 'argument from error' defined by Saxe (2005) contends that children and adults "do not simulate the other person's beliefs in their own mind," but rather people deploy an *intuitive theory* of how the mind works, relying on a naïve psychology, as Saxe describes in her 2005 article.

Personally, I like to assume I'm referencing intuitive theory of the mind, but likely rely more on simulation theory as I (sometimes consciously, often not) call upon my own experiences and mental models to inform those who seek my advice (e.g., "How would I feel in this situation?" or "Given this decision, how would I approach it?"). While this is a great starting point for empathy, true perspective taking requires a bit more discipline and cognitive strain (i.e., "given her experience, how must she feel in this situation, and how best can I support?"

Mitchell and Saxe, in a 2005 Harvard family spat well suited to read whilst sipping tea, both call attention to modern findings in neuroscience that the activation of complex cognitive processes such as those found in memory, cognitive control, semantic knowledge, and even emotion is often highly nuanced and can vary within and across groups and subjects. While I find merit in both arguments, I don't view them as mutually distinct as the researchers. Afterall, it is completely reasonable to imagine many situations in which a person simulates another's beliefs while deploying intuitive (and often false, as Saxe illustrates) theories of logic, decision making, memory, or emotion. I would content that empathy requires some combination of the two activities, depending and varying based on factors unique to an individual's unique neurological anatomy, and the inputs (mental models) derived from their experiences.

Mitchell in the 2005 paper *The false dichotomy between simulation and theory-theory: the argument's error* states that "much of the progress made by cognitive neuroscience over the past three decades has been of decidedly non-parsimonious nature" such as complex cognitive process in memory, cognitive control, semantic knowledge, emotion. Emotion is particularly salient in this case, and recent finding in neuroscience call to question the errors that can arise in assuming universality in cognitive activity, such as in the localizing of emotion to particular brain regions (Barrett, 2021 *How Emotions Are Made*).

Based on what we know about simulation, the mirror system, and theory theory, what other experiments could we run to better understand how our empathetic systems work together? Is fMRI the best experimental design we have in identifying what cognitive processes people use? Thus far, fMRI have focused on locating brain activity and correlating said activity with perceived cognition. The findings in Mitchell et al. (2005) showing an inverse correlation between the dorsal mPFC and similarity when mentalizing about dissimilar others are of particular interest. Perhaps an experiment using deductive reasoning techniques—priming

subjects for emotional triggers we know are most likely to draw activity to particular lobes before engaging in empathy tasks, and measuring cognitive strain, for example—might enable researchers to home in on how empathy is processed.

Because we can construct feeling and emotion based on physical bodily states, perhaps we could prime subjects to positive and negative states, serve subjects a standardized set of stimuli, measure response (both fMRI and survey response) to test how the construct of emotion effects empathy. A potential hypothesis: a person in a heightened state of emotion (positive or negative) is more likely to call on simulation theory, whereas a person in a subdued state is more likely to call on theory theory when empathizing with an 'other'.

Class 3: Development

I found the Somerville (2013) article to be interesting. The research points to social evaluation and concern with an *imaginary audience* on average peaking by around age 17, with effects subsiding going into young adulthood. The research methodology was sound in this study, controlling for unit and time fixed effects. Applying 3 separate tests 1) self-reported (rating), 2) GSR, and 3) fMRI and measuring correlation between them acted as a robustness check. The researchers were able to apply causal inference as the age difference could not be explained by experiential covariates among participants. I found interesting the distinction between implicit and explicit evaluation — that even anticipatory situations invoked adolescent self-consciousness and neural correlates. I would be curious to learn more about broader age range dynamics and the average range and frequency of divergence in young adults. For example, do young adults that do not show this divergence from heightened self-conciseness correlate with social psychological disorders, such as social anxiety?

The findings above were supplemented by Richardson et al. (2018) in that ToM and pain networks are functionally distinct by age 3 years and continue to develop through childhood and into adolescence. By age 6 children have already developed a sophisticated capability in interpreting the mental states of others, and this ability is slowly and continuously developed over time, boosted by explanatory practice and feedback. As older children continue to interpret and learn about hidden emotions, this provides further evidence and rationale for education systems that emphasize social and emotional learning in children, teens, and young adults.

Which leads nicely into the Blakemore (2010) study. As the ability to mentalize and understand emotion is developed from around age 4 and throughout the adolescent years, there are significant implications for how education systems can utilize the science around ToM and mentalizing to build better learning and development environments for students. The Blakemore study calls attention to the power of *live interaction* to encourage a level of deeper social and emotional learning, a degree of learning that may not be possible through to alternative learning environments (i.e., audio learning, interaction over social media, etc.). These results underscore the value of social interaction for children and adolescents as it pertains to learning, and calls into question the potentially negative effects of social

networking, virtual engagement, and text-based communication methods common with teenagers, young adults, and increasingly with older segments.

An interesting note in the Blakemore (2010) study was the tendency for mPFC activity to decrease over time from adolescent to adult subjects and raises the question into why this direction of change in mPFC activity occurs. One hypothesis may be that as the brain develops and matures over time, mentalizing and ToM tasks may move to brain regions more associated with memory, or automaticity in task processing, as opposed to the mPFC regions associated with development and learning most salient in childhood? I would be interested to learn more here. ☺