



SANS

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Abstract Book

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SANS Conference Oral Presentations

Thursday, April 27

Symposium #1: Brain and social network contributions to social connections and wellbeing

Rui Pei¹, Nina Lauharatanahirun², Laetitia Mwilambwe-Tshilobo³, Ovidia A. Stanoi⁴, Emily Falk (discussant)³

¹Stanford University, ²Pennsylvania State University, ³University of Pennsylvania, ⁴Columbia University,

The size, shape, and composition of our social networks impact our health, and shape how we use our brains. Here, we present four studies examining how aspects of people's social networks, and the ways people engage different brain networks during social tasks and rest, intersect to contribute to social behaviors and wellbeing. First, we will describe the behavioral and neural links between risk taking and social network clusters. Second, we will show that people who occupy brokerage positions in their social networks have more divergent brain responses, and more different connections in their social networks, which contributes to more social interactions. The third study will highlight how network size and perceived closeness of connections in people's social networks influence the relationship between loneliness and brain function. Fourth, we will show how students' neural representations of others' centrality in different types of social networks relate to their tendency to seek and offer support in daily life. Together, the studies presented in this symposium highlight the importance of social and functional brain networks for social connections and wellbeing. In a panel-style discussion following the empirical research presentations, we will reflect on recent advances and future directions, highlighting critical intersections between brain and social network dynamics.

S1.1 Risky decision making reflects adolescents' social network clustering structure

Rui Pei^{1,2}, Nina Lauharatanahirun³, Christopher N. Cascio⁴, Matt B. O'Donnell², Emily Falk²

¹Stanford University, ²University of Pennsylvania, ³Pennsylvania State University, ⁴University of Wisconsin

Social groups, reflected as clusters in social networks, are fundamental for self-identity, physical health, and psychological well-being. Forging relationships with new social groups involves taking risks (e.g., approaching unknown others at the risk of being rejected), and fosters adaptive development during adolescence and emerging adulthood. Across three studies, we investigated the role of risk taking in the formation of social groups, and the neural processes that may support this association. In Study 1-2, we found that behavioral risk taking was positively associated with the number of social network clusters among adolescents (Study 1 n = 409; Study 2 n = 404; Age range 12-22), indicating that adolescents with higher risk taking tendencies tended to have more groups in their social networks. Study 3 (n = 62; Age range 16 - 17 years old) provided evidence that reward-related neural activity during risk taking in the laboratory tracked the number of clusters in objectively logged online social networks. These findings suggest that behavioral risk taking and reward-related neural activity likely support the formation of social groups. Our work underscores one of the positive implications of heightened risk taking during adolescence, which is social exploration and the cultivation of multiple social groups.

S1.2 Neural and social interaction patterns of brokers in social networks

Nina Lauharatanahirun¹, Mary Zhuo Ke¹, Derek Spangler¹

¹Pennsylvania State University

Relationships within social networks are formed by the connections that tie individuals to one another. These social connections may vary and depend on the frequency of interactions, types of people, and social network position. For example, people might be directly connected with one another or they might be connected through mutual contacts. People who connect otherwise unconnected others (known as brokers) may connect people who have different traits, knowledge, or resources. Brokers within a network have the opportunity to facilitate increased social interactions with diverse groups within a network. In the present study, we investigated how 1) risk-taking differed between people (N=38) within a social network and 2) divergent whole-brain EEG brain responses affected potential for brokerage and self-reported social interactions. Our findings indicate that brokers have greater diversity in risk-taking behaviors within social networks and divergent intra-brain responses in gamma functional connectivity resulting in higher levels of self-reported social interactions. These findings highlight the importance of social network positions in shaping social connections and interactions.

S1.3 Loneliness and functional brain connectivity through the lens of social networks

Laetitia Mwilambwe-Tshilobo^{1,3}, Jeeseung Ahn¹, Yoona Kang¹, Ovidia Stanoi², Sebastian Speer³, Diana Tamir³, Zachary Boyd⁴, Dani S. Bassett¹, Kevin Ochsner², David M. Lydon-Staley¹, Peter J. Mucha⁵, Emily Falk¹

¹University of Pennsylvania, ²Columbia University, ³Princeton University, ⁴Brigham Young University, ⁵Dartmouth College

Connections with others promote well-being. Social relationships, especially high-quality ones, can mitigate the subjective experience of loneliness. What factors are associated with the experience of loneliness and how it is instantiated in the brain? Do objective features of a person's social network, like having many social ties, or subjective factors, like feeling a depth of connection towards people in one's network, buffer the effects of loneliness on brain function? In the present study, we address these questions by investigating how the network size and perceived closeness of college students' social networks relate to

loneliness and moderate the relationship between loneliness and brain resting-state functional connectivity. First, we mapped participants' personal (ego) networks (N = 111), collected perceived interpersonal closeness to peers nominated in the ego network, and perceived loneliness. Behavioral results indicate that lonelier people had smaller ego networks and reported lower emotional closeness to those in their networks. Next, we examined whether lonely people show distinct patterns of brain function, and how perceived closeness and network size moderate the relationship between loneliness and brain function. We developed a neural signature of loneliness using the Human Connectome Project's resting-state fMRI and loneliness data, which provides a robust link between patterns of brain connectivity and the subjective experience of loneliness. We applied the neural signature to our participants' resting-state fMRI to assess the degree to which they expressed this signature, and found robust correlations with loneliness, highlighting the robustness of the signature. We then examined whether social network resources buffered the strength of the brain-loneliness relationship. Here, we found that signature expression did not differ according to social network size, but did vary depending on the perceived closeness of those ties. The closer lonely participants felt to others in their network, the less they expressed the loneliness connectivity pattern. These findings highlight how subjective perceptions of the quality of social ties and the size of a person's social network may contribute to the experience of loneliness and its impact on brain function.

S1.4 Neural evaluations of multilayer social networks inform decision-making in daily life

Ovidia A. Stanoi¹, Danielle Cosme², Mia Jovanova², Dani S. Bassett², David M. Lydon-Staley², Peter J. Mucha³, Emily B. Falk², Kevin N. Ochsner¹

¹Columbia University, ²University of Pennsylvania, ³Dartmouth College

Whether deciding which co-workers to turn to for help, what love interests to pursue, or what professors to ask for advice, many everyday decisions are related to our membership in social groups. Such decisions require consideration of multiple dimensions of social information about other people, including how approachable, popular, or influential they are. Although success in social interactions depends on the ability to integrate and evaluate these myriad informational dimensions swiftly, little is known about the neural mechanisms underlying this process. In this study, we asked 1) how people represent multidimensional information about members of their real-life social networks, 2) how the brain tracks the value of social relationships in a multidimensional space, and 3) how individual differences in these neural valuations relate to help seeking and prosocial behavior in daily life. Building on earlier experimental work (Tavares et al., 2015; Park et al., 2021), we hypothesized that the hippocampal formation represents social relationships in a multidimensional map (similar to how it represents physical space) and works together with the vmPFC to guide social decisions. To answer our research question, we used data from 92 college students belonging to 9 close-knit student groups. All participants first completed an fMRI scan in which they passively watched pictures of their group members, then rated each other on six dimensions (liking, closeness, leadership, etc.) in a round-robin design. Finally, for 28 days following the initial scan date, participants answered two phone surveys daily about their emotions and social interactions. Our research highlights that studying people as members of complex multidimensional social networks is essential to understanding their behavior and decisions in everyday life.

Symposium #2: EDIJ Town Hall

Ajay Satpute¹, Andy Chen², Jeni Kubota³, Niv Reggev⁴, Damian Stanley⁵

¹Northeastern University, ²National Taiwan University, ³University of Delaware, ⁴Ben Gurion University, ⁵Adelphi University

Moderated by: Ajay Satpute, Northeastern University

How is SANS doing in terms of equity, diversity, inclusion, and justice? The session will include a brief overview of efforts from prior SANS events, presentation of diversity and inclusivity metrics from recent conferences, and an open discussion for setting the agenda on EDIJ values for SANS 2024 and the society in general.

Led by the SANS EDIJ Taskforce.

Friday, April 28

Symposium #3: Alignment and divergence in social cognition

S3.1 Disrupting the temporoparietal junction reduces trust in out-group but not in-group individuals

Andrea Fariña¹, Luuk Snijder¹, Jan Hausfeld², Steven Scholte², Ilja Sligte², Jan Engelmann², Carsten De Dreu¹

¹Leiden University, ²University of Amsterdam

BACKGROUND AND AIM: People trust individuals belonging to their in-group more than those belonging to rivaling out-groups, possibly because out-group individuals are heuristically expected to exploit rather than reciprocate. Previous work in cognitive neuroscience indeed showed that reduced perspective-taking ability increased the difference in trusting in-group versus out-group members, and revealed a link between perspective taking and BOLD response in the temporoparietal junction (TPJ). Here we tested the hypothesis that disrupting the functionality of the TPJ reduces trust. **METHODS:** 90 right-handed participants played an incentivized Trust Game in the role of the trustor with ingroup and outgroup members (manipulated within-subjects) while in an fMRI scanner immediately after receiving continuous Theta Burst Stimulation (cTBS) on their (neuro-navigated located) TPJ (left, right, sham; manipulated between subjects). We measured expectations, behavioral trust, and BOLD responses in several pre-registered regions of interest (ROIs), including the TPJ, IFG, VS, and DLPFC. **RESULTS:** Participants expected ingroup members to back-transfer more money than outgroup members ($t(1884) = 13.03, p < 0.001$) and invested more when paired to ingroup rather than outgroup partners ($t(6302.2) = 42.64, p < 0.001$). Trust in out-group partners was further reduced when (left) TPJ functionality was disrupted (partner \times TBS: ($F(4,6302.1) = 3.66, p < .01$). At the whole brain level, trust decisions reliably associated with neural activity in areas involved in mentalizing (inferior frontal gyrus (IFG), insula, TPJ and cerebellum), and cognitive control (anterior cingulate cortex, and dorsolateral prefrontal cortex (DLPFC)). Neural activity in these regions was similar for in-group and out-group partners. However, ROI analyses revealed partner \times TMS-treatment interactions on neural activity in the DLPFC. Participants with disrupted left TPJ showed less activity in the DLPFC in ingroup compared to outgroup trials. **CONCLUSIONS:** Results support the possibility that the (left) TPJ is causally involved in trust, in particular reducing distrust in out-group members. In addition, findings suggest that cognitive control and mentalizing work in concert when deciding whom to trust, and whom to discriminate against.

S3.2 Choosing for others: Neurocomputational mechanisms underlying risky choice

Melanie Ruiz¹, Sarah Gallardo¹, Carmen Lima¹, Peter Sokol-Hessner², David Smith³, Dominic Fareri¹

¹Adelphi University, ²University of Denver, ³Temple University

Despite a robust body of literature highlighting the importance of social context to our choices and how we process consequences of those choices, our understanding of how the social world affects the neurocomputational processes underlying risk evaluation is deeply lacking. We have previously shown that when faced with risky vs. safe monetary choices, people become more loss averse and risk averse when their choices affect others (close friends, strangers; Fareri et al., 2022). In this pre-registered fMRI study (pre-registered $N = 50$ pairs of participants), we characterized the neural mechanisms supporting these changes in computational risky decision processes. To date, we have recruited 14 pairs (11F) of same-sex participants to complete a risky monetary decision-making task in social and non-social contexts (adapted from Fareri et al., 2022). One person from each pair underwent fMRI while the other performed the same task in a separate behavioral room in the imaging suite. Participants received a monetary endowment of \$24 to use in this task. Across 3 rounds, (96 choices each, 288 choices total), participants chose between monetary gambles (50% chance of receiving a positive or negative/zero monetary outcome) and guaranteed monetary options (100% chance of receiving \$0 or a small positive outcome), in which the recipient of the monetary outcomes changed. In the first round of the task, participants chose for themselves. In rounds two and three (order counterbalanced across participants), choices were made either for a same-sex stranger or for the same-sex close friend who accompanied the MRI participant to the experimental session. Hierarchical logistic regression across both fMRI and behavioral participants ($N = 25$ after behavioral exclusions) revealed that participants took fewer risks on behalf of others (stranger + friend) relative to when choosing for themselves ($b = -0.15, SE = .07, z = -2.26, p = .024$), replicating our prior findings of more conservative behavior when evaluating risks for others (Fareri et al., 2022). Preliminary whole-brain analyses on fMRI participants ($N = 12$ after behavioral exclusions) revealed increased activation in the ventral striatum, insula and extended amygdala ($z > 3.1$, whole-brain cluster-extent thresholded at $p < .05$) during experienced losses (vs. wins) when gambling for others relative to gambles chosen for the self. Taken together, these results replicate and extend our prior work, demonstrating that risky choices affecting others elicits enhanced engagement of structures previously implicated in risk evaluation in non-social contexts. Future analyses will implement Hierarchical Bayesian Estimation to estimate how individuals' loss aversion and risk attitudes change when choosing for socially close and distant others relative to the self, and how those changes relate to changes in neural activation and functional connectivity of reward-related neural circuits.

S3.3 Neural responses to social rejection reflect learning about relational value

Leor Hackel¹, Begum Babur¹, Yuan Chang Leong², Chelsey Pan¹

¹University of Southern California, ²University of Chicago

BACKGROUND AND AIM: Social rejection hurts, but it is also informative; through experience, people learn to spend time with others who value them and to avoid those who don't. Past work has asked how the human brain responds to the hurt of rejection, finding responses that overlap with responses to pain, including dorsal and ventral anterior cingulate (dACC, vACC), anterior insula (AI), and ventrolateral prefrontal cortex (vlPFC). Yet, these regions also respond when people update an internal

model of the environment, suggesting these regions may underpin learning from social experience. In particular, people can learn in two ways. First, people track the “relational value” others ascribe to them—an internal model of how much others value them. At the same time, people more generally track rewarding outcomes—for instance, concrete opportunities for interaction. We used computational neuroimaging to better understand brain responses to social rejection, asking to what extent neural responses reflect social pain or either kind of social learning. **METHODS:** In an fMRI experiment, participants (N = 40) repeatedly attempted to match with partners for a trust game. Feedback on each round revealed (i) how the partner ranked them relative to other players (reflecting relational value) as well as (ii) whether they actually got to match with the partner (a positive or negative outcome). Participants could be ranked highly but fail to match, or they could be ranked poorly but succeed in matching anyway, allowing us to dissociate these two forms of learning. **RESULTS:** Participants were more likely to choose partners who tended to rank them highly, as well as partners they often matched with. To dissociate the two types of learning in the brain, we fit participant behavior to a Bayesian model of cognition tracking both types of feedback. Brain regions previously linked to social rejection (dACC, vACC, AI, vIPFC) correlated with Bayesian model updates about relational value. In contrast, activity in these regions did not correlate with negative updates of relational value or expected outcomes, suggesting they did not reflect social pain. Representational similarity analysis supported this interpretation: voxel patterns in these regions reflected how participants were ranked by partners, and these patterns predicted participants’ later self-reports about how much they were liked. In contrast, reward prediction errors related to outcomes correlated with responses in ventral striatum—a key region in reward-based reinforcement learning. **CONCLUSIONS:** These findings highlight how the brain learns from social experience, turning past acceptance into future friendship: through distinct brain networks, people update an internal model of how they are valued by others and update reward predictions about acceptance. In turn, people choose to interact with partners who value them and who have offered concrete instances of connection in the past

S3.4 Friends diverge while strangers align: Using fMRI hyperscanning to investigate social interaction in real time conversations

Sebastian Speer¹, Laetitia Mwilambwe-Tshilobo¹, Lily Tsoi², Shannon Burns³, Emily Falk⁴, Diana Tamir¹

¹Princeton University, ²Caldwell University, ³Pomona College, ⁴University of Pennsylvania

Successful social interactions are essential for humans’ well-being as they foster social bonds that reduce stress and support longevity. Although people often have an intuitive sense of how to interact, researchers have yet to identify the key ingredients for a ‘successful’ interaction. One ingredient that may help people succeed at social interactions is mentalizing - the tendency to consider what others think and feel^{1,2,3}. People use three dimensions, namely social impact, rationality and valence, termed the 3D mind model, to represent mental states^{4,5,6}. People use these representations to predict future mental states and actions in hypothetical targets⁷. Here we examine how mentalizing supports successful social interactions in live conversation. Previous work on social interactions suggests that linguistic, behavioral, physiological, and neural alignment are associated with positive social outcomes such as interpersonal liking, cooperation and social influence^{8,9,10,11,12}. We therefore tested whether people align their mental states over the course of a live conversation, and whether alignment differs between friends and strangers. To this end, we used fMRI hyper-scanning: 60 dyads engaged in a real-time conversation with discrete prompts and demarcated turns. Half of the recruited dyads self-identified as friends; The other half of the dyads were strangers. This allowed us to explore how an already existing social connection influences the mental state alignment of dyads during their conversations. To measure mental state alignment, we developed predictive models that can decode mental state representations from whole-brain activity patterns, using four previous (independent) fMRI data sets that used mental state judgment tasks designed to evoke neural patterns that vary across the three mental state dimensions. These models successfully captured mentalizing during real-time conversation, allowing us to decode from each person’s brain their ‘location’ on each dimension in mental state space at a given moment of time. We computed the distance between the two speakers in 3D mental state space, at each moment of time across the whole conversation, where a smaller distance represents a higher alignment of mental states within the dyad. Our analyses revealed that over time the mental states of strangers align, whereas they diverge for friends. Friends start off with higher mental state alignment than strangers and then drift apart in mental state space until their distance is significantly larger than the distance for strangers. This suggests that friends may explore a larger content space and exhibit more surprising turns, whereas strangers are more aimed at finding common ground in their conversations. Thus, social context may shape the extent to which we aim to find common ground or explore new frontiers in a conversation.

S3.5 Contention in real-world social networks: Examining the neural and behavioral correlates of structural equivalence

Miriam Schwyck¹, Junsol Kim², Jeanyung Chey³, Noam Zerubavel⁴, Peter Bearman⁴, Yoosik Youm⁵, Carolyn Parkinson¹

¹University of California, Los Angeles, ²University of Chicago, ³Seoul National University, ⁴Columbia University, ⁵Yonsei University

BACKGROUND AND AIM: Humans live their entire lives within social networks. Recently, there has been increasing evidence that information regarding where one sits in a social network is valuable in understanding social behavior, dynamics, and thought processes. In particular, researchers have started to look at how the relative similarity of people’s social network positions (specifically, “structural equivalence” or the extent to which they share the same relationships with third parties and, thus, the same rank in the social hierarchy) relates to interpersonal behavioral outcomes. Here, we examine how structural equivalence may breed competition by combining functional magnetic resonance imaging (fMRI), behavioral assessment, and analyses of participants’ real-world social networks. **METHODS:** We analyzed data from two bounded social networks of rural towns on a South Korean island comprised largely of older adults. All participants are members of the community center in town and regularly spend several hours per day together; these individuals provided data on their interactions with one another, as well as ratings of their feelings towards one another. Here, we examined data from a subset of participants who underwent fMRI

scanning while viewing facial images of other familiar network members in the same community center. **RESULTS:** We first found that brain regions associated with social cognition encoded the extent to which the participant was structurally equivalent to the person they were viewing. That is, social brain regions spontaneously encoded the relative similarity in network position between oneself and a familiar other. We also found a strong positive relationship between structural equivalence and feelings of dislike, such that people reported greater feelings of dislike towards others who were more structurally equivalent to themselves. Finally, we tested the effect that social brain activation had on this relationship between structural equivalence and dislike. We found that neural responses elicited by targets significantly modulated the prediction of structural equivalence on dislike ratings. **CONCLUSIONS:** Here, we sought to build on recent theories that structural equivalence within networks breeds competition and conflict. In a long-standing natural social network, we found evidence consistent with this theory, showing that people tend to dislike familiar others who share similar network positions. Furthermore, we found that the brain spontaneously encodes others' structural equivalence to oneself, with potential consequences for the extent to which social cognitive processes are engaged when encountering others in day-to-day life. **ACKNOWLEDGEMENTS AND FUNDING:** This work was supported by the Ministry of Education of the Republic of Korea, the National Research Foundation of Korea (NRF-2022S1A3A2A02089737), and the National Science Foundation (DGE-2034835 and BCS-2048212).

Symposium #4: Biases in decision-making, information-seeking and social information processing

S4.1 Contextual sensitivity in social appraisals alter altruistic decision-making

Anita Tusche¹

¹Queen's University

Why do people act altruistically in some contexts but not in others? Here, we examine the hypothesis that individuals' sensitivity to distinct characteristics of a target (i.e., another person's merit or need) differs across people and settings. Using computational models and fMRI data, the study aimed to explain who, how, and when these contextual (in)sensitivities in social appraisals will alter social behavior (altruistic sharing). To this end, participants (N=32) completed two fMRI tasks on separate days. A social inference task served to identify individual differences in judgments of others' need and merit (unrelated to altruistic choices). In an altruistic choice task (modified dictator game), subjects repeatedly accepted or rejected different monetary offers for themselves and different partners who varied in their immediate need (high/low) and perceived deservingness (low/high/unknown). Using drift-diffusion models (DDMs) and behavior in the altruistic choice task, we showed that a partner's need and merit act independently to modulate attention to self and partner outcomes in altruistic choice contexts. The influences of need and merit on generosity were uncorrelated across individuals, suggesting that different mechanisms might support them. Notably, behavioral and neural indices of individuals' biases in social appraisals – identified in the separate social inference task – predicted variance in altruistic behaviors across people and contexts. Overall, our results provide insights into the neurocomputational mechanisms of altruistic choice. We identify stable individual differences in social appraisals on the behavioral and neural levels (i.e., overall sensitivity to contextual social cues and contextual discriminability). Moreover, we demonstrate how different types of social inferences – and their biases – provide distinct inputs into the altruistic decision process. These findings point to the complex interplay of context, target, and perceiver characteristics guiding social behavior.

S4.2 Misinformation biases in information-seeking

Stefan Bode¹

¹University of Melbourne

Over the past decades, the availability of information has increased exponentially. We are now confronted with new information around the clock, delivered via online news platforms and social media. However, not all information is reliable, and "fake news" have become a serious threat. In this talk, I will first present results from a study in which participants could receive information from different sources about simple lottery outcomes and were subsequently asked to guess the outcome, based on the sources' predictions. We demonstrated that a substantial proportion of participants preferred to choose sources, which made more positive predictions, which in turn led to positive biases in their beliefs, despite knowing that the sources were not more accurate. In another series of studies, participants were explicitly told how reliable each source was. Before making decisions based on the sources' predictions, participants were always given the opportunity to acquire additional information at a small cost, which would allow participants to make better-informed decisions. We investigated whether the presence of fully unreliable sources, and sources that were known to be incorrect, increased the desire for obtaining additional information. We found that the presence of unreliable and untruthful sources led to poorer decision-making, but – contrary to expectations – also to a reduced desire for additional information. This reduction in information-seeking could not be explained by an inflated confidence in the available information, but rather occurred despite being less confident in making good decisions. These findings have serious consequences for understanding how to combat misinformation, as they suggest that labelling information as untrustworthy might not be sufficient to help people make better decisions.

S4.3 Information sources bias safety detection

Sarah Tashjian¹

¹California Institute of Technology

The ability to rapidly determine when we are safe is critical to allostasis. Conversely, swiftly determining the danger of a predator is key to survival. Consequently, biases in the way the brain computes safety can result in anxiety if underestimated or danger if overestimated. In this talk, I will present results from two preregistered studies testing whether the source of information biases

safety evaluation. Using a novel task, subjects predicted whether they would receive electric shock when encountering attacking animals (“threat”) while armed with weapons (“protection”). In their natural habitat, the Bengal tiger is justly feared. With a gun in hand, however, we fear the tiger less. In both contexts, the sensory features of the tiger remain stable, yet safety estimates fluctuate. Thus, detecting safety relies on interpretation and weighting of threat and protective information – bias appraisal of either source of information will result in inaccurate safety evaluation. Subjects in our studies more accurately estimated protective value of weapons than threat value of animals, and protection was represented in more stable neural patterns across the whole brain. Searchlight analyses identified integration of threat and protective factors in the vmPFC, supporting theoretical models of the vmPFC as crucial for adaptive coding of safety contingencies. Subjects with higher trait anxiety overestimated the danger of animals and less flexibly integrated threat and protective information. Focusing on evaluating sources of protection has potential to mitigate anxiety in individuals resistant to current anxiety therapies that focus on external threat. vmPFC dysfunction may play a role in pathogenesis of anxiety as a result of biased threat estimation.

S4.4 Social decisions are biased by losses of trust and risky social influence

Caroline J. Charpentier¹

¹*California Institute of Technology*

Valence-dependent biases are highly prevalent during decision-making. Expecting positive versus negative outcomes differentially impacts information-seeking (preference for good news), reinforcement learning (higher learning rate for rewards than punishments), belief updating (optimism bias) and economic decisions (loss aversion). Yet, whether such pervasive biases exist in social decisions remain poorly understood. Here, we characterize two of these biases. In a dynamic trust learning task, participants played a repeated trust game with human partners and slot machines who varied similarly in their pattern of reciprocation. Losses in trust (i.e., decreases in reciprocation) were found to impact decisions more than equivalent increases in trust, akin to a “trust loss aversion”. This bias was stronger in the human condition, indicative of social specificity. In a social risk/ambiguity task, participants made gambling decisions before and after observing the choices of two other players. Decisions were more strongly influenced by other players’ risky than safe choices, even when controlling for baseline preference, such that less ‘social evidence’ was needed to switch from safe to risky choices than the other way around. This pattern was present for both non-ambiguous and ambiguous gambles. Crucially, the two tasks were collected in the same participants (N=358), and while some processes were correlated across tasks, such as sensitivity to expected value, the two biases described above were largely independent, and not explained by cognitive/executive functioning. This suggests that they represent separate processes, which help further characterize the complex range of social decision-making biases, and may constitute relevant candidates to explain variability along social dysfunction in psychopathology.

Saturday, April 29

Symposium #5: Systems and dynamics of emotion

S5.1 Deconstructing emotion regulation: A system-identification approach using Bayes factors

Ke Bo¹, Thomas Kraynak², Mijin Kwon¹, Micheal Sun¹, Peter Gianaros², Tor Wager¹

¹Dartmouth College, ²University of Pittsburgh

Emotion regulation is fundamental to healthy function. One major regulation strategy is reappraisal, in which participants reinterpret the meaning of affective events. Reappraisal and emotion-generation processes may interact non-additively, with brain regions involved in both. It remains unclear whether some regions are selectively activated by reappraisal or emotion generation alone, which is an obstacle to developing brain measures of these processes. Here, we applied a systems identification approach to two large community samples ($n=182$ and 178), who viewed and reappraised images from the International Affective Picture System (IAPS) during fMRI scanning. We used Bayes factors to quantify evidence for both activation and null effects for emotion-generation (Look Negative - Look Neutral) and reappraisal (Reappraise - Look Negative) contrasts. This allowed us to take an axiomatic approach, identifying brain regions matching four potential system components: (1) Reappraisal only regions responding only to reappraisal demand, not negative images; (2) Common appraisal regions activated by negative images and further increased during reappraisal; (3) Non-Modifiable emotion-generation regions activated by negative images but unaffected by reappraisal; and (4) Modifiable emotion-generation regions activated by negative images and reduced by reappraisal. Our data identified regions consistently associated with each component across both datasets. Reappraisal-only regions included anterior prefrontal cortex and temporal-parietal junction. Common appraisal regions (the component with the largest number of associated brain voxels) included frontoparietal regions, nucleus accumbens, and medial prefrontal cortex. Among emotion generation-related regions, most subcortical regions were non-modifiable by reappraisal, including amygdala, brainstem, PAG, parabrachial complex, and thalamus, while visual and attention-related regions were modifiable by reappraisal. Brain activities in reappraisal only, common appraisal and modifiable emotion region were related to the successful regulation of negative feelings, and the spatial location of them overlapped with serotonin, GABA and glutamate receptors. These results suggest the brain regions underlying reappraisal are highly overlapped with the region that generates emotion while it still has its specific brain system. Automatic appraisal supported by subcortical structures are not influenced by reappraisal, while sensory representations are the main targets to be regulated.

S5.2 Shallow neural networks for collision detection predict arousal-related differences in emotional experience

Monica Thieu¹, Philip Kragel¹

¹Emory University

BACKGROUND AND AIM: Human emotional experience is constantly shaped by visual input. Temporally invariant visual features, processed in primary visual cortex and then along the ventral stream, predict subjective emotion responses—both categorical judgments and ratings along dimensions like valence and arousal (Kragel et al., 2019). Separately, people also reflexively avoid visual looming, a radially expanding motion pattern associated with threat of collision that is mediated by the superior colliculus (King et al., 1992; Billington et al., 2010). It is unclear, however, whether visual information about looming threats contributes to subjective emotion reports, and if so, how it is unique from the information coded in the ventral visual stream. We investigated this question using a basic model of visual collision detection via optical flow of the sensory array. We hypothesized that if human emotional experience is shaped in part by looming motion information, such a simple model would predict emotion ratings to complex, dynamic visual stimuli. Further, we hypothesized that the collision detection model would predict aspects of emotional experience distinctly from deep neural networks designed to detect invariant visual features of objects. **METHODS:** To test these predictions, we used linear readouts from a shallow neural network model of collision detection (Zhou et al., 2022) to predict categorical emotion judgments of short video clips (Cowen & Keltner, 2017). We contrasted the fidelity of representations from this collision detection model with those from a deep convolutional neural network for object recognition, whose architecture is consistent with that of the ventral visual hierarchy (Kragel et al., 2019; Nonaka et al., 2021). Specifically, we compared each model's confusion matrix with distance matrices based on differences in mean valence and arousal ratings between emotion categories. **RESULTS:** We found that the collision detection model predicted emotion judgments above chance (empirical permutation testing $p < .01$), and that the model's pattern of errors was consistent with differences in arousal ratings (linear regression $\beta = .024$, $SE = .011$). Further, the collision detection model's pattern of emotion predictions was distinct from those of the object recognition model, whose errors correlated with category differences in both valence ($\beta = .010$, $SE = .003$) and arousal ratings ($\beta = .035$, $SE = .013$). **CONCLUSIONS:** These results show that information about low-level, threat-relevant visual looming is uniquely linked to subjective emotion reports, perhaps by contributing to differences in affective arousal. More broadly, our results suggest that visual affordances like looming (Lee, 1976) can contribute to subjective experience. Future work is needed to determine how computations of such threat-relevant visual dynamics, like those implemented in the colliculo-pulvinar pathway (Evans et al. 2018), inform emotional experience.

S5.3 The affective neuroimaging consortium (ANiC)

Mijin Kwon¹, Philip Kragel², Lukas Van Oudenhove³, Yaroslav Halchenko¹, Tor Wager¹, The Affective Neuroimaging Consortium⁴
¹Dartmouth College, ²Emory University, ³Katholieke Universiteit Leuven, ⁴The Affective Neuroimaging Consortium

We still have much to learn about the organization of brain systems underlying affective processes. Neuroimaging studies have revealed information about the brain bases of hundreds of varieties of affective tasks and states, but generally (and often necessarily) with small sample sizes. Conversely, large-scale studies with >1,000 participants have transformed human neuroscience, but their task diversity is low: they include only a few, well-studied affective tasks. In particular, these studies cannot test or maximize the generalizability and specificity of brain representations, models, or neuromarkers for any affective state. To do so, we need datasets that are both large and functionally diverse. They must (1) systematically span a broad space of affective stimuli, states, and tasks; and (2) include diversity in methods over which brain representations should generalize, including scanner, paradigm, and acquisition-specific variables. To this end, we have launched the Affective Neuroimaging Consortium (ANiC), a grassroots collaborative project that aims to provide the largest and most diverse dataset of fMRI activation maps related to affective states to date. We include whole-brain images at the individual-person level, providing vastly more information than coordinate-based meta-analyses and allowing models and neuromarkers to be validated at the person level (with tests of sensitivity, specificity, etc.). We also plan to include PET receptor binding maps from multiple neurotransmitters, linking fMRI to neurochemistry. Here, we introduce the organizing principles, current status, and potential use cases of this consortium. These include the testing and refinement of neuromarkers for affective states, the evaluation of current psychological constructs and ontologies, and the development of new constructs and ontologies aligned with brain function. As a proof of concept, we will present the results from an ongoing analysis that tests the performance of existing brain signatures for pain using a subset of the proposed ANiC dataset.

S5.4 Dynamic fluctuations in the integration of functional brain networks mediate arousal effects on memory performance during naturalistic recall

Jadyn Park¹, Ioannis Pappas², Yuan Chang Leong¹
¹University of Chicago, ²University of Southern California

BACKGROUND AND AIM: A consistent finding in memory research is that arousing stimuli are more likely to be remembered than neutral ones. Yet, the neural mechanisms underlying how arousal supports memory are not fully understood. The current work examines the relationship between arousal-related memory enhancement and brain network topology during memory encoding. Fluctuations in arousal have been found to covary with network integration across functional brain networks; in turn, network integration is thought to promote successful memory encoding via stronger inter-regional brain communication. Building on this past work, we propose that increases in network integration is a mechanism by which higher arousal events are more strongly encoded and better remembered. We test this hypothesis using an open fMRI dataset of participants engaging in naturalistic memory recall. **METHODS:** Participants (n=17) watched a TV episode and verbally recounted the plot while undergoing fMRI. Here, we focused on data from movie-viewing. The episode was segmented into 48 events, which were scored as remembered if the participant described the event during recall. The neural data were parcellated into 200 regions defined by the Schaefer atlas. For each participant and each event, we constructed an unweighted, undirected graph from the functional connectivity matrix computed over the course of the event, and calculated the global efficiency of each graph. Global efficiency is inversely related to the shortest path length between any two nodes and is a commonly used metric of network integration. To obtain a measure of arousal dynamics, we recruited an independent group of participants (n=27) to watch the same episode and continuously rate experienced arousal. **RESULTS:** Global efficiency in the brain was higher during events with higher arousal ratings (b=0.002, SE=0.0006, p=0.004), suggesting heightened arousal was indeed associated with integrated brain states. Both arousal and global efficiency significantly predicted whether an event was successfully recalled (arousal: b=0.20, SE=0.08, p=0.01; global efficiency: b=14.88, SE=4.35, p<0.001). In other words, an event was more likely to be recalled if it had a higher arousal rating, or if the brain was in a more integrated state during encoding. A mediation analysis indicated that global efficiency partially mediated arousal effects on recall (b=0.005, p=0.004, 95%CI=[0.001, 0.01]). **CONCLUSIONS:** Taken together, these results suggest that arousal-dependent biases in memory are related to dynamic changes in the integration of functional brain networks. In taking a multimethod approach that combines behavioral measures, graph theoretic analyses, and a naturalistic memory paradigm, our work advances a cross-level understanding of arousal-dependent memory biases that bridges affective states, ongoing cognition, and brain network topology.

S5.5 The dynamics of affect and temporal memory across event boundaries

Mengsi Li¹, Runan Wang¹, Tori Levier¹, Regina Lapate¹
¹University of California, Santa Barbara

BACKGROUND AND AIM: Everyday life is filled with dynamic shifts between emotional and mundane events. Emotional responses often persist beyond the initial emotional provocation, biasing appraisal of neutral stimuli in new temporal contexts (Lapate et al. 2017). Acute contextual changes typically produce “event boundaries”, which alter temporal memory (Davachi & DuBrow, 2015). However, precisely how event boundaries modulate the dynamics and persistence of emotion is unknown. **METHODS:** We designed a novel event-boundary EEG task in which participants viewed emotional-event sequences comprising four positive or negative images. To create event boundaries, a novel neutral face was shown after each emotional-event sequence, which participants rated on likeability. We measured temporal order and temporal distance memory for emotional items shown within and across emotional sequences. **RESULTS:** Emotional items shown across vs. within-sequences produced poorer order memory and lengthened temporal distance judgments (ps < 0.02), replicating well-known event-boundary effects. Event boundary effects were amplified by emotional-valence shifts (ps < 0.01). Despite those event boundaries, emotional

responses persisted into new temporal contexts, biasing neutral-face appraisals according to the valence of the preceding sequence ($F = 17.66$, $p < 0.001$). Neurally, emotional coding of event sequences and resulting valence-congruent biases in neutral-face appraisals were indexed by the posteriorly-distributed late positive potential (LPP): Negative emotional events evoked greater LPPs ($F = 17.58$, $p < 0.001$), which predicted lower likability of later-presented novel neutral faces ($F = 4.45$, $p = 0.04$). In contrast, the temporal-context sensitive regulation of emotion was reflected in the temporal dynamics of theta oscillations: theta power decreased over negative (but not positive) event sequences, an effect that persisted into the subsequent neutral-face epoch ($ps < 0.05$). Critically, reduced theta power during neutral-face processing following negative sequences was associated with reduced affective spillover ($F = 4.21$, $p = 0.04$), suggesting a potential role for theta in the intrinsic and temporal-context sensitive regulation of emotion. **CONCLUSIONS:** In summary, our behavioral and neural results converge to indicate that although event boundaries distort temporal memory for emotional events, these boundaries do not necessarily modulate the persistence or pervasiveness of emotional responses, which are prone to spilling over into new temporal contexts.

Symposium #6: How to study social neuroscience in the real world

S6.1 Social-interactive neuroscience approaches to understand real-world social behavior

Elizabeth Redcay¹, Junaid Merchant¹, Kathryn McNaughton¹, Diana Alkire²
University of Maryland¹, National Institute of Drug Abuse²

Social interaction is central to our everyday lives and fundamental to our social and cognitive development. However, gaps remain in our understanding of how the brain supports typical and atypical development of social-interactive abilities, and how it relates to variation in social experiences. We argue that many of these gaps arise due to the reliance on non-interactive social stimuli to understand core social-interactive phenomena. Using evidence from fMRI and behavioral paradigms that engage participants in real-time, live social interactions, we demonstrate that the presence of an interactive social partner engages the mentalizing, reward, and attentional systems to a greater than when processing non-interactive social stimuli, even when other task demands are matched. We confirmed the common involvement of these brain systems through a meta-analysis of over 100 neuroimaging studies that used various socially interactive paradigms. Findings from our lab demonstrate that youth with and without autism spontaneously engage the mentalizing system when chatting with a peer (but not a computer), even without explicit mentalizing demands. Positive, engaged responses from a peer (but not a computer) elicit responses in the reward system, and this neural sensitivity to social interactive behavior relates to participants' enjoyment of social interactions outside the scanner. Using a combination of mobile eye-tracking, observational coding, and behavioral approaches, we also provide evidence for the role of neural and behavioral synchrony in individuals' social cognitive abilities and subjective experiences. Together these findings demonstrate that real-time social interaction engages our brain in ways that differ from "offline" social processing and that variation in this neural sensitivity to social interaction predicts real-world social behavior in both typical and atypical development.

S6.2 "Wild Type" Neuroscience: Paradigms and computational tools for live and spontaneous face processing

Joy Hirsch^{1,2}
¹Yale School of Medicine, ²University College London

Although live and expressive human faces provide primary dynamic cues for natural in-person interactions, investigations of face processing are typically based on simulated representations of simplistic and non-interactive faces. These predetermined stimuli do not provide information related to functional organizations tuned to acquire and process live face interactions, and, therefore, limit the generalizability of current face processing models. Conventional face-processing models propose hierarchical pathways consisting of specialized regions within the ventral stream for face processing. Current investigations of dyadic face processing are motivated by the hypothesis that live and interactive behaviors engage extended visual processes beyond the ventral stream. The introduction of functional near infrared spectroscopy, fNIRS, supports an advanced neuroimaging technology for interrogation of live face processing under real dyadic and interactive conditions. Simultaneous neuroimaging data acquired from live interacting dyads enables investigations of the underlying neurobiology of live face processing. Comparisons of live face conditions with non-interactive faces show greater neural activations in right temporal and dorsal parietal regions of brain for the live and interactive conditions, consistent with the hypothesis. These findings suggest that natural faces, as experienced in "real-world" interactive situations, include elaborated social, cognitive, and perceptual mechanisms and challenge current models of face processing as well as conventional data acquisition and computational approaches. In contrast to typical single variable and single participant investigations, simultaneous acquisitions of multiple data streams are synchronized and compared over multiple time domains. For example, time varying signals from fNIRS and EEG, as well as from eye-tracking, gaze targets, dwell times, fixations; pupillometry; facial classifications; auditory conditions; physiological variables; and subjective reports are all synchronized and processed to interrogate dyadic interactions. Computational challenges include multivariate approaches, linear regressions, and classification tools such as those applied in machine learning to inform models of face processes during dyadic and naturally spontaneous behaviors. Computed dyadic measures such as eye-to-eye contact and neural coupling further contribute to the challenges and advantages of novel computational approaches to support emerging "two-person" theoretical frameworks. The importance of natural in-person paradigms and computational tools for models of live and interactive face-processes is highlighted.

S6.3 Embodied hyperscanning as a measure of mutual prediction and learning

Antonia Hamilton¹, Sara de Felice¹

¹*University College London*

Collecting neuroimaging data from two or more participants engaged in a social interaction, aka hyperscanning, has great potential to advance the cognitive neuroscience of social interaction. However, to make best use of these methods, it is critical to have a solid understanding of what hyperscanning can and cannot do. This talk will emphasise the need for an embodied approach, where we understand the interaction of brains as something mediated by and determined by the interaction of bodies. This falls within a mutual prediction framework in which people in an interaction are continually acting and predicting each other's actions using an overlapping and dynamic network of brain regions. To understand this, we must integrate analysis of bodily movements including facial gestures and expressions, hand movements, gaze behaviour and types of spontaneous and socially-relevant nonverbal behaviours into our neuroimaging analysis. Wearable neuroimaging methods including fNIRS and EEG allow participants to produce these spontaneous behaviours and researchers to capture them in a way that is not possible in an MRI environment.

To illustrate the value of embodied hyperscanning approaches, I will share two examples of how this can be done. First, a study of sharing biographical information illustrates how face-capture analysis integrates with fNIRS neuroimaging to show how people engage in mutual prediction during a simple task with minimal interactions. Second, a new study of social learning in conversation illustrates how coding of gaze and joint attention can help us understand the relationship between interbrain coherence and learning in a way that is relevant to educational settings. Overall, this work illustrates both the challenges and opportunities which are available in new multimodal and embodied approaches to real world neuroscience.

SANS Conference Abstracts



Poster Session I
Thursday, April 27
14:30 - 16:00

1-A-1 A neuro-temporal decoding investigation of multi-attribute decision making

Matthew Bachman¹, Azadeh HajiHosseini¹, Sophie Faessen¹, Cendri Hutcherson¹

¹University of Toronto

BACKGROUND AND AIM: Decision making frequently requires one to calculate, weigh, and combine the different individual attributes of each option before making a choice. Prior neural research has characterized the spatial distribution of multi-attribute decision making by applying machine learning algorithms to fMRI data. Notably, these studies have reported significant activation in perceptual regions, in addition to those more commonly involved in the calculation of subjective value. However, fMRI's low temporal resolution has limited our ability to disassociate between the relative timing of perceptual and value signals. Our study fills this gap by applying machine learning algorithms to high-temporal resolution EEG data collected during a multi-attribute decision making task. **METHODS:** To accomplish this goal, we collected data from 40 participants who learned to associate different faces and colors with varying amounts of positive and negative values. Participants then briefly saw combined face-color stimuli, which they were asked to accept or reject based on the summed value of the face and color attributes. These points were accumulated and later converted into bonus money, thereby incentivizing participants to accurately accept positive total values and reject negative ones. Behavioral analyses indicated that participants were able to incorporate the face and color values in order to accurately accept net positive options or reject negative ones. Linear support vector machine classifiers were trained by the EEG data during the choice period in 10-ms time bins to decode when it could significantly predict activation for each condition. **RESULTS:** Our preliminary neural results indicate that both the perceptual and value attributes for faces and colors could be significantly decoded above chance from ~110ms until 600ms. The integrated face-color value was represented relatively weaker but tended to be maintained for much longer periods of time. Additional planned analyses include further characterizing the spatial and temporal differences between the perceptual and value attributes of each stimuli. We will also conduct temporal generalization analyses, which will suggest whether these perceptual and value signals might reactivate over time. **CONCLUSIONS:** These preliminary results suggest a key distinction between the formation of perceptual and value signals in multi-attribute decision making that can be confirmed by further, in-progress analyses.

1-A-2 Examining motivational influences on intuitive physical judgments

Ren Calabro¹, Meriel Doyle¹, Yuan Chang Leong¹

¹University of Chicago

When reasoning about and interacting with the world around them, people rely extensively on their inferences about physical scenarios. Examples of how these inferences can be flawed are well-documented, including in real-world optical illusions. In the current work, we test the hypothesis that our intuitive physical judgments can change when we are motivated to see a particular outcome in a physical scenario. While undergoing eye-tracking, participants (n = 29) were presented with images of block towers that varied in stability and were rewarded for correctly judging whether each tower would fall or remain standing under the influence of gravity. On each trial, we incentivized participants to judge the tower as stable or unstable using monetary bonuses; the bonuses did not depend on the participants' responses, so the reward-maximizing strategy was to respond as accurately as possible. We hypothesized that people would be motivated to respond that a given tower was stable versus unstable when financially incentivized to make a certain judgment about the tower's stability. We found that on average, participants were more likely to judge the tower as stable when motivated to see it as stable than when motivated to see it as unstable. When analyzing participants' eye-gaze data, we found that the fixation patterns of subjects were significantly correlated with the average fixation patterns of other subjects who made the same choice, suggesting that how people sample information contributes to their judgments about physical scenes. We also found that participants' fixation patterns were significantly correlated with the average fixation patterns of other subjects who had the same motivation. In other words, people who have the same motivation tend to focus on the same aspects of the tower, suggesting that motivation may influence how people sample information to make judgments. Future work will assess whether people direct their attention to mechanical failure points identified by a convolutional neural network architecture (Inception v4) when predicting how towers will fall. The results of this project may shed light on potential limitations of human physical scene understanding.

1-A-3 Neural mechanisms of moral conviction and decision-making

Qiongwen (Jovie) Cao¹, Michael Cohen¹, Jean Decety¹

¹University of Chicago

BACKGROUND AND AIM: Moral conviction can trigger more intense responses than other strong but nonmoral beliefs. Moralization inspires activism to fight perceived injustices despite personal cost, but it can also instigate divisiveness and great harm. Previous research from our lab has identified specific neuro-hemodynamic responses to photographs depicting violent protests differ when protests are congruent with versus incongruent with participants' sociopolitical attitudes (Workman, Yoder & Decety, 2020). However, the neural mechanisms underlying attitude moralization in the context of real-world decision-making remain unexplored and were specifically examined in the current study. **METHODS:** Prior to scanning, participants rated their levels of moral conviction and support for 40 sociopolitical issues and completed a perceptual confidence task to assess metacognitive sensitivity (Fleming & Lau, 2014). During fMRI scanning, participants were shown pictures of two groups of protestors for or against different sociopolitical issues and decided which protest group they supported more (5 runs * 24 trials). **RESULTS:** The difference in pre-scan support score between the two sociopolitical issues in a given trial predicted in-scanner choices of which protest group participants supported more. Higher average moral conviction was associated with faster decisions and increased consistency between support ratings and choices. Individuals who had higher metacognitive sensitivity reported higher moralization of issues for which the support rating was low. A set of parametric regressors, including those encode mean support and mean moralization of the two sociopolitical protests in each trial, were regressed on brain activity while making choices. We examined activity in spherical ROIs based on activity peaks shown by

Workman et al. (2020) to be more active when considering support for violent protest from one's own side vs. the opposing side. Brain activity averaged across these 6 ROIs (bilateral dmPFC, right dlPFC, left dlPFC, right aINS, bilateral PCC and left precuneus) was greater for trials comparing sociopolitical causes with low average support and high average moralization. Averaged activity in the reward circuit (amygdala, vmPFC, and striatum) showed the opposite pattern, with greater activity on trials comparing causes with high average support and low average moralization. **CONCLUSIONS:** Behavioral data demonstrate that individual differences in metacognitive sensitivity correspond to systematic differences in moralization ratings of sociopolitical issues. Meanwhile, moral conviction seems to signal the importance and difficulty level of the decision. The neural data ties together with the prior results to imply that negative feelings about protesters on the opposing side play an important role in people's willingness to support violent protests from their own side.

1-A-4 From impressions to behavior? Differential vmPFC activity during impression formation does not impact risk-taking behavior with humanlike compared to non-humanlike A.I.

Richa Gautam¹, Megan Collins¹, Sam Venezia¹, Andrea Wilhelm¹, Nina Lauharatanahirun², Jennifer Kubota¹, Jasmin Cloutier¹
¹University of Delaware, ²Pennsylvania State University

Characteristics of partners can influence an individual's willingness to take risks, but do risk preferences change for non-human partners? To address this, participants (n=40) first formed impressions of differently competent (high or low competence) partners varying in humanness-human partners, humanlike A.I. partners, and A.I. partners represented with geometric symbols-while undergoing functional magnetic resonance imaging (fMRI). They then played a lottery choice task (LCT)-a paradigm assessing risk-taking preferences-with the same partners. We found that activity in the vmPFC, which has previously been shown to support positive evaluations of others, increased as partners became more humanlike, with greatest activity when forming impressions of human partners and least activity when forming impressions of A.I. partners represented by symbols. This difference was significant for humans compared to A.I. partners and for humanlike A.I. compared to A.I. partners represented by symbols, but not for humans compared to humanlike A.I. partners. Partner competence, on the other hand, did not affect vmPFC activity. However, results from the LCT revealed that both partner humanness and competence impacted risk preferences, such that participants were more likely to trust highly competent human partners over low competence human partners or A.I. partners (both humanlike and non-human-like) of high or low competence. These results suggest that while we differentiate between humanlike and nonhuman-like A.I. when forming impressions, evaluating humanlike A.I. more positively than A.I. represented by symbols, these differential evaluations do not influence our likelihood of taking risks with those partners. Instead, when deciding whether to risk our resources, we prefer A.I. partners less than human partners regardless of the A.I. partner's perceived humanness.

1-A-5 How do neural representations of familiar others shape social decisions?

João Guassi Moreira¹, Carolyn Parkinson¹
¹University of California, Los Angeles

People make decisions that affect others on a daily basis. Accordingly, social neuroscience has seen a surge of interest on this topic (social decision-making) over the past fifteen years. Importantly, the decisions that people make in everyday life typically involve specific, known others, and people often have the sense that they base such decisions on their knowledge of and relationships with those individuals. Yet, neuroscientific research on social decision-making has tended to focus on decisions about fictive and/or generic others, and research that has examined the neural basis of social decisions about familiar others has tended to focus on general differences between decisions about familiar others and strangers. While this research has been highly informative, it is limited in its ability to provide insights into how mental representations of familiar others guide social decision-making in everyday life. In this study, we collected fMRI data on 60 individuals while they made social preference judgments about themselves and two others (parent, friend). Specifically, participants were shown a series of social preferences (e.g., 'would live in a big city', 'enjoys spending time in art museums') and were asked to rate how well those preferences described a given agent on each trial (self, parent, friend). Following the scan, individuals completed a social decision-making task involving allocating monetary and social resources among their parents and friends. Imaging data from the social judgment task was used to extract neural representations of the three agents and compute similarities between participants' neural representations of their friends and parents to those of themselves. These similarity scores were then entered in a hierarchical model predicting social decision preferences between the participants' parents and friends. Finally, an exploratory analysis was conducted using written text participants provided about their parents and friends to determine whether thematic content about obligation and social support moderated the link between neural representations and social decision preferences, helping delineate the potential psychological processes that inform representational similarity at the neural level. Preliminary analyses suggest behavioral indicators of mental representations influence social decision behavior; planned ROI- and searchlight-based imaging analyses will compare neural representations of different familiar others, assess how neural representational overlap shapes social decisions, and probe the representational content that drives social decisions preferences about familiar others.

1-A-6 Higher interoceptive sensitivity linked to moral intuition toward group consensus

Juyoung Kim¹, Hackjin Kim¹
¹Korea University

BACKGROUND AND AIM: When more than two moral values conflict, one's decision can be adaptively guided by moral intuition, or internalized motivation to match our decisions to the norms of the culture we are part of and to conform to the moral expectations of those around us. Theoretically, it has been suggested that the moral decision-making process is closely

associated with following one's gut feeling or being aware of one's interoceptive signals, but it has yet to be empirically examined. Here, we aimed to investigate whether individuals' moral decision-making tendency or moral intuition toward group consensus moral decisions are related to their interoceptive sensitivity. **METHODS:** Across two behavioral studies, we used moral dilemma scenarios to assess the degree of an individual's moral decision-making tendency that matches the group-level consensus of the participants. Participants read each scenario and chose between utilitarian and deontological options for each scenario. For each participant, moral intuition toward group consensus was calculated as the ratio of decisions that match the option the majority of the participants chose. In Study 1 (N = 74), interoceptive awareness was assessed with a self-report questionnaire. We also assessed whether the resting state functional connectivity from the hub regions of interoception such as the pregenual anterior cingulate cortex (pgACC) and anterior insula (AI) predicts the degree of one's moral intuition toward group consensus. In Study 2 (N = 30), interoceptive sensitivity was measured using the heartbeat counting task. **RESULTS:** In Study 1, we found that the moral intuition toward group consensus was significantly correlated with the subjective assessment of interoceptive awareness as well as with the resting-state functional connectivity from the pgACC to the dmPFC and from the AI to the precuneus. In Study 2, interoceptive sensitivity measured in the heartbeat counting task was significantly correlated with the moral intuition toward group consensus. **CONCLUSIONS:** This study provides empirical evidence that those with higher interoceptive sensitivity show a higher degree of internalized moral intuition toward group consensus, which may serve the goal of seeking a more efficient and adaptive regulation of bodily metabolic demands. **ACKNOWLEDGEMENTS AND FUNDING:** This research was supported by Basic Science Research Program through the National Research Foundation of Korea(NRF) funded by the Ministry of Education (NRF-2022M3E5E8018285).

1-A-7 Neural mediators of the relationship between self-efficacy and self-protective tendency

Jinhee Kim¹, Hackjin Kim¹

¹Korea University

Neural mediators of the relationship between self-efficacy and self-protective tendency Jinhee Kim¹ and Hackjin Kim^{1*} ¹School of Psychology, Korea University, South Korea **BACKGROUND AND AIM:** Self-efficacy is one's belief and confidence in their own ability to achieve their goals and is known to be a protective mechanism to preserve mental health. Empirical evidence suggests that self-efficacy serves as a buffer against other people's opinions, whether it be positive or negative, and its underlying neural mechanism remains unknown. **METHODS:** In this research, we used functional magnetic resonance imaging (fMRI) to scan the brains of 36 participants while they performed a previously developed reciprocal artwork evaluation task which consists of two phases: receiving an evaluation of their own artwork from a partner and completing an evaluation of the same partner's artwork. Choice behavior influenced by social evaluative feedback were fit with the reinforcement learning model to estimate the learning rates as well as trial-by-trial fluctuations in the self-protection value and signed prediction error (PE), which were then mapped to fMRI data. We used the general self-efficacy scale to assess the participants' self-efficacy trait. **RESULTS:** The behavioral results demonstrated that those with lower self-efficacy showed higher learning rates especially for negative evaluative feedback. We found that the degree to which the right ventrolateral prefrontal cortex (VLPFC) encodes PE at the feedback receipt phase is associated with the individual difference in self-efficacy. Specifically, the VLPFC activity of individuals with high self-efficacy increased in response to unpredicted positive feedback whereas that of individuals with low self-efficacy increased in response to unpredicted negative feedback. Furthermore, inter-subject representational similarity analysis revealed that individual variability in self-efficacy was also reflected in the neural representation of bilateral VLPFC encoding PE. Lastly, we found that the precuneus activity tracking the social feedback type during the partner's artwork evaluation mediates the relationship between self-efficacy and learning rate. **CONCLUSIONS:** Taken together, these findings suggest that the VLPFC and precuneus, which are known to be involved in emotional regulation and self-referential processing, track different aspects of social feedback depending on individual differences in self-efficacy, thereby providing a neural explanation for why individuals with lower self-efficacy show self-protective bias due to negative social feedback. **ACKNOWLEDGEMENTS AND FUNDING:** This research was supported by Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Education (2020R111A1A01070413) and a Korea University Grant

1-A-8 Towards human-compatible autonomous car: A study of non-verbal turing test in automated driving with affective transition modelling

Zhaoning Li¹, Qiaoli Jiang², Zhengming Wu³, Anqi Liu⁴, Haiyan Wu¹, Miner Huang², Kai Huang², Yixuan Ku²

¹University of Macau, ²Sun Yat-sen University, ³Guangzhou Intelligent Connected Vehicle Pilot Zone Operations Centre, ⁴Johns Hopkins University

BACKGROUND AND AIM: Autonomous cars (AC) are indispensable when humans go further down the hands-free route. Although existing literature highlights that the acceptance of the AC will increase if it drives in a human-like manner, sparse research offers the true-to-life ride experience to passengers to examine the human likeness of the AC. Given that it is the key to improving the acceptance of the AC, our main goal was to 1) offer the naturalistic experience from a passenger's seat perspective to measure the human likeness of current ACs; 2) investigate how human passengers ascribe humanness to the AC. **METHODS:** We tested whether the AI driver could create a human-like ride experience for passengers based on 69 participants' feedback in a real-road scenario (Fig. 1). Specifically, we designed a ride experience-based version of the non-verbal Turing test for automated driving. Participants rode in autonomous cars (driven by either human or AI drivers) as a passenger and judged whether the driver was human or AI. Further, based on Lewin's field theory, we advanced a computational model combining signal detection theory with pre-trained language models (PLMs) to predict passengers' humanness rating behaviour (Fig. 2). We used affective transition (AT) between pre-study baseline emotions and corresponding post-stage emotions (collected using the modified Differential Emotions Scale and written description), transformed by PLM, as the signal strength of our model. **RESULTS:** Results of the non-verbal variation of the Turing test showed that the AI driver failed to pass the test because

passengers detected the AI driver above chance. Results of the computational modelling showed that our proposed model could adequately predict passengers' humanness rating behaviour in the test. Further analysis suggested that affective transition (AT), serving as a hypothetical essential part of passengers' subjective ride experience in our model, may play a crucial role in their ascription of humanness. Specifically, we found that the passengers' ascription of humanness would increase with the greater AT. **CONCLUSIONS:** The present study examined whether the current SAE Level 4 AC could create a human-like ride experience for passengers in a real-road scenario for the first time. Though the AI driver failed to pass our test, we offer the first insights into what renders passengers' subjective ride experience truly human-like for future automated driving by using computational modelling. The practical success of basing the computational modelling on Lewin's seemingly abstract and theoretical field theory also speaks directly to his famous maxim that 'there is nothing as practical as a good theory'. Furthermore, our results demonstrate the possibility and feasibility of using NLP techniques (e.g., pre-trained language models) as adjuncts to the interaction between social cognition and artificial intelligence to guide theorising and the generation of conceptual insights.

1-A-9 Lower interoceptive sensitivity linked to higher social comparison tendency

Gahyun Lim¹, Jinhee Kim¹, Jihwan Chae¹, Minyoung Kim¹, Kyunghwan Lee¹, Daon Lee¹, Hackjin Kim¹

¹Korea University

BACKGROUND AND AIM: People often experience social threats in situations evoking social comparison such as social networks, which could have negative impacts on their mental health. Interoceptive sensitivity, the ability to accurately attend to and perceive one's internal signals, has been associated with the less negative interpretation of and more adaptive reactions to social threats. Here, we investigated the relationship between one's interoceptive sensitivity and social comparison tendency. **METHODS:** We developed a mobile app designed for a dyadic social evaluation task where participants were told that evaluators from multi-users of the app rated their preferences. In each trial, participants simultaneously viewed the ratings (from -4 to 4 scales) from an evaluator for them and their counterpart, which were manipulated such that absolute and relative social evaluative outcomes are orthogonal to each other. Social comparison tendency was calculated by the influence of the relative rating score on the participants' decisions to accept the outcome or reject it (i.e., receive a second opinion from a new evaluator). Individual interoceptive accuracy and awareness score was assessed by the heartbeat tracking task with their heart rates recorded by a wearable smartwatch. **RESULTS:** We found that participants with lower interoceptive accuracy and awareness were more likely to be influenced by the relative social evaluative ratings whereas those with higher interoceptive accuracy were more likely to be influenced by the absolute social evaluative ratings when they made decisions to accept or reject their evaluation. **CONCLUSIONS:** These findings suggest that social comparison tendency, that is, higher sensitivity to one's social status relative to others, may arise from reduced sensitivity to one's own bodily signals. **ACKNOWLEDGEMENTS AND FUNDING:** This research was supported by the National Research Foundation & funded by the Korean government (MIST) (NRF-2021M3A9E4080780).

1-B-10 Misogynistic behavior judged far less meaningful and offensive than black racism, as well as demonstrating even a diluting effect on people's outrage and suggesting that it may serve as a conduit to other forms of bigotry

Catherine Stevenson¹, Nak Won Rim¹, Marc Berman¹

¹University of Chicago

In several ways, misogyny--or the systematic prejudice and discrimination against women--is a probative vehicle for exploring morality. Like racism, misogyny has profound effects on individuals and groups. Yet, as the oldest form of bigotry in the world, it has made sluggish progress by many standards and continues to battle for basic recognition. While recent press and movements like #MeToo have raised discourse on these topics, we argue that attitudes about misogyny--about its nature even its existence--remain stubbornly persistent: People often underestimate its potency and pervasiveness or disregard it altogether. The current study proposed to explore how people perceive and evaluate misogyny in comparison to another form of bigotry, anti-black racism. Our overarching hypothesis was that people consider misogyny to be much more acceptable than racism and less threatening to the individual, the group, and society at large. In a between-subjects design, participants were divided into one of four conditions, each involving a white, male office worker, James, who loses his temper against a co-worker. In the three experimental conditions, James yells at: 1) a white woman using slurs (misogyny condition), 2) a black man using slurs (racist condition), or 3) a black woman using slurs (misogyny & racist condition). Finally, in what served as our control condition, James yells at a fellow white man using neutral, "uncharged" insults. Across 10 DVs in which participants were called on to evaluate the behavior and character of "James," we found overwhelming evidence for our three predictions. First, racism was consistently judged to be substantially more meaningful and offensive than misogyny. Second, even though black women presumably suffer from both forms of bigotry--i.e., racism and misogyny--we predicted and demonstrated that misogyny tends to "dilute" rather than compound negative evaluation. Third, we explored and found support for our hypothesis that men sometimes bond over misogyny and that it can thus serve as a conduit or gateway to other radicalization: To be more specific, participants were prompted to rate how "misogynistic" James was; all experimental conditions differed from control but not from each other, indicating participants inferred misogynistic tendencies from racist behavior. By contrast, the inverse was not at all true: People clearly did not suspect racism from information about misogyny alone. Collectively, the data suggest that misogyny remains insidious precisely because it is so deeply woven into the social fabric, wreaking unconscious havoc on both men and women. Furthermore, we hope to expand these findings using other methodologies such as natural-learning processing as applied to large text corpora. The University of Chicago had provided funding for this research.

1-A-11 Behavioral and electrophysiological evidence of moment-to-moment changes in expectations

Deborah Marciano¹, Ludovic Bellier¹, Ida Mayer¹, Ming Hsu¹, Robert Knight¹

¹University of California, Berkeley

BACKGROUND AND AIM: Reward expectations have powerful effects on attention, learning, memory and satisfaction. Expectations have traditionally been studied as static, for example in the form of a cue given at the beginning of a trial. Yet expectations are often dynamic: any sports fan knows that expectations change rapidly as games unfold. Given the central role of reward expectations in cognition, investigating their dynamics is crucial. Here we provide parallel electrophysiological and behavioral evidence that expectations change from moment to moment, using slot machines as a test case of dynamic reward expectations and a novel paradigm. **METHODS:** In Study 1 (EEG, N=37, 150 trials each) subjects played a realistic slot-machine game. They chose one item on the left reel, the right reel spun and decelerated to a stop. If the items on the payline matched, subjects lost \$0.25; otherwise, they won \$0.10. We classified wins by whether the machine stopped 1 item before a match (Narrow Escape Before, NEB), 1 item after (NEA) or more (Full Escape, FE). **RESULTS:** Subjects reported feeling happier and more motivated to play again following wins than losses ($p < .01$), and even more so in NEB compared to other wins ($p < .01$). The feedback related negativity (FRN, locked to the stop of the machine) was enhanced for losses (Fig.1.a $p < .001$). The P3 was larger for NEB than for other wins ($p < .001$), suggesting a bigger reward prediction error. Prior to the slot machine reveal, EEG differed for NEB vs. NEA and FE in the [-500ms-0] window ($p < .01$), reflecting the expectations elicited by the possibility of losing (NEB) vs. assured winning as the wheel spins past match (NEA/FE). Study 2 (online, N=30, 36 trials each) used a new task to behaviorally measure expectations. On each trial, subjects chose between betting on a slot machine or a sure amount. Subjects could change their choice as often as they wanted during the trial. Bonuses depended on their choice at a random timepoint, thus incentivizing subjects to report their true expectations at each moment. We averaged choices across trials and subjects for each timepoint to build expectation trajectories for the 4 outcomes assessed in the EEG study. Notably, these trajectories were strikingly similar to the EEG traces in the last second before the machine stopped (Fig.1, c d). A timeseries regression analysis confirmed that behavioral expectations predicted EEG activity at Cz ($p < .001$). **CONCLUSIONS:** These studies provide the first evidence that moment-to-moment expectations can be behaviorally measured and are tracked by EEG activity. Our results also suggest that moment-to-moment changes in expectations and the resulting RPEs could be the mechanism behind the famous Near Miss Effect-the finding that near misses (versus Full misses) decrease satisfaction. Studying expectations' dynamics is critical given their influence on affect and cognition.

1-A-12 Activity and connectivity of the salience network in the process of risky decision making

Daniela Mier¹, Alexander Wolber¹, Brigitte Rockstroh¹, Stephanie Schmidt¹

¹University of Konstanz

BACKGROUND AND AIM: Decision making under risk activates nucleus accumbens (nacc), insula and anterior cingulate cortex, which are part of the so-called salience network. The Balloon-Analogue-Risk Task (BART) is a well-validated experimental paradigm to study risky monetary decision making. In the original BART, no experimental distinction is possible between decision making and reward anticipation. Thus, it remains unclear whether the reported activation can be attributed to the anticipation of a reward, or the decision making process itself. **METHODS:** We developed an adapted version of the BART which differentiates the decision, the anticipation and the feedback phase, and evaluated this version in a pre-registered study (<https://osf.io/b6uf5>), including 29 healthy participants. Participants could inflate 12 balloons up to 8 times, or decide on each pump to cash out. Each successful inflation added ?0.25 to the total gain, while balloon popping reduced the gain of the trial to zero ?. The probability of balloon popping increased with each pump. Brain activation was measured with a 3 Tesla Siemens scanner, and was analyzed with SPM 12. **RESULTS:** While each of the three subprocesses was related to activation in nacc, insula and anterior cingulate cortex, nacc activation was highest in the decision phase and lowest in the anticipation phase. In the decision phase, insula activation, as well as nacc-insula connectivity varied with the risk of the decision. **CONCLUSIONS:** Present results replicate previous findings showing a central role of the salience network in risky decision making. We demonstrate that decision making and anticipation of a reward under risk can be distinguished by activity and connectivity patterns of the nacc. This qualifies the adapted BART for specifying mechanisms of disturbed risk processing in patients samples.

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1-A-13 Pinpointing the role of the cerebellum in social reward processing

Haroon Popal¹, Megan Quarmley¹, Johanna Jarcho¹, Ingrid Olson¹, Brady Nelson¹, Camile Johnston¹

¹Temple University, ²Stony Brook University

BACKGROUND AND AIM: Although the cerebellum has been traditional thought of as a motor processing brain region, recent evidence suggests that the cerebellum is functionally diverse. The posterior cerebellum in particular has been shown to play a role in social cognitive processes, and recent work has proposed that this region helps fine tune mental models of social cognition to, for example, to ensure accurate selection of actions in a social scenario. Social interactions with strangers are difficult, in part because we are constantly trying to gauge whether the other person likes or dislikes us without much information for our mental models to help us. From a reward processing standpoint, this requires tracking the value (positive or negative) of people's valence to us and ensuring that our predictions about other people's affect towards us are correct. The aim of this project was to specify how the posterior cerebellum uniquely contributes to social reward processing, and to distinguish this contribution from regions that are canonically part of the reward and social brain regions. **METHODS:** Adolescents, ages 12-17, completed a well-matched social and monetary reward task in the scanner. In the monetary condition, participants were asked to select which of two doors would result in winning money, and in other trials losing money. In the social condition, participants were asked to select which of two faces representing people would like or dislike them.

Representational similarity analysis was used to compare the responses of reward and social brain regions to conditions in which participants either won or lost money and were either liked or disliked by others. **RESULTS:** We found that two regions within Crus I of the posterior cerebellum were sensitive to social and monetary outcomes. We also found that both these regions were not as sensitive to the outcome of predicting monetary wins/loss, or social likes/dislikes as the ventral striatum. **CONCLUSION:** These results suggest that these regions in the cerebellum may be involved in more than just reward prediction error, or reward processing in general. Additional analyses will explore the connectivity of the social and reward posterior cerebellum regions to their respective networks in the cerebrum. **ACKNOWLEDGEMENTS AND FUNDING:** This study was supported by grants from the National Institute of Mental Health (K01 MH107808) to BN, the Eunice Kennedy Shriver National Institute of Child Health and Human Development (R21HD093912) to JJ, the Brain Research Foundation Young Investigator Award, Ellen Schapiro & Gerald Axelbaum Investigator (22441) to JJ, and from the National Institute of Neurological Disorders and Stroke (F99 NS129182) to HP.

1-A-14 The competing dynamics of approach and avoidance motivations following interpersonal transgression

Bo Shen¹, Yang Chen², Zhewen He³, Weijian Li⁴, Hongbo Yu⁵, Xiaolin Zhou⁶

¹New York University, ²Virginia Tech University, ³University College London, ⁴Zhejiang Normal University, ⁵University of California, Santa Barbara, ⁶East China Normal University

BACKGROUND AND AIM: Two behavioral motivations co-exist in transgressors following an interpersonal transgression—approaching the victim to offer compensation and shunning the victim to avoid confrontation and further conflict. Little is known about how the underlying approach and avoidance motivations compete in the transgressor’s mind and determine their socially adaptive or maladaptive choice. We addressed this question by triangulating an interpersonal transgression task, mouse-tracking, and computational modeling. **METHODS:** The present study adopted a social interaction task to manipulate participants’ (i.e., transgressor) responsibility for another’s (i.e., victim) monetary loss and measure the participants’ tradeoff between compensating the victim and avoiding face-to-face interactions with the victim (Figure 1a). Following each transgression, participants used a computer mouse to choose between two options differing in the amount of compensation and the probability of face-to-face contact with the victim (Figure 1b). **RESULTS:** Results showed that as participants’ responsibility increased, (1) the decision weights on contact avoidance relative to compensation increased (Figure 1c), and (2) the onset of the contact-avoidance attribute was expedited and that of the compensation attribute was delayed (Figures 1d and e). **CONCLUSIONS:** These findings suggest that transgressor’s social-affective state coordinates the dynamics of the competition between opposing social motivations and shed new light on the cognitive mechanisms underlying psychological barriers to reconciliation. It has broad implications about how motivations modulate the dynamics of decision-making processes.

1-A-15 The anterior cingulate cortex encodes social image identity during a decision making task

Joseph Simon¹, Erin Rich¹

¹Icahn School of Medicine

BACKGROUND AND AIMS: Humans and nonhuman primates live in complex social environments that require them to process unique social information. Processing of this information has been linked to many brain regions including the anterior cingulate cortex (ACC), specifically the ACC gyrus. Here, we asked if this region more strongly encodes information from a social context, relative to a nonsocial, when the desired outcome is the same (i.e., when both predict reward target’s location). **METHODS:** To test this, we targeted the ACC gyrus in two rhesus monkeys performing a reward localization task. Monkeys had to use social (i.e., eye gaze) or nonsocial (i.e., arrow direction) visual guides to locate the reward target. We recorded from neurons within the ACC and the frontal eye field (FEF), a region that hasn’t reported any specificity for social information. We performed a regression using a sliding window to determine the effects of image type on neuron activity. **RESULTS:** We found that monkeys were able to locate the rewarding target above chance levels and were significantly better at nonsocial images compared to social. A binomial test found a significant difference between social and nonsocial in the ACC. More specifically, it found that the number of neurons that responded to social information in the ACC was significantly greater than nonsocial information. **CONCLUSIONS:** Social information can be an important contributor to decision-making. Here, we have found that during choice, monkeys are able to use both social, and nonsocial, visual guides to make correct choices. How this information is interpreted in the ACC, seems to be separated with only social information showing significant encoding. **ACKNOWLEDGEMENTS AND FUNDING:** NIMH T32 AG049688 & NINDS F99/K00 1F99NS125826-01A1

1-A-16 What makes a stimulus “social”? A study of shared thresholds and individual differences

Rekha Varrier¹, Jordan Selesnick¹, Peng Liu¹, Tory Benson¹, Alison Sasaki¹, Ashna Kumar¹, Emily Finn¹

¹Dartmouth College

ABSTRACT TYPE: PRE-REGISTRATION Recent work suggests that motion is key to processing social information (Pitcher & Ungerleider, 2021). Past fMRI studies have shown, using simple animations (often assigned “social” or “non-social” by creators), that both sensory and fronto-parietal brain areas process social content. But we don’t yet have a clear understanding of how these regions contribute to subjective social perception, especially under ambiguity. Here, we systematically vary social evidence in animations using the motion parameter “chase subtlety” (directness of motion; Gao et al., 2009). In a series of online behavioral experiments (n=608 in total), we verified that “socialness” ratings decrease with subtlety for true chases where one circle follows another at 6 subtleties, but not non-social controls with the same net motion properties (cf. Figure 1). In an upcoming fMRI study, we hypothesize that while sensory brain areas will respond proportionately to levels of social content (evidence accumulation), fronto-parietal areas will respond only beyond a certain social threshold. We also predict that individual differences in neural activity are related to subjective ratings. Based on the high effect size (2.9) in the online study, an a priori

sample size calculation estimates $n=4$. For the proposed fMRI study, we plan to collect a more conventional sample of 20, since we will also investigate individual differences within-stimuli. We will probe the relation between the socialness ratings and chase subtlety using a linear mixed effects model with rating as the outcome variable, subtlety and animation type (chase/non-social) as the fixed effects and participant as the random effect. For the fMRI data, we will first compute beta estimates for each animation (similar to Varrier & Finn, 2022), and then probe how the betas vary with socialness (defined objectively [subtlety] and subjectively [rating] in separate models) separately for chase and non-social animations. Specifically, we will fit the betas to linear and sigmoid functions to identify voxels that accumulate evidence or have social thresholds, respectively. Next, for each voxel, we isolate social (and not motion-correlated) responses by comparing the chase and non-social parameter estimates across participants (paired t-test). We will also compare the standard deviations of all the estimates to identify voxels with the most subjective responses to social content. Lastly, to isolate effects of a conscious social percept while holding sensory input constant, we will create beta maps for each of several highly ambiguous animations using regressors specific to each animation, and identify brain regions where neural activity levels correlate with socialness ratings across subjects. All fMRI analyses will be FDR-corrected ($q < .05$). This study will thus shed light on how both shared and idiosyncratic responses in sensory and association regions give rise to conscious social percepts.

1-B-17 Shared experiences strengthen social connectedness through shared impression formation and communication behavior

Wasita Mahaphanit¹, Luke Chang¹

¹Dartmouth College

BACKGROUND: Shared reality theory predicts that individuals seek to share similar impressions about the external world with others in order to connect and reduce epistemic uncertainty. In this study, we provide an empirical test of this theory in a naturalistic context by manipulating shared experiences in which participants were able to chat in small groups while watching reality television. **METHODS:** To create shared experiences, we built a real-time multi-user online platform that permits synchronous communication between groups of participants time-locked to external stimuli (e.g., video). This platform allowed us to causally manipulate shared experiences by controlling the type of content shown to each group member while they engaged in synchronous chat. We first presented all participants within a group ($N=420$, 105 groups of 4) the same introduction of a reality dating show and then seamlessly showed different dyads within a group separate video segments depicting social interactions between one of two different pairs of contestants. After the group finished watching the show, each participant rated each contestant on several trait dimensions (e.g., likeability) and also reported how connected they felt to each of the members of their group using a continuous scale. **RESULTS:** Our manipulation of shared experiences was subtle and the majority of participants were completely unaware that half of their group watched different video clips. Nonetheless, we found that people felt more connected to group members who underwent the same video experience compared to those who watched a different video. This provides causal evidence that the uniqueness of the shared experience shaped participants' feelings of connectedness beyond natural social interactions. We also found that participants reported feeling more connected to group members that shared similar impressions of each of the contestants. Finally, the nature of the interactions also appeared to impact relationships as participants reported feeling more connected to partners who responded to their messages more quickly during the group chat. Together, these results highlight the importance of communication during shared experiences in aligning shared interpretations of reality and facilitating social connection. **CONCLUSION:** Our experimental platform provides a novel method for studying natural and unconstrained communication in groups while still maintaining experimental control. This platform allowed us to elucidate the extent to which communication behavior and shared experiences facilitate feelings of connectedness to create a shared reality. We hope this work will inspire more empirical investigations of the mechanisms that underpin social interactions. **ACKNOWLEDGEMENTS AND FUNDING:** We thank Emma Templeton and Eshin Jolly for their feedback on this project and the National Institute on Drug Abuse (R01DA053311) for funding this work.

1-B-18 The social cognitive neuroscience of intergroup contact

Daniel Mazidi¹, Nadia Andrews², Kyle Nash¹

¹University of Alberta, ²University of Canterbury

BACKGROUND AND AIM: Intergroup contact research has been growing in importance as communities see ever expanding cultural and ideological integration. Though research suggests that intergroup contact alone can promote acceptance of outgroup members, it is still unclear how positive and negative contact affect social cognitive processes. Here we used a novel e-contact paradigm and Implicit Association Test (IAT) with EEG to explore intergroup contact and stereotype accessibility. **METHODS:** Participants were assigned to either neutral, negative, or no-contact (control) conditions to manipulate intergroup contact. In each condition, the participant played a lab-built online poker game with a chat function controlled by the experimenter. The chat function was used to send positive, negative, or no messages at all (control) from an outgroup player (Brazilian) to the participant (New Zealander). The messages were controlled by the researcher. After the intergroup contact manipulation, participants completed a relevant IAT while EEG measures were recorded. **RESULTS:** Participants in the positive contact conditions showed reduced stereotype accessibility during the IAT as indexed by N400 amplitudes during congruent and incongruent IAT trials. Participants in the negative contact condition did not differ from the control condition in N400 response during the IAT. **CONCLUSIONS:** This suggests that stereotype accessibility may be reduced by positive contact with outgroup members, while negative contact may not impact stereotype accessibility differently than no contact.

1-D-19 Emotion and temporal context modulate the intrinsic functional connectivity of lateral prefrontal cortex

Jingyi Wang¹, Laura Pritschet¹, Caitlin Taylor¹, Emily Jacobs¹, Regina Lapate¹

¹University of California, Santa Barbara

Control signals in lateral prefrontal cortex (LPFC) are thought to be organized along a rostral-caudal axis of temporal abstraction, with rostral LPFC (frontopolar cortex/FP) supporting abstract and temporal context-dependent forms of cognitive control (Badre and D'Esposito, 2007; Badre and Nee, 2018). Prior evidence indicates that the similarity structure of intervoxel functional connectivity patterns in LPFC reflects its intrinsic functional organization, which constrains abstract, goal-directed cognition (Waskom et al., 2017). Moreover, recent work suggests that FP has privileged access to internal states, including emotionally-valenced information, which may guide LPFC-dependent cognitive control (Bramson et al. 2020, Lapate et al. 2022). Here, we used dense sampling fMRI to examine whether the intrinsic functional architecture of LPFC differentially reflects changes in emotion (mood) and temporal context along the rostral-caudal axis. Two participants (n=1 Female, 23-y-old; n=1 Male, 26-y-old) underwent daily resting-state scans for n=30 consecutive days. We correlated changes in the similarity of intra-regional functional connectivity patterns in LPFC with changes in elapsed time and mood states. We found that the similarity of functional connectivity patterns in FP tracked temporal context, correlating negatively with elapsed time elapsed over a 30-day period--an association that was progressively attenuated over caudal LPFC regions. Emotional-state changes further explained the similarity structure of functional connectivity patterns in LPFC, with the strongest association found in FP, which was attenuated in caudal regions. Collectively, these results indicate that time and emotion modulate the intrinsic functional architecture along the rostral-caudal axis of LPFC.

1-D-20 Temporal dynamics of affective spillover

Runan Wang¹, Mengsi Li¹, Regina Lapate¹

¹University of California, Santa Barbara

BACKGROUND AND AIM: In everyday life, we are frequently challenged by an extraordinary range of affective experiences. To maintain context-appropriate behavior, it is important to constrain the unwarranted spillover of affect to future events and contexts unrelated to the source of emotion (Lapate et al. 2017). The temporal dynamics of emotional responding, particularly the timecourse of recovery following positive and negative events, is relevant for understanding wellbeing and vulnerability to psychopathology (Lapate & Heller, 2020). Here, we sought to (a) characterize the timecourse of affective spillover following positive and negative events; and (b) test whether the timecourse of affective spillover is associated with individual differences in mood and emotion regulation. **METHODS:** Emotionally evocative pictures (negative, neutral, and positive) were shown for 3 s and followed by briefly-presented novel neutral faces (450 ms). Participants were asked to evaluate the likeability of novel faces based on their first impression. They were instructed to ignore the influence of previously-shown emotional images when making their rating. To characterize the temporal dynamics of affective spillover, we manipulated the inter-stimulus interval (ISI: 1.5s, 3s, and 9s) between emotional pictures and later-shown neutral faces. Emotional arousal was matched across negative and positive images, and emotional valence and arousal were balanced across ISIs. Participants completed the trait PANAS and the Emotion Regulation Questionnaire (ERQ). An independent sample (n=100) provided neutral-face likeability ratings in the absence of emotional images, which permitted computing normalized trial-wise affective spillover scores. **RESULTS:** Replicating prior work, we observed robust affective spillover: neutral-face likability ratings were biased according to the valence of previously-shown emotional pictures ($F = 24.66$, $p < 0.001$; negative vs. neutral, $p < 0.001$; positive vs. neutral, $p = 0.018$). Moreover, the timecourse of affective spillover differed by emotional valence: Following negative events, affective spillover decreased linearly over time, returning to baseline at the longest ISI ($F = 4.19$, $p = 0.041$). Following positive events, affective spillover persisted over time, with no modulation by ISI ($F = 1.39$, $p > 0.25$). Trait reappraisal was associated with less affective spillover in the late recovery epoch (9-s ISI) following negative events, suggesting faster recovery from negative emotion ($r = 0.48$, $p = 0.01$). Following positive events, persistent affective spillover correlated with higher trait positive affect ($r = -0.48$, $p = 0.01$). **CONCLUSIONS:** Our results suggest that the timecourse of affective spillover differs by valence, with longer-lasting influence of affect following positive compared to negative events. Moreover, these results indicate that the timecourse of affective spillover is sensitive to trait variation in emotion regulation and daily mood.

1-F-21 Hard to face: Rejection sensitivity and automatic responses to facial expressions

Alexa Boland¹, Lane Beckes¹

¹Bradley University

BACKGROUND AND AIM: Rejection sensitivity (RS), hypervigilance to social rejection, affects many facets of one's social life and interactions. Previous research shows that those higher in RS may automatically respond to facial expressions differently than those lower in this trait (i.e., Ehrlich et al., 2015; Kawamoto et al., 2015). However, the majority of these studies use disgusted or angry facial expressions to emulate social rejection, which may impact non-rejection sensitive people similarly to rejection sensitive people. Research conducted by Burkclund et al. (2007) suggests that a more subtle socially-salient expression, such as disapproval, may yield more meaningful results. The present study tests whether early attentional ERP components and behavioral indices of face salience are different between those high and low in RS. **METHODS:** Prescreened individuals in the top and bottom third of the sample completed the EEG task. Participants first completed a behavioral staircasing task using variably transparent images of faces overlaid on images of tools and instruments. This procedure estimates the relative perceptual salience of faces when transposed on other objects. During EEG, participants viewed images of neutral, disgusted, and contemptuous faces. Their ERPs were recorded using the BrainVision ActiChamp. We collected data on 29 (16 low, 13 high rejection sensitive) participants. **RESULTS:** Paired samples t-tests of ERP data indicated greater P1 responses to contempt faces than other facial expressions, all $ps < .05$. Analysis of the behavioral data also indicated evidence of increased salience for

the contempt faces, all p 's < .05. Furthermore, both groups exhibited stronger N170 amplitudes in response to disgusted faces relative to neutral faces, all p 's < .01. In the high RS group, N170 responses to contempt faces ($M = -38.19$) were also significantly greater than to neutral faces ($M = -27.36$, $t(12) = -2.37$, $p = .035$, with no such effect in the low rejection sensitive group, $t(15) = -0.46$, $p = .65$). Moreover, there was a significant difference, using a one-tailed independent samples t -test, between the high ($M = -1.54$) and low ($M = 6.93$) RS groups on the behavioral salience task, $t(26) = 1.77$, $p = .04$, with more negative numbers indicating greater face salience relative to other objects. **CONCLUSIONS:** Our results support previous findings that those higher in RS automatically perceive facial expressions distinctly from those lower in RS. Additionally, our findings suggest that less intense, more socially relevant facial expressions, such as contempt faces, distinguish neural and attentional responses between those high and low in rejection sensitivity with greater fidelity than do generic disgust faces. **ACKNOWLEDGEMENTS AND FUNDING:** This research was supported by the Bradley University Daniel J. Elias Endowment Fund and the College of Liberal Arts and Sciences Undergraduate Summer Research and Artistry Fellowship Program.

1-F-22 The multidimensional neural representation of face impressions

John Andrew Chwe¹, Jonathan Freeman¹

¹Columbia University

BACKGROUND AND AIM: From a glimpse of a face, we automatically infer many personality traits. Behavioral studies have long suggested that face impressions are underpinned by a 2-D space defined by trustworthiness and dominance (Oosterhof & Todorov, 2008), which was recently shown to generalize across 41 countries (Jones et al., 2021). How the brain accomplishes such multidimensional encoding of faces' trait information is virtually unknown. **METHODS:** During fMRI, participants ($N = 26$) viewed 77 faces from the Chicago Face Database. Faces were all White males to avoid well-known interactions with racial and gender stereotypes and were presented in a 1-back task to ensure participant attention. To provide reliable pattern estimates for individual faces, each face was repeated 8 times across runs. Following the scan, participants completed the Physiognomic Belief Scale, which measures the extent to which a participant believes that personality traits can be inferred from a person's face (Jaeger et al., 2019). We also collected trustworthiness and dominance ratings on all faces from independent raters. **RESULTS:** Whole-brain searchlight analyses revealed a bilateral region of the anterior temporal lobe (ATL) whose neural-pattern structure was significantly correlated with trustworthiness-dominance space ($p < .05$, corrected). Specifically, the 2-D distance between any given pair of faces in trustworthiness-dominance space predicted those faces' pattern similarity in the bilateral ATL. This ATL encoding was unrelated to physiognomic beliefs. In contrast, we found evidence for trustworthiness-dominance encoding in the posterior superior temporal sulcus/temporoparietal junction (pSTS/TPJ), bilaterally, but this pSTS/TPJ encoding was highly dependent on physiognomic beliefs ($p < .05$, corrected). **CONCLUSIONS:** Our findings show that the ATL and pSTS/TPJ encode faces' trait information in the form of a 2-D trustworthiness-dominance space. While trustworthiness-dominance encoding in the ATL was unrelated to whether participants believed faces were a valid window into personality, only participants who harbored these beliefs showed such encoding in the pSTS/TPJ. These results suggest a dissociation between a relatively more implicit ATL representation that is impervious to beliefs, versus a more explicit pSTS/TPJ representation that depends on those beliefs. The data extend our understanding of the ATL's role in representing person knowledge and the pSTS/TPJ's role in attributions based on complex social cues into the novel domain of inferring personality traits from faces. To our knowledge, these findings are the first to identify the neural representational basis of face impressions, and they point to multiple neural systems operating in a relatively more implicit and explicit manner that facilitate these consequential social inferences. **ACKNOWLEDGEMENTS AND FUNDING:** This work was funded in part by National Science Foundation CAREER Award, BCS-1654731.

1-F-23 Expectation mediates the effects of social manipulation on pain response during tDCS

Amin Dehghani¹, Carmen Bango¹, Tor Wager¹

¹Dartmouth College

Transcranial Direct Current Stimulation (tDCS) is a non-invasive neuromodulation technique gaining traction as a treatment for various neurological, psychiatric, and pain conditions due to its potential effects on brain network dynamics and behaviors. Previous tDCS studies on pain-relief have high variability in their results, possibly originating from the use of different stimulation types and ignored psychological factors. In the general field of brain stimulation, psychological factors (including expectation and social manipulation) are rarely investigated. Placebo effects like expectation synergize with real treatment and can have large effect sizes. In this single-blind, randomized cross-over study, we aimed to investigate the effects of 20 min 2mA anodal/cathodal tDCS of the left motor cortex (M1) and positive/negative social manipulations on pain responses in a repeated pain paradigm with 20 healthy participants. For this purpose, participants underwent five experimental sessions including a pain calibration session followed by four test sessions. Test sessions involved pain before and after two treatments crossed in a 2 x 2 design: Anodal or cathodal tDCS treatment (M1, 21 min) crossed with positive (pain-reducing) or negative (pain-enhancing) suggestions about the effects of tDCS delivered by a confederate posing as a previous participant (positive or negative 'social modeling'). Treatment order in sessions 2-5 was randomized, with 6-7 days interval to minimize carryover effects. The social modeling manipulation consisted of simple text and video presentation of a mock previous participant's positive or negative experience with tDCS. Analysis results using a general linear mixed-effects model revealed main effects of tDCS and social modeling on pain perception ($p < .05$). Pain responses were lower following anodal vs. cathodal stimulation and following positive vs. negative social modeling. There was no interaction between tDCS and social modeling. Mediation analysis using social modeling as a predictor, expectation and stimulation as mediators, and temperature and pre-treatment ratings as covariates revealed that expectation mediated the association between social modeling and post-treatment ratings. There were no observed effects of sex on pain responses. This study suggests that expectation mediates the analgesic effects of social manipulation during tDCS.

1-F-24 Domain-specific brain decoding of face stimuli captures individual differences in face recognition ability

Andrew Graves¹, Jesse Grabman¹, Chad Dodson¹, James Morris¹

¹University of Virginia

BACKGROUND AND AIM: Face recognition ability lies on a wide spectrum. Neuroimaging has richly characterized the neural systems involved in the recognition of faces, but few studies have associated activity in these systems with individual differences in phenotypic variation. Univariate fMRI analysis provides invaluable maps of neural activation associated with cognitive processes, but has been criticized for its limitations for assessing population heterogeneity. Here, we leverage populations of voxels by taking a brain decoding approach using multivariate pattern analysis (MVPA) as a mechanism for predicting individual differences in face recognition ability. **METHODS:** 92 participants completed three runs of an old/new face recognition memory paradigm. Across three runs, participants encoded 30 faces and 30 flowers followed by a short delay. At test, participants distinguished encoded stimuli from an equal number of new faces and flowers. From this task, we computed signal detection metrics to evaluate task performance (e.g., d' and c). Outside the scanner, participants completed the Cambridge Face Memory Test (CFMT) to quantify individual differences in face recognition ability. For decoding, we fit least-squares all (LSA) beta-series GLMs. We applied a Neurosynth (keyword: face) mask to each beta-series to target domain-specific regions. Penalized logistic regression classifiers were fit for each participant to decode faces from flowers for both the encoding and recognition phase, and evaluated using leave-one-run-out cross-validation. We used multivariate Bayesian beta regressions fit to the outcome variables of encoding and recognition decoding accuracies, from participants' CFMT, d' and c for both stimuli, age, and sex. **RESULTS:** We found that face recognition ability (i.e., CFMT) was positively associated with decoding accuracy above and beyond the effects of signal detection and demographics, (standardized beta regression coefficients- Encode: .17 [.04, .30], Recognition: .14 [.02, .26]). In other words, stronger face recognizers' brain activity during encoding and recognition exhibited higher quality differentiation between faces and flowers, as compared to weaker recognizers. The simple linear bivariate Pearson's correlations between decoding accuracies and CFMT scores were also positive and significant (Encode $r = .332$, $p = .001$; Recognition $r = .247$, $p = .017$). **CONCLUSIONS:** While neuroimaging studies have provided good evidence of specialization for neural systems supporting face recognition, little evidence exists to show how these systems support such a range. This work contributes to a better understanding of how domain-specific neural systems support this heterogeneity. Future work on this project will identify which cortical and subcortical structures are contributing to the current results, using ROI and whole-brain approaches. **ACKNOWLEDGEMENTS AND FUNDING:** This work was supported by the National Science Foundation (# 1657726).

1-F-25 The neural basis of automatic facial stereotyping

Youngki Hong¹, Jonathan Freeman¹

¹Columbia University

BACKGROUND AND AIM: People quickly infer personality traits from faces, a process known as facial stereotyping. Long assumed to operate in an automatic manner, such facial stereotypes influence a wide range of social decision-making despite having no relationship to targets' actual personality traits. While affective responses to faces' trait appearance have long been characterized, most notably the amygdala's role in processing facial trustworthiness, the neural basis of automatically activated social-semantic trait representations in response to facial appearance is virtually unknown. **METHODS AND RESULTS:** In Study 1 ($N = 400$), we used a semantic decision task (SDT) to show that faces automatically activate semantic representations related to traits. When faces were manipulated on trustworthiness and dominance dimensions, faces' trait appearance influenced the speed with which subsequent trait-related words were processed. For example, presentation of a dominant-looking face facilitated categorization of dominant-related words (e.g., aggressive) and impeded categorization of submissive-related words (e.g., timid). In an ongoing fMRI study ($N = 40$), we aim to examine the neural basis of these automatically activated facial stereotypes. In the scanner, participants will view faces that appear trustworthy/untrustworthy or dominant/submissive, and in a separate task, view words conveying trustworthy/untrustworthy or dominant/submissive trait concepts. We will conduct cross-domain classification by training a support vector machine (SVM) classifier on one domain (e.g., dominant vs. submissive faces) and testing on the other (e.g., dominant vs. submissive words) and vice versa. Such effects would identify a common neural-representational pattern for dominance-related concepts and faces vary on dominance as well as for trustworthiness-related concepts and faces vary on trustworthiness. A whole-brain searchlight analysis is expected to reveal the anterior temporal lobe (ATL), a region related to processing of person knowledge and social-semantic information, as a region showing strong cross-domain classification accuracy scores. **CONCLUSIONS:** Together these studies will identify the neural basis of automatically activated social-semantic representations related to facial appearance, potentially located in the ATL. This research will advance our understanding of facial stereotyping by revealing their social-semantic activation at the cognitive and neural levels. If the hypothesis regarding the ATL is confirmed, the findings would also extend our understanding of the ATL's role in processing stereotypes and person knowledge by implicating it as a crucial player in the automatic activation of trait stereotypes implied by others' facial appearance. Such findings may inform future research aiming to reduce or eliminate facial stereotyping.

1-F-26 Neural representations in MPFC and insula encode individual differences in estimating others' preferences

Hyeran Kang¹, Kun Il Kim¹, Jinhee Kim¹, Hackjin Kim¹

¹Korea University

In a human society where interdependent relationships are predominant, successful social interactions could be fostered by making appropriate reactions via accurate estimation of other's mind, which often requires consideration of contextual information. Here, we aimed to identify the neural mechanism involved in individual differences of such capacity, using

preference estimation task. In this task, after seeing the target's face, participants had to guess whether the target would prefer the given item (e.g., a picture of hamburger). The preference estimation accuracy was measured by the percentage of the correct guesses, participants' matching the target's preferences in 4 Likert-scale. To investigate the neural mechanism of accurate estimation of other's preference, we performed inter-subject representational similarity analysis (IS-RSA) with the preference estimation accuracy scores, which revealed that the multi-voxel patterns in the pregenual anterior cingulate cortex (pgACC) and the right anterior insula (rAI) predict individual variability in the preference estimation accuracy. This study demonstrates that the diverging behavioral patterns among participants in inferring others' preferences were reflected in multivariate neural representations in the pgACC and the rAI, both of which have been strongly implicated in individual differences in interoception as well as context-dependent ambiguous facial emotion estimation. This research was supported by Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Education (NRF-2022M3E5E8018285).

1-F-27 Age differences in perceptual generalization of trust learning

Lauren Lilly¹, Brittany Cassidy², Jessica Cooper³, Kendra Seaman¹

¹The University of Texas at Dallas, ²University of North Carolina, Greensboro, ³Emory University

Pre-registration **BACKGROUND AND AIM:** Trust is an important social decision that impacts people's daily lives. Older adults are disproportionately targeted by financial scams, likely due to excessive trust (Burnes et al., 2017). Older adults' excessive trust is potentially associated with less learning of trust information than younger adults (Seaman et al., under review). Here we investigate age differences in the generalization of this learning to others. Specifically, we examine the behavioral differences in how older versus younger adults choose to play with unfamiliar others based on their previous interactions with perceptually similar others. **METHODS:** Participants (younger n=33 and older n=30 adults) first learned the trustworthiness of three original partners from a classic iterative trust game where the participants were endowed with \$9 at the beginning of each trial (total 45 trials) and were asked to decide on the level of investment (\$0, \$3, \$6, \$9) to transfer to each partner upon viewing their faces one at a time. The trustworthy, neutral, and untrustworthy partners shared in 93%, 60%, and 7% of trials, respectively. After this learning phase, participants were asked to choose a new partner between a morphed image and a silhouette to play with in a future trust game (total 112 trials). By varying the degrees of likeness of these new partners (perceptually morphed images) to the original partners, we examine how participants generalize their trust decision. **ANALYSIS PLANS & GENERAL IMPLICATIONS:** A hierarchical logistic regression will examine how older and younger adults choose potential partners to play with in a future trust game. We will regress future partner selection (Play vs. No Play with morph) on three predictors: the morph type (Trustworthy, Neutral, Untrustworthy), perceptual similarity of the morphed image to the original partner (23%, 34%, 67%, 78%), and participant age group (Younger vs. Older). First, we expect an interaction between morph type and perceptual similarity such that the likelihood of choosing to play with a morph will increase with a greater perceptual resemblance to the trustworthy partner and decrease with a greater perceptual resemblance to the untrustworthy partner. Second, we expect an interaction between age group and morph type such that there will be no differences in playing with trustworthy morphs, but older adults will be more likely to choose to play with untrustworthy morphs than younger adults. Third, we expect a three-way interaction such that the contrast between trustworthy/neutral and untrustworthy morphs with increasing perceptual similarity will be significantly less for older than younger adults, meaning although older adults will be less likely to choose the untrustworthy morphs, this tendency will be weaker than that of younger adults. These findings will reveal age differences in trust generalization, which may help explain why older adults are more likely to be targeted by fraud.

1-F-30 Online comments on social media influence personal opinions about news headlines

Johannes Schultz¹, Federica Nisini¹, Jan Weis¹, Wouter Van Den Bos²

¹University of Bonn, ²University of Amsterdam

BACKGROUND AND AIM: People increasingly read news online, where they are simultaneously exposed to the news and to comments by other readers about the news. These comments might influence readers' opinions: For instance, recent studies showed that people are likely to read comments before the article itself and spend more time reading the comments than reading the article. As interactions on social media have been linked to opinion polarization, it is useful to better understand how user-generated comments influence people's opinions about world events and facts. Here, participants in an online study were exposed to news headlines about controversial contemporary topics posted on social media and expressed their opinion before and after reading comments written by other users. Preregistered hypotheses (<https://osf.io/5dm7h>) were that (i) participants would adjust their opinion in the direction of the other readers' comments, (ii) the opinion update would be bigger when their initial opinion and the group opinion (expressed in the comments) don't align, and (iii) the opinion update would be modulated by participants' own attitude about the topic of the news headline. **METHODS:** 194 American individuals recruited using Amazon Mechanical Turk (MTurk) completed pre-exposure attitude questionnaires about three contemporary topics (climate change, vaccination, veganism). Participants were then presented with one news headline per topic and expressed their opinion and their confidence in their opinion. Participants were then presented with four comments per headline and expressed their opinion and their confidence again. The comments were either supportive of the headline, critical, or mixed (supportive / critical). **RESULTS:** Participants adjusted their opinion in the direction of the comments after reading either supportive or critical comments (respectively: $V = 3395$, $p < .001$, $BF > 100$, and $V = 9880$, $p = .001$, $BF = 56.48$). In both cases, participants updated their opinion in the direction of the comments' valence. Participants updated their opinion more when their initial opinion and the group opinion did not align compared to when these opinions aligned ($W = 16304$, $p\text{-value} = .02$, $BF > 100$). The opinion update was smaller when participants had stronger rather than weaker prior attitudes about the topic of the news headline ($R = -0.07$, $p\text{-value} = .015$). **CONCLUSIONS:** Our findings suggest that the opinion that social media users form about online

news can be easily influenced by other people's comments, including with regard to contemporary topics with pressing societal relevance. These findings support initiatives to strengthen people's awareness of these influences and the development of skills in source criticism. **ACKNOWLEDGEMENTS AND FUNDING:** This study is funded by EU H2020 Grant #870578 DIGYMATEX

1-F-31 How culture influences optimism bias in self evaluation

Di Song¹, Rongjun Yu¹

¹Hong Kong Baptist University

In order to take on the challenges of the uncertain future, individuals often need to be optimistic. Optimistic bias refers to the phenomenon that we overestimate our chances of positive experiences and underestimate our chances of negative experiences. Recent studies showed that we update more when we receive positive feedback than when feedbacks are negative. In the optimistic bias paradigm, there are three stages: initial evaluation, re-evaluation and memory test. The paradigm focuses on how individuals change their original evaluation in the re-evaluation stage after getting positive or negative feedback. Optimistic bias is quantified as the change value of the initial evaluation in re-evaluation after the subjects get positive feedback, minus after they receive negative feedback. The Chinese culture empathizes humility, and people are not encouraged to react strongly to others' praise and compliment. Here, we investigate optimistic bias when receiving social feedback and the underlying neural mechanisms. In experiment 1, we showed that, surprisingly, individuals showed stronger feedback when evaluating their friends' personalities than when judging their own personalities. In Experiment 2 we replicated the finding that there was no optimistic bias when processing feedback about themselves from friends. The EEG results showed that the FRN was sensitive to the valence of feedback as well the conflict between self-evaluation and feedback. The P300 was enhanced only when the feedback was in conflict with self-evaluation regardless of feedback valence. In Experiment 3, rather than asking participants to do self-evaluation, they were asked to directly predict how others would evaluate them. Behavioural results showed that participated updated more when the same positive feedback was predicted than unpredicted, partially showing optimistic bias. The FRN and P300 were sensitive to expectation deviation. These findings suggest that people do not show optimism bias when processing feedback from friends, possibly due to the humility and modesty in Chinese culture. We also showed that when positive self-expectation is confirmed by social feedback, it boosts the highest confidence in upgrading self-evaluation. Our findings also confirm the role of FRN and P300 in processing social information conflicts.

1-F-32 Couple-level neural similarity and marital relationship: Evidence from older couples living in a rural area of Korea

Kiho Sung¹, Yoosik Youm¹, Jeanyung Chey²

¹Yonsei University, ²Seoul National University

BACKGROUND AND AIM: Recent evidence from a task fMRI study suggested that neural synchronization of married couple and their marital satisfaction have positive association (Li et al., 2022, PNAS). Also, similarity in brain functional connectivity at rest was known to predict interpersonal closeness (Hyon et al., 2020, PNAS). Thus, we hypothesized that if brain functional connectivity at rest is more similar between married couple, their spousal relationship will be better. **METHODS:** To test the hypothesis, we analyzed a dataset of 36 aged married couples (72 older adults) living in a rural area in the Korea: Korean Social Life, Health, and Aging Project (KSHAP). With survey data that includes 5 marital relationship items and brain resting-state fMRI data, we examined if neural similarity of married couples is positively associated with marital relationship. Marital relationship was measured by sum of the four survey items asking how much respondent could open up to partner, rely on partner, how often does partner make too many demands and criticize respondent. The two negative items were reverse coded. We tested each correlation of 1) husband's marital relationship score, 2) wife's marital relationship score, and 3) sum of husband's and wife's marital relationship scores. We adopted Harvard-Oxford human brain atlas to define ROIs. Using CONN software, we extracted ROI-to-ROI correlation matrices, vectorized each subject's matrix, and measured neural similarity by calculation of absolute difference between husband's and wife's vectors. To predict marital relationship from couple-level neural similarity vector, we used partial least square (PLS) regression, and validated the model using leave-one pair-out cross-validation (LOOCV). **RESULTS:** The results showed that none of the three marital relationship scores (husband, wife, sum of husband and wife) were associated with neural similarity. **CONCLUSIONS:** We suggested two possible explanations. First, relationship between neural synchronization of married couple and marital relationship may not be linear. Some couple get married through heterophily (disassortative mating), while others met through homophily (assortative mating). Second, brain functions could have frequency-specific properties, so the results may differ if brain signals are decomposed into different frequency bands. Third, compared to the study of Li et al. (2022) that examined association of marital satisfaction and functional brain connectivity during task fMRI, this study tested association of marital relationship and brain functional connectivity of resting-state fMRI. **ACKNOWLEDGEMENTS AND FUNDING:** This work was supported by the Ministry of Education of the Republic of Korea and the National Research Foundation of Korea (NRF-2021S1A5A2A03065033)

1-F-33 Coherence in experiential and physiological emotional responding: Implications for empathy

Joia Wesley¹, Nakia Gordon¹

¹Marquette University

PURPOSE: Emotions are multicomponent including experiential, physiological, cognitive, and behavioral facets. Emotion response coherence occurs when these components are coordinated. This prepares individuals to appropriately respond to their environment (Mauss et al., 2005). Emotionally provocative experiences elicit greater experiential and physiological response coherence, and this is associated with greater well-being (Brown et al., 2020). Research on response coherence has almost exclusively focused on intrapersonal processes. Yet, emotions are largely embedded in social interactions, guiding behavior

and providing useful information about the quality of social relationships. Thus, emotion coherence may affect interpersonal functioning. The purpose of this study is to use an interpersonal approach to examine the relationship between physiological response coherence and interpersonal processes. Specifically, we hypothesize that coherence within interacting partners on physiological and self-reported arousal will predict greater state empathy. **METHODS:** Participants (N = 49 dyads) were undergraduates from a Midwestern university who completed two sessions. In the first session, participants were individually consented, identified three emotionally salient experiences, and completed questionnaires including the interpersonal emotion regulation (IERQ) and trait empathy questionnaire (TEQ). In the second session, friends engaged in four conversations. Each friend shared one of the previously identified emotional stories and a neutral story about their daily routine. EDA was continuously measured throughout the interaction task. Following each conversation, friends completed emotion and arousal ratings along a visual analog scale (VAS) anchored by 0 (not at all) to 10 (extremely). State empathy was a composite of average scores on Emotionally Connected, Sympathetic, Empathetic, and Compassionate. **DATA ANALYTIC PLAN:** A Pearson correlation will be used to determine the relationship between self-reported arousal and electrodermal activity (EDA). The correlation coefficient will be used as the coherence measure. Correlation coefficients will be transformed using Fisher's z scores. Two univariate linear regression models will be used to test if coherence in self-reported arousal and EDA predicts state empathy. We hypothesize that coherence will predict state empathy. **IMPLICATIONS:** Understanding how emotion coherence impacts interpersonal processes such as empathy can be used to improve interpersonal relationship quality and connectedness. Currently, mind-body training awareness programs are being used to improve intrapersonal emotion processes. This research may be an impetus in adapting these interventions to help improve interpersonal functioning.

1-F-34 Understanding the neuroscience of human event segmentation using the hidden Markov model and naturalistic fMRI of story listening

Helen Wu¹, Anthony Vaccaro¹, Jonas Kaplan¹

¹University of Southern California

BACKGROUND AND AIM: When we recount our experiences, we find ourselves chunking our continuous lives into meaningful events, summarizing each event using a few phrases. The event segmentation theory proposes that humans naturally segment ongoing activity in order to understand it and that our corresponding brain activity patterns remain similar within an event and change at event boundaries when we enter a new event. The current literature has mostly focused on human segmentation response to audiovisual stimuli such as movies. Our study investigates how the brain parses narrative information when the input is only auditory. Participants listened to two audio stories while in the MRI. The event structures predicted from fMRI data were then compared to human-annotated event boundaries. We predicted that meaningful boundaries identified by readers would correspond to event boundaries in the Default Mode Network (DMN), but not in early sensory cortices. **METHODS:** The stimuli were two short stories: "The Living Room", about a woman's experience of watching a young couple's life through their window across the street, and "The Hitcher", an account of two brothers hitchhiking to get home late in the night. 36 participants (18 female) listened to both stories in the MRI. We then used a Hidden Markov Model (HMM) (Baldassano et al., 2017) to find the best-fitting segmentation structure for the fMRI data. The algorithm relies on two assumptions: (1) while processing narrative stimuli, observers experience a sequence of discrete events; (2) each event has a distinct neural signature. Twenty separate participants read the unsegmented transcripts of the two stories and marked the boundaries that separated all of the meaningful events in the story. The positions of the human-annotated event boundaries were combined to select the consensus boundary positions. The consensus boundary positions in the text were then converted to time-series positions in the fMRI data and compared with the event boundaries generated by HMM using a moving-window algorithm. The HMM was computed based on voxels from four separate regions of interest: primary visual cortex, primary auditory cortex, angular gyrus, and posterior cingulate cortex (PCC). **RESULTS AND IMPLICATIONS:** The fMRI results showed that the angular gyrus, consistent with the current literature, can produce event structures that match with the behavioral event structures significantly and consistently for both stories, while the posterior cingulate cortex only matched with one story. HMM segmentation of early sensory cortices did not consistently match the meaningful human-annotated event boundaries. Our results confirm the role of DMN regions in the process of meaning-making over long timescales, and extend those results to the context of auditory comprehension.

1-F-35 The single and dual-brain mechanisms underlying the advisers confidence expression strategy switching during influence management

Enhui Xie¹, Xiaoxue Gao¹, Xianchun Li¹

¹East China Normal University

BACKGROUND AND AIM: Effective influence management during advice-giving requires individuals to express confidence in the advice properly and switch timely between the competitive strategy (i.e., give overconfident advice) and the defensive strategy (i.e., give underconfident advice). However, how advisers switch between these two strategies, and whether and why there exist individual differences during this process remain elusive. **METHODS:** We used an advice-giving game that manipulated incentive contexts (Incentivized/Non-Incentivized) to induce the adviser's confidence expression strategy switching and measured the brain activities of adviser and advisee concurrently using functional near-infrared spectroscopy (fNIRS). **RESULTS:** Behaviorally, we observed individual differences in strategy switching that some advisers applied the defensive strategy when incentivized and the competitive strategy when not incentivized (I-D_N-C group), while others applied the competitive strategy when incentivized and the defensive strategy when not incentivized (I-C_N-D group). This effect was mediated by the adviser's perceived stress in each condition. The I-D_N-C group was more effective in influencing management than the I-C_N-D group, as reflected by the frequencies of advice-taking in the advisees. Neurally, compared with the I-C_N-D group, the I-D_N-C group showed higher activation in the dorsolateral prefrontal cortex (DLPFC) that supported strategy switching, as well as increased interpersonal

neural synchronization (INS) in the temporoparietal junction (TPJ) that supported influence management. This two-in-one process, i.e., confidence expression strategy switching and the corresponding influence management was linked and modulated by the strength of DLPFC-TPJ functional connectivity in the adviser. **CONCLUSIONS:** We developed a neurocognitive model that contributed to understanding the adviser's strategy switching during influence management. **ACKNOWLEDGEMENTS AND FUNDING:** This work is supported by the National Natural Science Foundation of China (32071082, 31900798, and 71942001), Key Specialist Projects of Shanghai Municipal Commission of Health and Family Planning (ZK2015B01), and the Programs Foundation of Shanghai Municipal Commission of Health and Family Planning (201540114). Dr. Xiaoxue Gao is supported by Young Elite Scientists Sponsorship Program by China Association for Science and Technology (YESS2021).

1-F-36 Dissecting the role of social brain and cognitive control in moral decisions

Xinyi Xu¹, Haiyan Wu¹, Guochun Yang², Ruien Wang¹, Jiamin Huang¹

¹University of Macau, ²University of Iowa

Tracking past decisions and predicting future rewards in light of new incoming information are critical in moral decisions. Although recent work highlighted that many variables modulate social decisions involving moral consideration, how can self-interest and keeping consistency together interact in moral choices is still an open question. Many variables can modulate social decisions involving moral consideration, such as seeking self-interest and keeping self-consistency; however, their interplay during moral decision-making and their neural correlates remain unclear. Here, we address this question by utilizing a mouse-tracking moral decision task in fMRI. Specifically, by visualizing two key variables, self-interest and decision history, subjects incorporate this information into their moral decisions in each trial. We constructed a multi-attribute, time-dependent drift diffusion model (tDDM), in which reward and consistency could affect the evidence accumulation process with different onset times and weights. We performed a standard first level GLM approach with three scan sessions (9 sessions) together. A GLM was constructed for each participant using decisions (dishonesty or honesty) as regressors. We selected 5 ROIs for consistency including SMA, PrACC, dACC, dlPFC and vmPFC, and 2 ROIs for reward including ventral striatum and OFC. Also, inter-subject representational similar analysis and functional connectivity analysis were also applied. The behavioral choice data and mtDDM results show that the reward has a larger weight but the consistency has an earlier timing in evidence accumulation. Significant neural activation in the brain regions related to cognitive control and reward are observed using univariate analysis. The drift rate of consistency in the best-fitting model is associated with cognitive control brain regions. The relationship between the drift rate of reward and the related brain regions is mediated by the mouse tracking index area under the curve, which is further confirmed by fMRI functional connectivity analysis. Moreover, using inter-subject representational similarity analysis (IS-RSA) to map the evaluation consistency and reward into brain activity, we find that their drift rates are represented in SMA, mPFC, ANG and IFG regions. Together, our behavioral and brain findings highlight a key role of the reward, as well as the interplay of self-interest and self-consistency, in moral decisions. Our work uncovers the trade-offs between reward and consistency considerations in moral decisions and their neural correlates, deepening our understanding of motivated moral decisions and self-image. This work is supported by NSFC (U1736125) and SRG of Univeristy of Macau. We would like to thank all participants that took part in the study and enabled this research to be possible.

1-H-38 Dorsomedial Prefrontal Cortex (DMPFC) prioritizes social learning at rest

Courtney Jimenez¹, Meghan Meyer²

¹Dartmouth College, ²Columbia University

BACKGROUND AND AIM: As we move through everyday life, we come across an abundance of information. Yet, some experiences stick with us while others are forgotten. Is certain information from encoding prioritized in memory? If so, how? One possibility is that social information--that is, information about people--may be prioritized via consolidation mechanisms at rest. **METHODS:** Participants in the current study completed an fMRI scanning session consisting of a structural anatomical scan, two encoding scans, a post-encoding rest scan, and subsequently, a surprise memory test. Stimuli presented at encoding consisted of 5-10 second video clip excerpts from the non-narrative, documentary film, Samsara. A total of 60 video clips were presented at encoding, 30 of which were social stimuli (e.g., showed footage of humans) and 30 of which were non-social stimuli (e.g., showed footage of locations and industrial objects). **RESULTS:** We implemented a multivariate neural pattern reinstatement analysis and show that the amount of social reinstatement in the DMPFC is significantly related to social memory performance. Additionally, we show that nonsocial reinstatement in the IVLPFC is significantly related to nonsocial memory performance. Critically, a linear mixed effects model reveals that the correlation between the number of DMPFC social pattern reinstatements and social memory performance is driven by early rest. We don't see evidence of the same temporal prioritization in the relationship between the number of IVLPFC nonsocial pattern reinstatements and nonsocial memory performance. Further, we replicate findings that implicate the hippocampus in a general consolidation function at rest. We find that the amount of correct pattern reinstatement in the right hippocampus at rest is negatively correlated with overall memory performance. **CONCLUSION:** Collectively, these results suggest that the link between neural pattern reinstatement during rest and subsequent memory may be supported by different prefrontal regions for social (DMPFC) and non-social (IVLPFC) memory. These results provide evidence that the DMPFC, a key region of the default network, prioritizes the consolidation of social information for memory in earlier moments of rest.

1-H-39 Impaired pattern separation is enhanced by positive emotion

Claire Lauzon¹, Michael Yassa², R. Shayna Rosenbaum¹

¹York University, ²University of California Irvine

BACKGROUND AND AIM: Pattern separation (PS)--the neurobiological process of making overlapping mnemonic information more distinct--has been shown to depend critically on the hippocampus. Previous research has suggested that PS of negative stimuli is enhanced compared to neutral and positive stimuli, and that hippocampal activation is strongest during discrimination of negative stimuli. Nonetheless, it remains unclear whether PS of emotional stimuli is supported by the same mechanisms as neutral information. In this study, we assess whether the critical role of the hippocampus in PS transcends emotional valence, or whether emotional arousal can rescue otherwise impaired PS. Individuals with hippocampal lesions have been reliably shown to be impaired in mnemonic discrimination of neutral objects, suggesting a deficit in PS. The present study explores how impaired PS is influenced by the use of emotional stimuli by comparing individuals with hippocampal damage to a sample of age-matched controls. **METHODS:** PS ability was assessed using an emotional mnemonic discrimination task (Leal et al., 2014), which involves an incidental encoding phase followed by surprise memory test. The encoding phase requires participants to identify visual scenes as either positive, negative, or neutral in valence. In the test phase, participants must discriminate among three different types of scenes: previously studied, unstudied but highly similar to previously studied, and unstudied and dissimilar. Participants are instructed to respond "old" to studied images, and "new" to all unstudied images, regardless of similarity. Test images included an equal proportion of negative, neutral, and positive scenes, which allowed for analyses of recognition memory and PS ability across emotional valence. PS was inferred from the ability to identify similar scenes as unstudied rather than mistaking them for previously studied images. **RESULTS:** Individuals with hippocampal lesions demonstrated impaired overall recognition memory relative to controls, but relatively improved performance for emotional compared to neutral stimuli. PS was improved in hippocampal patients for positive stimuli, but remained critically low compared to controls for negative and neutral stimuli. Contrastingly, control participants exhibited consistently strong recognition memory and PS across stimulus types. **CONCLUSIONS:** While general emotional valence may enhance recognition memory in individuals with hippocampal amnesia, only positive emotion appears to specifically enhance PS. This effect mirrors the positivity effect often seen in aging adults, where positive stimuli are preferentially attended to and remembered.

1-H-40 Computational evidence of cultural shaping of social information learning

BoKyung Park¹, Leor Hackel², Eun Jin Han¹

¹The University of Texas at Dallas, ²University of Southern California

Previous work has shown that people from independent Western cultures (e.g., Americans) focus more on dispositional information, and less on situational information about others' behavior, compared to people from interdependent Eastern culture (e.g., East Asians). However, is this true when repeatedly interacting with others and receiving feedback on our actions, and/or does it shape how people choose interaction partners through direct experience with others over time? To address this gap in the literature, we made White American (N = 125) and Korean (N = 118) participants learn about social targets [human] vs. non-social targets [slot machines] by observing the targets' sharing behaviors. On each trial, participants were presented with a pair of two targets (out of four) and chose one that they thought would share more points with them. They received feedback on how many points the chosen target gave to them out of their total points ("pool") on the trial, thus learning about the targets' generosity (indexed by the proportion of the points shared) and the reward outcome the target produced (indexed by the actual number of points shared). Some targets shared a large proportion from a small pool of points, and therefore ended up sharing less points (generous but produced a small reward), while others shared a smaller proportion from a large pool, and ended up sharing more points (ungenerous but produced a large reward). We calculated how much participants incorporated the targets' generosity vs. reward outcome information in their choices, by implementing a reinforcement learning model. We found that Americans were influenced by target generosity information more than Koreans when they were learning about human targets, while both cultural groups considered target generosity information less when they were learning about slot machines. In a subsequent task, participants again indicated their preference between two presented targets while viewing the point pool each target had on that trial. The point pool was randomly generated on each trial and thus not associated with the amount of pool they had in the previous task. Participants received no feedback after their choice, and therefore were expected to use what they had learned about the targets' behaviors from the prior task to inform their choices. Compared to Americans, Koreans relied less on the learned generosity of the targets to make their decisions. Instead, they leveraged situation-specific information to determine which target to choose, such as the point pool amount immediately available to the targets in the current task. These findings suggest that the cultural differences in the focus on different types of information persist in repeated interactions with others, driving people to selectively incorporate culturally encouraged social information about others in determining interactions with them.

1-H-41 The reward positivity does not encode current reward value

Lindsay Shaffer¹, Holly Crowder¹, Lam Duong¹, Craig McDonald¹, James Thompson¹

¹George Mason University

BACKGROUND AND AIM: Ongoing assessment of rewarding outcomes is crucial for successful behavioral adaptation within a constantly changing environment. An ERP associated with reward processing is the reward positivity/feedback-related negativity (RewP/FRN). The RewP/FRN has been linked to feedback evaluation of good and bad outcomes, although it's unclear what kind of reward information is modulated in the RewP/FRN. Recent studies examining this issue suggest the RewP/FRN reflects information about reward value and motivational states. Differences in methodologies across studies, however, have not formally investigated whether changes in the RewP/FRN are influenced by changes in reward value and motivational state in

the same study. **METHODS:** To investigate what kind of value information is conveyed in the RewP/FRN, we acquired EEG recordings from hungry participants (n=31) as they completed two rounds of a modified Doors Task to win two different, but equally rewarding, food rewards. In between rounds, one of the food rewards was selectively devalued by having participants eat the food until they were sated via reinforcer devaluation. Reinforcer devaluation has been previously used to isolate behavior based on changes in reward value. Participants provided self-reported ratings of hunger and perceived pleasantness of the food before and after devaluation. **RESULTS:** Participants rated both food rewards as equally pleasant at baseline and pre-devaluation. Participants reported feeling sated after eating food ($t=13.31$, $p < 0.0001$). Participants rated the devalued food significantly less pleasant after eating, but did not change their ratings for the non-devalued food ($t=-3.57$, $p = 0.0006$). Non-parametric permutation tests based on the t-statistic consisting of 13 frontal, central, and parietal channels associated with the RewP/FRN reveal no significant differences between RewP/FRNs associated with devalued food compared to non-devalued food. **CONCLUSIONS:** The EEG results of this study do not support claims that the RewP/FRN is an index of current reward value or that the RewP/FRN is sensitive to motivational states. These findings suggest that signals reflected in the RewP/FRN might reflect general preference rather than a dynamical assessment of current reward value. **ACKNOWLEDGMENTS AND FUNDING:** This work was supported by the NSF (#192557) and the NIMH (R01DA003431).

1-H-42 Valence-specific effects of memory reconsolidation on episodic details and subjective feelings.

Ga In Shin¹, Sarah DuBrow², Vishnu Murty¹
¹Temple University, ²University of Oregon

Memory becomes prone to reconstruction during periods of reactivation following retrieval. While mainly studied in rodent models, affective neuroscience has begun to capture the role of reconsolidation in humans. However, this field often limits investigations to one form of memory (i.e., feelings versus episodic memory) leaving open questions regarding their putative interactions. To provide a more comprehensive understanding of the downstream consequences of reconsolidation, it is essential to characterize their interactions. Here, we conducted a study that examines how both episodic details and feelings change with biased re-exposure during reconsolidation. Human participants (n=25) performed a reconsolidation experiment over three days. On Day 1, they learned the positive and negative attributes (i.e., stories) of novel faces. On Day 2, within the reconsolidation window, faces were re-exposed with the previous positive stories (Restudy+), negative stories (Restudy-), or were not re-exposed (Control). On the last day, we characterized face recognition, face-stories associative memory, free recall, and subjective feelings ratings. Ratings of subjective feelings significantly decreased following the negative re-exposure (Restudy-; $p = .007$) when there was no significant change in ratings in the Control and Restudy+ conditions. While, face recognition and associative memories showed no significant differences across restudy valence conditions (Restudy+ vs. Restudy-; $p = .988$ for face recognition and $p = .71$ for associative memory), free recall of Restudy- stories was the greatest. Critically we found an interaction between free recall and subjective feelings, such that recall of the restudied negative and positive stories influenced changes in subjective feelings ratings ($p < .001$ and $p = .01$, respectively) but not in recall of the unstudied stories. In general, these findings show that re-exposure during reconsolidation had valence-specific effects where negative but not positive re-exposure influenced later subjective feelings and recall of stories. These findings support a model in which episodic memory and subjective feelings may be influenced via reconsolidation. We hope to extend these findings by probing the underlying neural mechanisms to provide new insights into how to increase the effectiveness of targeting and editing unique traumatic memories during the reconsolidation window in the clinic.

1-H-43 Striatal response to negative feedback in a stop signal task operates as a learning signal that adjusts reaction times

Benjamin Smith¹, Megan Lipsett¹, Elliot Berkman¹
¹University of Oregon

BACKGROUND AND AIM: We examined fMRI activity of 225 subjects in a stop signal task, which measures response inhibition, with a focus on understanding learning effects. One would expect the striatum is involved in learning to perform the task better after errors, but in stop signal tasks, no one in literature has ever observed a direct correlation between a behavioral measure of learning (like reaction time change) and any corresponding neural learning signal. **METHODS:** In our stop signal task, subjects respond to an arrow by pressing a left or right button, but 1 in 7 trials includes a tone instructing them to inhibit the response. The task has 128 trials, with difficulty adjusted via automatic timing of the tone to ensure a mix of correct and incorrect responses. We compared brain activity (BOLD) in the interval between trials for successful inhibition (Correct Stop, CS) vs failed inhibition (Failed Stop, FS) trials. **RESULTS:** In that "Cue Following CS>FS" contrast, there was strong evidence of greater bilateral striatal activity (most evident in the putamen; peak MNI coordinates [-24 10 -4], 386 voxels, $p < 0.001$; [24 14 0], 469 voxels, $p < 0.001$). Significant clusters of striatal activity were also evident in a whole-brain contrast in the following trial. These effects seem to be due to really low striatal activity in FS rather than really high activity in CS. We wondered if the striatal activity was a learning signal, so we measured peak and trough activity in the bilateral striatal cluster following every Failed Stop trial. In that cluster, peak activity correlated within subjects with RT change ($t=3.88$, $r=0.07$, $p < 0.001$), while average subject trough activity inversely correlated with average subject RT change ($t=-2.5$, $r=-0.17$, $p=0.007$). In a mixed-effect model predicting peak activity, both RT change ($B=0.05$, $t=3.0$, $\chi^2=8.9$, $p=0.003$) and probability of stop trial ($B=-0.34$, $t=-2.1$, $\chi^2=7.8$, $p=0.005$) had significant fixed (i.e., within-subjects) effects on peak-activity. Both peak ($p < 0.05$) and trough ($p < 0.05$) subject averages were related to a response to failure scale measuring a tendency to reduce goal-efforts following failure. **CONCLUSIONS:** We found post-correct striatal activity. Subjects with more of that activity seemed to slow down more after an error, and within subjects, deeper troughs of that activity was related to greater slowing. A mixed-effects model indicates the striatal activity might be a learning signal that encodes reaction time change and the current expected probability of a stop trial occurring. This extends Chevrier and Schacher's

(2010) finding that post-error striatal deactivation follows FS trials, by linking striatal activity to post-error reaction time change, and provides evidence that the striatum encodes a reward prediction error signal for learning within the stop signal task.

1-H-44 Using model-based approaches to characterize depression-related variation in social learning and decision-making

Damian Stanley¹, Michael Moore¹

¹Adelphi University

Though the social aspects of depression are well-documented, little is known about how social learning and decision-making (SLDM) is modulated by depressive symptomatology. Research that has probed LDM in depression has primarily focused on impairments in nonsocial reward processing (Ng et al., 2019). Those studies that do examine SLDM in depression have focused on social rewards (Ait Oumeziane et al., 2019) and/or the interaction between social context and reinforcement learning (Safra et al., 2019). There is evidence (e.g., Moore & Fresco, 2007) that negative self-referential beliefs may bias a depressed individual's perception of their own task performance and not that of others', but it is unclear that this would be reflected in SLDM processes. To investigate this, we used a multi-shot trust game (Berg et al., 1995) to compare first-person (PLAY) and third-person (OBSERVE) trust learning. Participants (n = 217, recruited via prolific, 106 Female, age range: 18 to 45 years) learned about the trustworthiness of partners while playing trust games with them or observing others do the same. On PLAY trials, participants chose how many points (1 to 5) to send to their partner, the partner received 4 times the amount sent, and then "decided" (partner behavior was probabilistic) whether to share back half, or keep all, of the points. On OBSERVE trials, instead of participating, participants observed interactions between others and entered how many points they thought an observee "should" send. In computationally-matched nonsocial PLAY and OBSERVE control conditions, participants learned about the reward contingencies of different lotteries. In each of eight blocks (4 PLAY and 4 OBSERVE; counterbalanced), participants learned about two new partners and two new lotteries (20 trials each; randomly intermixed). Partner and lottery behavior was dictated by one of four share/win probabilities (0.2, 0.35, 0.65, and 0.8) for the first 9 interactions, which then switched (between trials 9 to 12) to different probabilities (0.65, 0.8, 0.2, and 0.35; respectively) for the remaining trials. We also assessed participants' depressive symptomatology with the Center for Epidemiological Studies-Depression scale (CES-D), as well as their levels of non-verbal IQ, empathy, worry, and social anxiety. The data are collected but not analyzed. Preliminary analyses will test whether learning rates are greater than chance, differ by condition, and are higher in SOCIAL (vs. NONSOCIAL) and PLAY (vs. OBSERVE) conditions. We will test two main hypotheses. H1: Overall social learning ability will be negatively associated with symptoms of depression. H2: The relationship between depressive symptomatology and social learning rates will be stronger when participants are interacting in the SOCIAL PLAY condition compared to observing in the SOCIAL OBSERVE condition. These findings will elucidate the relationship between depression and social learning and suggest a potential mechanism.

1-I-45 Connectome-based modeling predicts childhood socio-emotional development

Samantha Brindley¹, Amalia Skyberg², Jessica Connelly¹, James Morris¹

¹University of Virginia, ²University of Oregon

BACKGROUND AND AIM: Socio-emotional development, a process through which children learn to experience, express, and manage emotions and build meaningful social relationships, is critical to future well-being. The purpose of this study was to investigate the neural systems that contribute to individual differences in socio-emotional development during middle childhood. **METHODS:** Participants underwent fMRI while passively viewing a high valence, prosocial movie clip from Finding Nemo. Two years later, socio-emotional development was assessed with self-report questionnaires. **RESULTS:** Bootstrap exploratory graph analysis, a dimensionality reduction method, was employed to estimate two distinct latent communities from questionnaire data: 1) internalizing and 2) sociability. Higher scores on the internalizing community were associated with more symptoms of anxiety and depression and more perceived loneliness, while higher scores on the sociability community were associated with more skills essential for initiating and maintaining effective relationships, including empathy and engagement. In an independent sample of adults, inter-subject correlation analysis identified brain regions that were consistently evoked during the prosocial Finding Nemo movie clip in contrast to a nonsocial movie clip. Then, functional connectivity between the synchronous brain regions was calculated for all children. Connectome-based predictive modeling, a machine learning method that is sensitive to individual variability in functional connectivity patterns, was implemented to predict scores on the internalizing and sociability communities. We found that a functional connectivity model reliably predicted scores on the sociability community, but not on the internalizing community. While functional connectivity in the sociability connectome existed between regions distributed throughout the entire brain, the prefrontal cortex and the motor cortex emerged as particularly predictive regions involved in socio-emotional processing. **CONCLUSIONS:** In conclusion, we demonstrated that functional connectivity between brain regions synchronously activated during prosocial movie watching in adults predicted the longitudinal development of sociability in children. These results have implications for our basic understanding of the neural systems underlying individual differences in childhood socio-emotional development, which may be informative of health outcomes and quality of life through adolescence and adulthood.

1-I-46 Characterizing dynamic processing of socio-emotional stimuli across childhood and early adolescence

M. Catalina Camacho¹, Leah Fruchtman¹, Sishir Yarlagadda¹, Janhvi Duggal², Sally Njenga¹, Elizabeth Williams³, Deanna Barch¹

¹Washington University in St. Louis, ²King's College London, ³Rollins College

BACKGROUND AND AIM: Children rapidly develop social information processing (SIP)--the process by which we identify, attend to, interpret, and adjust our behavior in response to social cues--though, the neural processing underlying this

development is not well-known. Movies are rich stimuli able to capture more naturalistic SIP than typical task-based approaches. In this study, we aim to use a large fMRI dataset collected from 823 5-15-year-old children while they watched emotional videos to 1) characterize dynamic neural processing of complex social stimuli; and 2) characterize age- and puberty-related changes in dynamic processing. **METHODS:** We have annotated the videos for both emotional and non-emotional content. To characterize dynamic processing of these features, we will quantify dynamic connectivity in both a node-centric (nFC) and edge-centric (eFC) manner for each participant. Linear associations between dynamic nFC and eFC and emotion-specific and non-specific video features will be quantified using regression. The beta maps will then be used to examine linear and non-linear changes across development. **PREDICTION:** We predict that our nFC analyses will replicate previous work which has found that the default mode network is the primary locus of SIP and that connectivity of this network will strengthen with maturity. We predict that our eFC analyses will reveal a dynamic interplay between sensorimotor networks and the default mode network, which we predict will shift with increasing processing efficiency (age). **CONCLUSION:** This work will provide key insight to how social information is processed across development. These insights could be used to identify how the neural basis of SIP may be altered in children at high risk for emotion dysregulation or with poorer social functioning. **ACKNOWLEDGEMENTS AND FUNDING:** This work was funded by the National Institutes of Health.

1-I-47 Does infant temperament predict fathers childcare involvement?: A longitudinal study

Leonardo Dominguez Ortega¹, Jasmine Liu², Elizabeth Aviv², Yael Waizman², Darby Saxbe²

¹Loyola Marymount University, ²University of Southern California

BACKGROUND AND AIMS: The first few months after a baby is born is transformative for both infants and new parents who undergo neurobiological, behavioral, and social changes. Though prior research has emphasized an association between parents' division of infant care in the first year and downstream parent and child outcomes later in life (Khazan et al., 2008), less work has focused on antecedents to infant care egalitarianism between co-parents, and even fewer studies have focused specifically on fathers' involvement in caring for their infant. A small body of cross-sectional research has established that the more difficult a child's temperament is, the lower fathers' involvement in childcare becomes (Mehall et al., 2009; Renske et al., 2020; Schoppe-Sullivan et al., 2013). Since this lack of paternal involvement may negatively affect infants' neurodevelopment (Kim et al., 2016), it is critical for more work to explore factors that impact fathers' involvement in caregiving to inform early prevention and intervention efforts. Thus, our proposed study expands on current literature by using longitudinal methods to examine whether infant temperament at three months postpartum impacts father involvement in infant care at six months postpartum. **METHODS:** We propose to analyze data collected as part of a larger longitudinal study that followed 100 heterosexual, cohabitating first-time parents from pregnancy through the first year postpartum. The sample was ethnically and racially diverse (over 50% non-white). Couples completed a battery of self-report questionnaires during pregnancy, and again at three and six months postpartum. During the prenatal and six-month postpartum visit, fathers completed an adapted version of the Who Does What (WDW) scale (Cowan & Cowan, 1988), a self-report questionnaire assessing the division of infant care tasks split between parents, such as feeding, diapering, and playing with the infant. At both postpartum visits, fathers completed The Infant Behavior Questionnaire Very Short Form (IBQ-R VSF; Putman et al., 2014), a parent-report measure of infant temperament. **HYPOTHESIS:** We hypothesize that infant temperament, as reported by fathers, at three months postpartum will predict father's perceived involvement in infant care at six months postpartum. We hypothesize that as negative child temperament increases, fathers' perceived involvement in childcare will decrease. **ANALYSIS:** We will test our hypothesis using a longitudinal multiple regression analysis, and will include relevant covariates including the prenatally expected division of childcare, marital quality at three and six months postpartum, and parent demographics. **IMPLICATIONS:** To our knowledge, this will be the first study to longitudinally investigate the impact infant temperament has on fathers' perceived involvement in infant care during the first few months of new fatherhood. Results may guide future interventions to increase father involvement, which in turn

1-I-48 Interoceptive accuracy enhances deception detection with greater age

Amber Heemsker¹, Tian Lin¹, Didem Pehlivanoglu¹, Ziad Hakim¹, Pedro Valdes-Hernandez¹, Robert Spreng¹, Gary Turner², Leanne Ten Brinke³, Matthew Grilli⁴, Robert Wilson⁴, Natalie Ebner¹

¹University of Florida, ²York University, ³University of British Columbia, ⁴University of Arizona

BACKGROUND AND AIM: Prior research proposes that physiological reactions to viewing liars provides internal signals to facilitate deception detection. However, this work also suggests that interoception, or awareness of one's bodily signals, is needed to incorporate these reactions into explicit lie detection. Difficulties with deception detection may leave older adults especially vulnerable to fraud, but the relationship between interoception and deception detection has yet to be determined in aging. **METHODS:** The present study investigated effects of interoceptive accuracy (IAcc) on deception detection in 75 young (18-34 years) and 74 older (53-82 years) adults. Participants completed a heartbeat-counting task to determine IAcc, a social lie detection task in which participants made veracity judgments of genuine and deceptive pleaders, as well as an ecologically valid in-lab paradigm of phishing email detection to capture accuracy in online deception detection. We ran multilevel logistic regression models (MLRM) to accommodate for the hierarchical structure of the dataset. Statistical significance of effects and interactions was determined via the Wald's test. **RESULTS:** Results showed that, in line with previous literature, older adults demonstrated lower IAcc and deception detection accuracy than young adults. Among older adults, greater IAcc was associated with better accuracy at detecting deceptive pleaders with greater chronological age, as predicted. This effect among older adults was extended to email phishing. **CONCLUSIONS:** Our findings identify interoceptive accuracy as conducive to deception detection, and thus as a protective factor against fraud susceptibility. Further analyses revealed that the relationship between interoceptive accuracy and deception detection was stronger in older than young adults. This suggests that while

older adults are disproportionately vulnerable to deception, they also may benefit most from awareness of their internal physiological signals when confronted with deceptive cues. Based on the findings, interoceptive awareness training may be beneficial in reducing fraud susceptibility in aging. **ACKNOWLEDGEMENTS AND FUNDING:** National Institute on Aging Research Grant 1R01AG057764-01A1; FLDOH 22A12

1-1-49 Dissociable brain activity for high-stakes lie detection judgements in younger and older adults

Colleen Hughes¹

¹Montreal Neurological Institute

BACKGROUND AND AIM: Mixed evidence suggests that aging is associated with better and worse lie detection accuracy even when using naturalistic stimuli. One reason for this discrepancy may be that older adults use different strategies or are sensitive to different mental state cues than younger adults which may be evident using functional neuroimaging. We therefore investigated behavioral and neural differences among younger and older adults making lie detection judgments about real, high stakes situations. **METHODS:** From a larger study on social cognitive aging, 51 younger (M=22.0y, SD=3.8, 41 women, 10 men) and 34 older (M=67.8y, SD=6.7, 22 women, 11 men) participated. Participants viewed 24 real televised reports (~20s each) while undergoing fMRI at 3T. The speaker, who made a plea for information about a missing loved one, was later found to be lying or telling the truth about the situation. Without being told about the later evidence, participants judged if the speaker was lying or telling the truth. In the control condition, the speaker described a tragic event that happened to them, and participants judged if the event had a high or low impact on the speaker. We conducted task partial least squares, which is model-free and multivariate, using a block design to assess brain activity associated with the age groups and video types. **RESULTS:** Younger and older adults had comparably greater accuracy at detecting truths versus lies, OR=4.34, $p < .001$, 95% CI [1.96, 9.62]. The task partial least squares analysis identified two significant latent variables (Figure 1; LV1: 75% covariance explained, $p < .006$; LV2: 15% covariance explained, $p < .002$). The first described age-group differences regardless of video type. Medial prefrontal cortex, bilateral supramarginal gyrus, and right dorsolateral prefrontal regions showed greater activation in older versus younger adults during the task. The second pattern reflected differences between the lie and control videos. The truth videos did not significantly contribute to this pattern. Of note, greater activity in left anterior insula was observed when younger and older adults viewed videos of people lying versus control videos. **CONCLUSIONS:** Supported by behavioral and neural differences, older adults were comparably poor to younger adults at detecting when someone was lying versus telling the truth in naturalistic, high stakes contexts. The left anterior insula is widely implicated in emotional and social cue recognition which may explain its selective activation to videos in which the speaker was lying either due to the greater difficulty of detecting lies or greater presence of deception cues. In line with extant aging theories, older adults' maintained general ability to understand others mental states is supported by a wider network of default, salience, and executive network regions, perhaps reflecting greater structural and functional declines with age that have implications for decision-making.

1-1-50 Social interaction modulates functional connectivity in mentalizing networks differently between youth with and without autism

Matthew Kiely¹, Yaqiong Xiao², Diana Alkire³, Dustin Moraczewski⁴, Elizabeth Redcay⁵

¹University of Maryland, College Park, ²Shenzhen Institute of Neuroscience, ³National Institute on Drug Abuse, ⁴National Institute of Mental Health, ⁵University of Maryland

BACKGROUND & AIM: Autism Spectrum Disorder is characterized in part by difficulties with social interactions. Mentalizing, the ability to attribute mental states to oneself and to others, and social reward processing are proposed to relate to these social difficulties. However, questions of how brain networks related to mentalizing and social reward are involved in social interaction and differ in autism have broadly been studied outside of a social-interactive context. In a previous study using a social-interactive paradigm, we found age-related differences in functional connectivity (FC) within mentalizing and reward networks when typically developing (TD) youth interacted with a peer versus a computer (Xiao et al., 2022). The present study investigated mean FC within and between mentalizing and reward networks in autistic (AUT) and TD youth using this interactive paradigm. **METHODS:** During the fMRI scan, participants made predictions about either a perceived peer or a story character (social interaction factor), using hints related or not related to mental states (mentalizing factor). Our sample is comprised of 33 autistic (8 females, mean age = 11.59 ± 1.76 years) and 33 TD youth matched on gender, age, full-scale IQ, and head motion (mean age = 11.59 ± 1.82 years). We used linear mixed-effect models to test the effects of social interaction, age, group, and interactions between these terms, while controlling for gender, IQ, and head motion. **RESULTS:** There was no significant main effect of the social interaction on mean FC within or between the mentalizing and reward networks. However, there was a significant interaction between social context and group on mean FC within the mentalizing network ($p < 0.05$), such that the TD group showed greater connectivity during peer compared to character conditions while the AUT group showed the reverse pattern. Within the TD group, this effect of social interaction on mean FC within the mentalizing network was numerically greater in the peer versus character conditions, but it was non-significant ($p = 0.07$), and there was no significant main effect of social interaction on mean FC in the AUT group. **CONCLUSIONS:** We found group differences in how social interaction modulates FC within the mentalizing network. These differences in FC may contribute to differences in interacting with a peer versus a computer, particularly in spontaneous mental state reasoning during social interaction. Future investigations will examine relations between FC and behavioral measures to determine their behavioral relevance. While we did not see significant interactions with age in the mentalizing network like in our previous study, this sample was slightly older than in our prior study and thus may not span the relevant developmental window. Future studies should include a wider age range to understand developmental change in FC across children and adolescents with and without autism. **FUNDING:** R01MH107441

1-I-51 Similar functional connectome architecture predicts teenage grit

Sujin Park¹, M. Justin Kim¹

¹*Sungkyunkwan University*

BACKGROUND AND AIM: Grit is a non-cognitive skill to persevere in the face of setbacks and maintain consistent interest for a long time. This intrapersonal character has been associated with positive developmental outcomes across different domains such as academic achievement, career success, and subjective well-being. While prior studies supported these results, there is a paucity of work providing explanatory evidence from a neurodevelopmental perspective. Current study investigates whether macro-scale brain measures rather than putative regions of interest are predictive of individuals' grit scores.

METHODS: Based on previous research suggesting the utility of whole-brain functional connectivity patterns (i.e., functional connectomes) as developmental proxies, we proposed that individual differences in grit might be, in part, rooted in brain development in adolescence and emerging adulthood (11-18 years of age). **RESULTS:** Results showed that grit was associated with 1) connectome stability across conditions and 2) connectome similarity across individuals. The observed grit-brain association was not explained by individual differences in general cognitive abilities or social skills. Notably, inter-subject representational similarity analysis demonstrated that teenagers who scored higher in grit shared a similar functional connectome architecture with each other, more so than those with lower grit. **CONCLUSIONS:** Our findings suggest that gritty individuals are more likely to follow a specific neurodevelopmental trajectory, which may translate to beneficial behavioral outcomes. **ACKNOWLEDGEMENTS AND FUNDING:** This research was supported by the National Research Foundation of Korea (NRF-2021R1F1A1045988).

1-I-52 Is default mode network connectivity associated with naturalistic affective vocabularies during resting state thought in older adults?

Teodora Stoica¹, Matthew Grilli¹, Eric Andrews¹, Jessica Andrews-Hanna¹

¹*University of Arizona*

BACKGROUND AND AIM: Resting state thought is a framework where inner mentation is unconstrained by external environment demands. Despite being used as a context for neuroimaging analyses with an emphasis on the default mode network (DMN), less is known about resting state thought as a cognitive construct. Using a protocol where participants are trained to speak their thoughts aloud in an unconstrained environment (Think-Aloud Paradigm; TAP), our previous work shows that older adults (OA) use a more diverse repertoire of positively-valenced words compared to younger adults (Stoica et al., 2023). Constructionist theory proposes that conceptualization of emotion plays a role in transforming sensory information into discrete emotional experiences and importantly, may rely on brain regions that have been implicated in semantic cognition (Satpute & Lindquist, 2021), many of which overlap with a "dorsal medial subsystem" (dmPFC) of the DMN (Andrews-Hanna & Grilli, 2020; Andrews-Hanna, Smallwood & Spreng, 2014). Therefore, to understand which neural mechanisms may support diversity of naturalistic affective vocabularies in OA, the present study focuses its analyses on DMN regions putatively involved in conceptualization of emotions during semantic processing. **METHODS:** 122 OA completed a "standard" resting state fMRI task (no talking), followed by an fMRI version of the TAP, where they spoke aloud their thoughts. Audio data was transcribed and quantified for diversity of affective naturalistic vocabularies using a published valence dictionary of lemmas. **HYPOTHESIS:** We hypothesize that diversity of naturalistic affective vocabularies during resting state thought in OA will be positively correlated with the DMN during the fMRI version of the TAP and in the standard resting state fMRI task. **ANALYSIS:** Neuroimaging data will be preprocessed using fmriprep. DMN ROIs will be drawn from the 100-region Shaefer et al. 2018 parcellation, with an a priori focus on regions forming the dmPFC subsystem: dorsal medial prefrontal cortex, ventrolateral prefrontal cortex, lateral temporal cortex, temporal pole, and temporoparietal junction. Z-transformed resting state correlations between pairs of ROIs will be extracted and averaged to a network-level connectivity metric. Then, a linear regression will be conducted to assess whether individual differences in connectivity are associated with diversity of naturalistic affective vocabularies. Finally, an exploratory whole-brain analysis will be done to assess which brain regions outside this network are related to diversity of naturalistic affective vocabularies. **GENERAL IMPLICATIONS:** Our findings may contribute to existing theories proposing language plays a constitutive role in emotion experience, and perhaps emotion understanding and regulation. Specifically, this research may uncover the neural mechanisms underlying research demonstrating OA experience more positive task-unrelated thoughts in daily life.

1-I-53 Adolescents at-risk for depression show diffuse increases in white matter microstructure with age, including regions consistent with subcortical projection pathways implicated in depression

Holly Sullivan-Toole¹, Katie Jobson¹, Lindsey Stewart¹, Linda Hoffman¹, Josiah Leong², Ingrid Olson¹, Thomas Olino¹

¹*Temple University*, ²*University of Arkansas*

BACKGROUND AND AIM: Maternal history of depression is one of the strongest predictors of depression in offspring and is linked to both structural and functional alterations in the developing brain. However, very little work has examined differences in white matter microstructure in adolescents with a risk for depression (by virtue of maternal history of depression).

METHODS: In a sample aged 9-14 (n=117; 60% female), we used tract-based spatial statistics (TBSS) to examine differences in white matter microstructure between adolescents with (n=42) and without (n=75) a maternal (lifetime) history of depression. Microstructure was indexed using fractional anisotropy (FA), maternal history of depression was assessed using the Structured Clinical Interview for DSM Disorders (SCID), and child internalizing was assessed using parent-reports on the Child Behavior Checklist (CBCL). **RESULTS:** Adolescents with a maternal history of depression, compared to those without, showed cross-sectional increases in FA with age (significant interaction between risk-group and age) in diffuse regions of the white matter skeleton. Results for the majority of identified tracts were robust to controlling for sex, in-scanner motion, neighborhood SES,

and inter-cranial volume. Moreover, these effects persisted when controlling for youth internalizing symptoms, showing that maternal history of depression is a unique predictor of relatively increased white matter microstructure across development. Corrected cluster maps were thresholded at a whole-brain family-wise error $<.05$. Controlling for all covariates, adolescents with a maternal history of depression showed greater FA with age in the following tracts and regions: the corpus callosum, anterior and posterior limbs of the internal capsule, the anterior, superior, and posterior corona radiata, fornix, superior and inferior fronto-occipital fasciculi, cingulum, and uncinate, among others. **CONCLUSIONS:** Widespread increased FA may correspond to accelerated brain maturation in at-risk adolescents. Additionally, some regions of increased FA identified in at-risk youth were consistent with the subcortical projection pathways, bi-directional pathways connecting cortical and subcortical structures including basal ganglia, thalamus, midbrain, brainstem, and cerebellum. As the subcortical projection pathways are implicated in affect, reward processing, and depression, microstructural alterations in these pathways may have particular relevance for the development of psychopathology in at-risk youth. Thus, next steps will use probabilistic tractography to further investigate whether at-risk adolescents show microstructural alterations in specific subcortical projection pathways and whether microstructure in these pathways is associated with symptoms of depression. **ACKNOWLEDGEMENTS AND FUNDING:** This work was supported by NIMH grants R01 MH107495 (Olino) and F32 MH127948-01A1 (Sullivan-Toole)

1-I-54 Dynamical neural systems of social touch in infancy

Cabell Williams¹, Andrew Graves¹, James Morris¹, Kevin Pelphrey¹, Meghan Puglia¹

¹University of Virginia

BACKGROUND AND AIM: Social touch is nonsexual, pleasurable affective touch that conveys social information. In infants, touch communicates social proximity, modulates homeostasis, and regulates emotion. Touch is the first sensory system to develop and plays a large role in learning. Two brain regions identified in the processing of social tactile stimuli are the somatosensory cortex, which categorizes a stimuli's pressure, texture, slip, and vibration, and the insula, which interprets the emotional valence of a stimuli. However, little is known about how these regions covary and synchronize during the interpretation of social cues during infancy. Thus, this study aims to quantify variations in synchrony between the somatosensory cortex and insula using windowed cross correlation and a peak-picking algorithm with the ultimate goal of understanding neural interpretations of social touch during critical periods of development. **METHODS:** Preliminary results include nine healthy infants (female=2) between 50 and 151 days of age who were rocked to sleep and placed in a 3T magnetic resonance imaging (MRI) scanner. While asleep, they underwent a 2x2 block design functional MRI consisting of tactile and auditory social and non-social stimuli. Blood oxygen level dependent (BOLD) responses were extracted from the insula and somatosensory cortex as time series data. A windowed cross-correlation analysis with a peak-picking algorithm was applied to assess synchrony between these two regions. Windowed cross correlation measures synchronization on a discrete time scale by quantifying the strength of the correlation between two time series, while allowing for non-stationarity of the lag and signals. The peak picking algorithm identifies the maximum correlation by adjusting the lag times between the two time series until the maximum correlation is identified. The mean peak correlation is a measure of synchrony between the two datasets and aids in identifying the optimal lag time between two covarying regions of interest. **RESULTS:** We found greater activation in the somatosensory cortex for social tactile stimuli compared to non-social stimuli ($Z=4.56$, $p<0.01$). Our level one analysis has found mean peak correlation of $M=0.65$ ($SD=0.14$), $M=0.45$ ($SD=0.22$), $M=0.46$ ($SD=0.18$), $M=0.52$ ($SD=0.20$), $M=0.60$ ($SD=0.17$), $M=0.62$ ($SD=0.26$), $M=0.61$ ($SD=0.21$), $M=0.60$ ($SD=0.12$), $M=0.67$ ($SD=0.20$) for participants one through nine, respectively. **CONCLUSIONS:** We will continue data collection to increase our sample size (expected $n=15$) and optimize our preprocessing pipeline. Final analysis will include linear regression to predict behavioral sensitivities within the tactile domain, as measured by the perceptual sensitivity subscale of the Revised Infant Behavior Questionnaire. This research has implications for predicting biomarkers of potential neurodevelopmental disorders, like autism, in which tactile sensitivity is present in 60% of those diagnosed.

1-I-55 Similar topography of parietal cortical thickness represents generalized anxiety symptoms across development

Chaebin Yoo¹, M. Justin Kim¹

¹Sungkyunkwan University

BACKGROUND AND AIM: Generalized anxiety disorder (GAD) is known as a very common but damaging condition with high comorbidity rates, which is mainly characterized by excessive worry on a range of concerns and various somatic symptoms. Stable brain features such as cortical thickness are often used as predictors of individual risk in psychopathology, but research on cortical thickness and generalized anxiety have yielded largely inconsistent results. **METHODS:** Here, adopting an inter-subject representational similarity analysis (IS-RSA) framework and using a sample of 253 adolescents and emerging adults from the Healthy Brain Network dataset, we report a non-linear relationship between generalized anxiety symptoms (self-reported SCARED-GAD scores) and vertex-wise cortical thickness in the parietal regions. **RESULTS:** Significant correlations (FDR-corrected) were found between the generalized anxiety similarity matrix, which assumes higher similarity among more anxious subjects, and the cortical thickness similarity matrices of the right superior parietal cortex ($r=.197$, $p=.0004$), left superior parietal cortex ($r=.195$, $p=.0002$), precuneus ($r=.163$, $p=.0028$), postcentral gyrus ($r=.157$, $p=.0043$), and pericalcarine cortex ($r=.148$, $p=.0020$). Such pattern of shared geometries did not emerge when the generalized anxiety symptoms were assessed by the parents instead of self-report. **CONCLUSIONS:** Our findings suggest that participants with high generalized anxiety symptoms showed greater topographical similarity in cortical thickness of these regions. These findings complement previous research in discovering trait-like brain structural biomarkers of anxiety disorders and may potentially serve as a diagnostical aid of GAD. **ACKNOWLEDGEMENTS AND FUNDING:** This research was supported by the National Research Foundation of Korea (NRF-2021R1F1A1045988).

1-I-56 The influence of intention, outcome, and membership on children's moral judgments

Rongjun Yu¹, Di Song¹

¹Hong Kong Baptist University

Intention plays a critical role in mature morality. Adults typically judge actions based on agents' intention rather than merely on outcomes. Developmental studies have shown that young children tend to make moral judgments on the outcomes of actions. Previous studies also demonstrated in-group favouritism, that is, the tendency to favor one's own group above other groups. We hypothesize that group membership may influence basis intention-based morality and hence leads to in-group bias. Using a modified dictator task combined with a reverse operation, we examined the impacts of agents' intention and final outcome on individuals' moral judgment. The membership of actors was manipulated such as the actors and receipts could be either in-group members or out-group members. There were 108 children aged from 5 to 7 years old participated in two experiments. Children were asked to evaluate proposers in the Dictator's Game either as the third party (Experiment 1) or as the second party (Experiment 2). We showed that 5-7 y-olds shown stronger in-group favouritism when proposers had selfish intentions and when individuals were the receipts in the game. No in-group bias was found when proposers' intention was good, suggesting that individuals favour their own members over out-group members only when these in-group members had bad intentions. Our findings revealed the nuanced effects of membership on intention-based moral judgment.

1-K-57 Differences in conversation behaviour relate to the resting state functional connectivity of Left-IFG

Dhaval Bhatt¹, Jeremy Huckins¹, Andrew Campbell¹, Meghan Meyer²

¹Dartmouth College, ²Columbia University

BACKGROUND AND AIM: Among the types of social interactions humans engage in, in-person conversations play a key role in maintaining social networks (Dunbar, 2018) and regulating behaviour (Orehek & Lakey, 2011). Yet, how real-world conversations impact neurophysiology remains vastly underspecified. Here, we utilize a passive mobile sensing paradigm to ask: 1) how do real-world conversation patterns during the previous months relate to neurophysiology the day of the scan and 2) do resting state patterns during the scan predict future conversation behaviour? **METHODS:** Our research combines mobile sensing with resting-state fMRI. Specifically, participants in this study had an app on their smartphones that passively quantified the amount of conversation they engaged in for ~4 months, as detected via their phone's microphones. Participants also completed a resting state fMRI scan around the midpoint of their mobile sensing data collection. **RESULTS:** We show that the average duration of conversations during the prior month, but not the future month, relate to resting state functional connectivity profiles between default mode network (DMN) regions and the left inferior frontal gyrus (L-IFG), a node in the dorsomedial DMN subsystem. Additionally, inter-subject representational similarity analysis (IS-RSA) revealed that people with similar day-of-scan resting state functional connectivity profiles between LIFG and other DMN regions engage in similar, subsequent conversation patterns the following week. **CONCLUSIONS:** Our results suggest a two-way relationship between conversation behaviour and neurophysiology. Specifically, functional connections between the LIFG, a region consistently associated with language and self-regulation, and DMN regions consistently associated with social cognition, are impacted by past and shape future conversation behaviour. **ACKNOWLEDGEMENTS AND FUNDING:** We acknowledge Prof. Andrew Campbell's group for designing the Student Life App, used for mobile-sensed data collection. We also acknowledge Prof. James Haxby and Dr. Jeremy Huckins for their aid in the fMRI data collection. This research is supported by NIH's R01 research grant.

1-K-58 The structure of social memory: People as contexts

Eshin Jolly¹, Sushmita Sadhukha¹, Maryam Iqbal¹, Zainab Molani¹, Taylor Walsh¹, Luke Chang¹

¹Dartmouth College

BACKGROUND AND AIM: How do we represent and remember others? Social cognitive neuroscience has primarily focused on person-specific features: attributes and trait impressions we form by observing others' actions and inferring their intentions and mental states (Tamir and Thornton 2018; Fiske et al. 2007). On the other hand, a growing literature in learning and memory has demonstrated how encoding context in relational representations is critical for building useful cognitive maps to facilitate prediction in spatial but also abstract spaces (Whittington et al. 2022). We test the idea that people can act as contexts just like space and time, and that relationships between individuals serve as the structural basis for social memory and person representation. **METHODS:** 36 participants watched 3 hours of a character drama and completed 3 naturalistic memory tasks recalling individuals from the show: (a) a free-recall task of character identities; (b) a cued recall task testing cued categories that reflect hypothesized dimensions of social representation in the literature (actions, places, traits, people); (c) an open-ended content recall task about each character from the show. Critically, unlike previous work we didn't train participants to learn specific relationships (e.g. Park et al. 2021) or social features (e.g. Son et al. 2021). Instead we applied several naturalistic data analysis strategies to participants' memories directly including: intersubject similarity analysis, consensus-driven accuracy scoring, and natural-language-processing (NLP) techniques like latent-semantic-analysis (LSA) to directly model the content of specific character memories. **RESULTS:** Probing memories using people relative to locations, actions, and traits elicited the most similar memories and explained the most variance in recalls across individuals. The contents of these memories were also most similar in terms of embeddings based on relationships between characters rather than actions, places, or traits. Freely recalled character identities were structured according to observed social relationships between characters (social graph communicability) and participants' beliefs about the relationships between characters, rather than similarity of other social and non-social features. Lastly, we propose a computational model inspired by contextual memory models (e.g. Polyn et al. 2009) for how the process of person reinstatement can serve as a context and thus structure social memory. **CONCLUSIONS:** Our results suggest that the representation and recall of individuals is organized around their relationships with others rather than

the similarity of person or situation specific attributes such as individual traits, social groups, locations, or actions. This raises the possibility that the same cognitive and neural machinery utilized for abstract relational encoding and representation in non-social domains, may be repurposed for encoding and representing social information.

1-K-59 Social support and default mode network connectivity in aging adults

Minah Kim¹, Morgan Lynch², James Morris¹

¹University of Virginia, ²University of Southern California

BACKGROUND AND AIM: Social relationships can be difficult to form and sustain for older adults, who on average report declines in emotional support provided, satisfaction with support exchanges, and anticipation of support (Shaw et al., 2007). However, aging adults exhibit vast individual differences in these scores, and the variability is only partially explained by gender, race, and education. The Default Mode Network (DMN) is a resting-state network that is anatomically composed of the regions of the brain often associated with social cognition (Buckner & Carroll, 2007). Researchers have found that a greater activation of social brain regions during rest can improve social memory and efficiency of social judgments (Spunt et al., 2015, Meyer et al., 2019). This suggests that greater activation of the DMN translates to behavioral effects in the social domain. We examined whether functional connectivity within the DMN during resting state fMRI could predict self-reported measures of social support in healthy aging adults, while controlling for age, education level and cognitive abilities. **METHODS:** Participants were 92 healthy adults (Mage = 68.35, SDage 5.69) who completed a 8m 18s resting state scan with their eyes open (MFD < .2). The time series of four regional nodes from the DMN were extracted using the Multi-Subject Dictionary Learning Atlas (medial prefrontal, left and right angular gyrus, posterior cingulate), and functional connectivity was measured via correlations. We used a Bayesian regression model with uninformative priors and a No-U-Turn Sampler to estimate the coefficient distributions of our functional connectivity measures with age, education level, vocabulary and processing speed measures added as covariates. The social support response variable was calculated using an exploratory factor analysis (RMSR = .06) and composed of four social network questionnaire items (Krause, 1999): Emotional Support Provided, Emotional Support Received, Informational Support Provided, Informational Support Received. **RESULTS:** We found that increased connectivity between the medial prefrontal cortex and the posterior cingulate cortex was related to greater social support (OR=1.41, M= .34, 95% CI: .047-.642). There were no other meaningful predictors. **CONCLUSIONS:** Our preliminary findings suggest that provided and received social support in aging adults varies as a function of intrinsic brain activity, rather than cognitive abilities or age. Future work will use a simplified model and a longitudinal dataset to predict individual differences in changes to social support and test the utility of neural markers in understanding the social wellbeing of aging adults. **ACKNOWLEDGEMENTS AND FUNDING:** We thank Timothy A. Salthouse for access to the Virginia Cognitive Aging Project (National Institute on Aging Grant AG024270). This research was supported by NSF Grant 1657726.

1-K-60 Emotion for motion: Characterizing the open-loop pathway and amygdala-prefrontal contributions

Joanne Stasiak¹, Jingyi Wang¹, Neil Dundon¹, Elizabeth Rizer¹, Christina Villanueva¹, Taylor Li¹, Scott Grafton¹, Regina Lapate¹

¹University of California, Santa Barbara

BACKGROUND AND AIM: Emotions can be a powerful moving force, often with physiological and behavioral consequences. Facilitatory effects of emotion-induced action tendencies are evident in paradoxical kinesia (PK), a condition wherein individuals with Parkinson's Disease are able to move fluidly under surprising or emotionally arousing circumstances (Distler et al., 2016). PK often occurs in response to salient experiences, suggesting a modulatory role of saliency-encoding subcortical regions (amygdala, ventral striatum, and ventral putamen) on primary motor function, which form the little-understood 'open-loop' pathway (Kelly & Strick, 2004). Here, we employed a threat-of-shock paradigm in the MRI scanner to (a) test whether emotional arousal facilitates movement via the open-loop pathway; and (b) characterize amygdala-connected prefrontal (PFC) involvement in tracking emotional arousal experienced during goal-relevant threat. **METHODS:** Goal-relevant anticipatory threat was induced via a countdown procedure to shock administration, which could be avoided via time-sensitive motor action. Shock intensity and controllability were orthogonally manipulated: in 'controllable' trials, participants made a motor response to avoid 'mild' or 'unpleasant' shocks; in 'uncontrollable' trials, a shock was always received. Participants reported their experienced emotional intensity after each trial. **RESULTS:** First, we examined open-loop circuitry involvement during threat-motivated escape. Goal-relevant threat induced changes in emotional arousal and motor action: self-reported emotional arousal was highest in controllable-unpleasant trials ($F=71.89, p<0.001$), which also produced the highest motor performance accuracy ($F=4.75, p=0.002$). Suggesting open-loop involvement, basolateral amygdala activation was greater in controllable-unpleasant (vs. uncontrollable-unpleasant) trials (whole-brain corrected $Z=2.3, p<0.001$). Given recent work suggesting that the frontopolar cortex integrates amygdala-originated signals and goal-relevant information for the control of motivated behavior (Lapate et al., 2022; Bramson et al., 2020), we examined whether changes in subjectively-experienced emotional arousal during threat anticipation were tracked in PFC. A parametric modulation model indicated that the frontopolar cortex tracked trial-wise changes in subjectively-experienced arousal during threat anticipation activation across all conditions (whole-brain corrected $Z>2.3, p<0.001$). Future analyses will examine the role of amygdala-VS coupling on M1 engagement to further characterize how the open loop circuitry may promote successful escape from threat. **CONCLUSION:** Our results unveil robust facilitatory effects of emotion on motor action, which rely in part on the 'open-loop' circuitry. These results also indicate that changes in subjectively experienced arousal during goal-relevant threat are tracked by amygdala-interconnected frontopolar cortex.

1-L-61 Guilt-aversion motivates civic honesty

Youn Ji Choi¹, Luke Chang¹, Amanda Brandt¹, Alec Smith²

¹Dartmouth College, ²Virginia Tech University

A large-scale field study found that people around the world were more likely to incur an effort cost to return a lost wallet when it contained money compared to being empty (Cohn et al. 2019). The authors argue the primary motivation underlying this behavioral effect was a combination of altruistic concern and aversion to feeling like a thief. We propose an alternative psychological account based on emotions, in which people are motivated to return the wallet to avoid feeling guilt (Chang and Smith 2015). We tested the predictions of our computational model of guilt-aversion using the hypothetical lost wallet task in 513 participants. Consistent with our hypotheses, we found that participants reported feeling more anticipated guilt when wallets contained more money. In addition, we further manipulated participants' beliefs about the wallet owner's level of disappointment, and found that greater levels of expected disappointment monotonically increased participants' reported guilt. Finally, we found that guilt significantly mediated the original theft-aversion finding. Overall, we successfully replicated a large-scale study of civic honesty and, consistent with our hypotheses, find that a computational model of guilt-aversion provides a better explanation of participants' motivations to engage in altruistic behavior than the original proposal of not wanting to feel like a thief. Moreover, this work demonstrates the importance of developing formal models of psychological constructs in making quantitative predictions of behavior in novel experimental contexts.

1-L-62 How the statistical information of other's donation influences individual donation behavior

Tao Jin¹, Iris Vilares¹

¹University of Minnesota-Twin Cities

BACKGROUND AND AIM: People commonly engage in prosocial behaviors, actions intended to help or benefit others, which are susceptible to peer influence. Previous research on prosocial conformity primarily focuses on a single piece of social information (e.g., the averaged donation, the majority donation of a group). Instead, in the era of information explosion, we are often sequentially exposed to a large amount of diverse social information piece by piece. However, despite its prevalence, it remains unclear how a sequence of social information derived from different exemplars changes individuals' prosocial decisions, especially charitable donations. **METHODS:** The current study investigated the effect of the mean (Low vs. High) and standard deviation (Low vs. High) of social information on individual donations. Participants ($n=317$) were randomly assigned to one of four conditions. They completed a charitable-donation task at first. After observing five others' donations, they had a chance to adjust their initial donations. **RESULTS:** We found that participants observing a high average donation amount from others increased their averaged donations, whereas those observing small average donations decreased their own donations. However, we found no effect of the spread of others' donation on individual averaged donation shifts. In addition, the dispersion of individual donation amounts from the group norm decreased significantly after encountering social information in all groups. More interestingly, personal donations converged to the group norm much more after being confronted with others' donations with low variability compared to high variability. **CONCLUSIONS:** These findings deepen our understanding of how statistical information of others' donations influences individual donation behavior, providing evidence for the effectiveness of the average level of social information in shifting individual prosociality, and the role of the diversity of opinions on individual convergence toward the group norm.

1-L-63 Parenting and mating motivation and brain function in expecting fathers

Minwoo Lee¹, Paige Gallagher¹, Carolyn Zhou¹, Michael Shi¹, Michael Treadway¹, James Rilling¹

¹Emory University

BACKGROUND AND AIM: In many bi-parental species, males experience biological changes during their transition to fatherhood that prepare them to increase investments in parenting effort and decrease investments in mating effort. Human males experience hormonal changes across this transition, but whether they also experience changes in brain function has not been investigated. Here we designed an effort-based decision-making task in which men were given the opportunity to exert effort to view either infant or adult female stimuli of different reward magnitude. **METHODS:** Participants included 32 first-time, expecting fathers (32.69 ± 3.68 years) and 27 partnered non-fathers (30.19 ± 5.81 years). Expecting fathers were enrolled between 4-5 months of their partner's gestation. In this longitudinal study, men will be followed at multiple time points over the course of 17 months until their infant is one year of age. The current analysis is based only on the initial scans collected prenatally. During fMRI scanning, participants chose whether to accept or reject a series of trials in which both effort level and reward magnitude were varied. 24 trials involved infant pictures and 24 trials involved adult female pictures. **RESULTS:** Expecting fathers accepted fewer female trials compared with non-fathers ($t = -2.10$, $p = 0.040$) but there was no significant difference in the proportion of accepted infant trials between fathers and non-fathers ($t = 0.66$, $p = 0.512$). Overall, men showed stronger activation in the nucleus accumbens to female trials as compared to infant trials, both during anticipation and during viewing of the photographs. On the other hand, men showed stronger activation to viewing infant photographs than female photographs within the insula and secondary somatosensory cortex, regions implicated in emotional empathy. Activation was generally similar for expecting fathers and non-fathers, with one notable exception. As the reward value of infant stimuli increased, expecting fathers more strongly activated the precuneus compared with non-fathers. The precuneus is involved in cognitive empathy and has been reported to uniquely experience changes in gray matter thickness across the transition to fatherhood. **CONCLUSIONS:** Our results suggest that first-time expecting fathers have decreased motivation to view adult female stimuli. Although we found no evidence of a difference between expecting fathers and non-fathers in their neural response to adult female stimuli, expecting fathers responded more strongly to infant stimuli within the precuneus, suggesting that they may

already be experiencing neurobiological changes that prepare them to be more empathic towards their infants and partners. Alternatively, they may have pre-existing neurobiological differences that make them more likely to become fathers.

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1-L-64 The moral or the efficient: The neurocognitive bases underpinning the effect of efficiency on reciprocity in affective dilemma context

Rui Liao¹, Xintong Li², Xiaolin Zhou¹, Xiaoxue Gao¹

¹East China Normal University, ²Peking University

Imagine that you received equivalent help from two benefactors simultaneously, one helped altruistically without any expectation for repayment and the other helped with strategic intention of obtaining your repayment in the future. Whom would you choose if you could only choose one of them to reciprocate? Would you change your mind if reciprocating the other benefactor was more efficient? Here, we combine an interactive game with functional magnetic resonance imaging (fMRI) to probe into the neurocognitive mechanisms underlying how individuals make reciprocal choices in this dilemma context and how the efficiency of reciprocity modulates this process. In each round of the interactive game, the participant received equivalent help from two benefactors simultaneously and decided which one to reciprocate. One benefactor knew that the participant could reciprocate after receiving help (i.e., strategic benefactor), whereas the other benefactor was informed that the participant had no chance to reciprocate after receiving help (i.e., altruistic benefactor). We further manipulated the efficiency of reciprocity by independently varying how much each token the participant reciprocated was worth to each benefactor. Applying behavioral regression analysis and neuroimaging multivariate pattern analysis (MVPA), the current study found that, participants were more likely to choose the altruistic benefactor when faced with equal efficiencies of reciprocating the two benefactors. The frequency to choose the altruistic benefactor in this dilemma varied largely across individuals, and was mainly represented in the orbitofrontal cortex. Moreover, the efficiency of reciprocity significantly modulated participants' concerns on emotional responses to the two benefactors, which in turn modulated their reciprocal choices. Specifically, participants tended to experience more feelings of communal concern (gratitude and guilt) when faced with the altruistic benefactor and feel more obligation to repay when faced with the strategic benefactor. More efficient reciprocity for the altruistic benefactor brought increased considerations on feelings of communal concern during reciprocity, with the representation of this individual difference mainly involved the ventromedial prefrontal cortex. More efficient reciprocity for the strategic benefactor induced increased considerations on obligation during reciprocity, with the representation of this individual difference mainly involved the dorsomedial prefrontal cortex. These results extended our understanding on neurocognitive bases of reciprocity and the emotional motivations behind this process.

1-L-65 Endogenous oxytocin in social-cognitive aging: Interactions of plasma levels and receptor gene methylation on empathy

Rebecca Polk¹, Tian Lin¹, Kylie Wright¹, Kathleen Krol², Allison Perkeybile², Hans Nazarloo³, Sue Carter³, Jessica Connelly², Natalie Ebner¹

¹University of Florida, ²University of Virginia, ³Indiana University

BACKGROUND AND AIM: Oxytocin (OT) is a neuropeptide associated with a wide array of social-cognitive functions, including empathy, which is the ability to perceive and share emotional states of others. While research commonly investigates exogenously administered OT, less understood is the role of the endogenous OT system (e.g., plasma OT levels [pOT] and OT receptor methylation [OXTRm]) as critical pieces in OT's mechanisms of action in social cognition. Further, previous OT research on this topic has almost exclusively been in younger adults, despite well-documented age-related changes in social cognition including in empathy. Extending this previous work to older adults, here we investigated the effects of pOT and OXTRm on empathy in healthy aging. **METHODS:** Data from 160 healthy older adults (31% women; aged M=71.3 yrs, SD=7.4) who participated in a larger clinical trial investigating OT's role on cognitive, socioemotional, and physical functioning in aging (NCT02069431) were analyzed for this project. The protocol was IRB approved, and all participants provided informed written consent. Participant blood samples underwent highly sensitive Enzyme Immunoassay (Enzo Life Sciences, Inc.) to quantify unextracted pOT. OXTRm at site 934 was determined through pyrosequencing using PyroMark Gold Q24 reagents (Qiagen, Hilden, Germany), with increased methylation associated with reduced expression of the OT receptor gene (Perkeybile, 2019). Participants completed two questionnaires assessing empathy: 32 items from the Empathy Quotient (EQA; Baren-Cohen, 2003) with 6 additional items on altruism (Lee & Ashton, 2018), and the Toronto Empathy Questionnaire (TEQ; Spreng et al., 2009), with higher scores indicating higher empathy. We conducted linear regressions with pOT, OXTRm, and their interaction as independent variables predicting empathy. We assessed the two empathy measures (EQA and TEQ) in separate models. Chronological age and sex were entered as covariates. Statistical significance was set at $p < .05$. **RESULTS:** EQA empathy was positively associated with pOT, with this main effect qualified by a significant pOT by OXTRm interaction, in that higher OXTRm levels were associated with less empathy in individuals with higher pOT, while there was less influence of OXTRm on empathy in those with lower pOT. We observed a comparable trendwise effect in the same direction for TEQ empathy. The covariate effect of sex was significant in both models. **CONCLUSIONS:** These results support a modulatory role of both pOT and OXTRm, and their interplay, on empathy in aging. Future research will extend this work into other social-cognitive capacities that show age-related alterations and into individuals at risk into developing Alzheimer's disease and related dementias towards enhancing understanding of the endogenous OT system in healthy and pathological aging. Also, sex-dimorphisms in these relationships will be further explored.

1-L-66 Effects of a cognitive empathy intervention on caregiver brain function and mental health

James Rilling¹, Minwoo Lee¹, Sophie Factor¹, Joseph Kim¹, Paige Gallagher¹, Carolyn Zhou¹, Julie McIsaac², Kenneth Hepburn³, Molly Perkins⁴

¹Emory University, ²Anchor Psychological Services, ³Emory University School of Nursing, ⁴Emory University School of Medicine

BACKGROUND AND AIM: Caring for patients with dementia can be highly stressful and is associated with a variety of negative mental health outcomes, including depression and anxiety. One factor that has been linked with lower subjective stress and depression among dementia caregivers is high levels of cognitive empathy. A substantial literature shows that cognitive empathy, often referred to as reflective functioning, benefits other types of caregiving relationships such as the parent-child relationship. We developed and implemented a simple photo-captioning intervention designed to increase cognitive empathy in caregivers of adult dementia patients. **METHODS:** Participants were twenty caregivers (18 female) between the ages of 25 and 71 years (M=53 years) with Zarit Burden Scale scores of 24 or higher. Prior to the intervention, participants completed several mental health questionnaires, and their brain function was measured with fMRI as they viewed photographs of and attempted to empathize with their own patient, as well as an unknown patient and a friend, all matched on age, sex and race. Afterwards, they completed a 10-day intervention in which they took 3-5 photographs of their patient each day and captioned each photo with what they imagined the patient was thinking or experiencing at that moment in time, in the context of the situation, experience and relationship. After the intervention, participants again completed the mental health questionnaires and received another fMRI scan. **RESULTS:** Results show a significant decrease in Zarit Caregiver Burden ($t = -3.46, p = 0.003$) and State/Trait Anxiety ($t = -2.92, p = 0.009$) from pre- to post-intervention, as well as a significant increase in the perspective-taking scale of the Interpersonal Reactivity Index (IRI) ($t = 3.00, p = 0.007$). In addition, participants showed an intervention-related increase in neural activation within two of our three a-priori cognitive empathy ROIs. Specifically, within the right temporo-parietal junction (rTPJ) ($t = 1.76$, one-tailed $p = 0.047$) and dorsomedial prefrontal cortex (dmPFC) ($t = 1.89$, one-tailed $p = 0.037$), there was a pre- to post-intervention increase in activation for the contrast (own patient-unknown patient). This difference did not reach significance for the third ROI in the precuneus ($t = 1.35$, one-tailed $p = 0.096$). **CONCLUSIONS:** This pilot study suggests that a photo-captioning intervention may be effective in increasing cognitive empathy and related brain function in caregivers, as well as improving caregiver mental health. A larger clinical trial aimed at replicating and extending these findings is warranted. **ACKNOWLEDGEMENTS AND FUNDING:** Supported by the Emory Roybal Center for Dementia Caregiving Mastery, the Emory University Alzheimer's Disease Research Center, and the Emory Center for Health in Aging.

1-L-67 Applying EEG microstate analysis and process dissociation to moral dilemmas

David Simpson¹, Kyle Nash¹

¹University of Alberta

BACKGROUND AND AIM: There is considerable evidence linking slow, deliberative reasoning (system 2) with utilitarian judgments in dilemmas that involve sacrificing another person for the greater good (other-sacrificial dilemmas). However, the evidence on whether system 2 is associated with utilitarian judgments in self-sacrificial dilemmas is more mixed. We sought to test whether utilitarian judgments in self-sacrificial dilemmas are associated with system 2. **METHODS:** We employed process dissociation to measure a self-sacrificial utilitarian (SU) parameter, an altruism (A) parameter, an other-sacrificial (OU) utilitarian parameter, and a deontology (D) parameter. In Study 1 and Study 2, we used the cognitive reflection test to measure reliance on system 2. In Study 3, we used EEG microstate analysis to see if utilitarian responses (SU and OU parameters) are associated with resting-state microstate D, a pattern of EEG topography reliably demonstrated in resting-state activation that has been associated with system 2 processing. **RESULTS:** In exploratory (Study 1) and pre-registered confirmatory (Study 2) analyses, the cognitive reflection test (CRT) positively correlated with both the SU and OU parameters. Study 3 is currently ongoing. We will test whether the SU and OU parameters positively correlate with EEG microstate D. **CONCLUSIONS:** The psychometric evidence supports the hypothesis that there is an association between system 2 and utilitarian judgments, including self-sacrificial dilemmas. EEG microstate analyses will be completed for the conference.

SANS Conference Abstracts



Poster Session 2

Friday, April 28

16:30 - 18:00

2-C-1 Neural signature of negative affect predicts memory

Faustine Corbani¹, Asieh Zadbood¹, Anisha Marion², Megan Speer¹, Barbara Stanley³, John Mann³, Lila Davachi¹, Kevin Ochsner¹
¹Columbia University, ²The University of Utah, ³New York State Psychiatric Institute

BACKGROUND AND AIM: Emotional arousal is widely known to enhance memory of events. While previous work on this topic has focused primarily on the amygdala, it is increasingly recognized that emotions are the product of distributed patterns of activity. It remains unclear, however, how these patterns are related to memory. Here, we aim to determine whether subsequent memory is predicted by whole-brain patterns associated with negative affective responses during image-encoding. **METHODS:** During an MRI scan, 38 participants saw three 9-minute blocks of either neutral or negative images that they had to recall during a surprise memory test the next day. We used a trial-based individual least squares separate (LSS) modeling approach to extract whole-brain coefficient maps for each of the image-viewing trials for each participant. Then, we calculated the degree of similarity between the whole-brain beta weighted maps from our individual LSS models and a multivoxel whole brain pattern of negative affect called PINES. We compared the strength of the expression of the PINES signature across trial type (i.e. For negative and neutral images) to validate the use of the signature in our dataset. We next used binomial linear mixed effects models to examine whether strength of the expression of the PINES signature at the trial and run level predicted the likelihood of subsequently remembering an image. **RESULTS:** As expected, memory was significantly enhanced for emotional ($M = 0.67$, $sd = 0.18$) compared to neutral [$M = 0.44$, $sd = 0.21$; $t(58) = 4.417$, $p < 0.001$] images. Expression of the PINES signature was also significantly stronger for emotional images (mean = 0.595, $sd = 0.829$) compared to neutral images [mean = -0.595, $sd = 0.783$; $t(63) = 5.994$, $p < 0.001$]. Crucially, greater PINES score in response to an image was associated with significantly greater predictive likelihood of remembering that image ($b = 0.269$, $se = 0.081$, $p < 0.001$). This result held for both neutral ($b = 0.307$, $se = 0.080$, $p < 0.001$) and emotional images ($b = 0.225$, $se = 0.095$, $p < 0.05$). Interestingly, however, this result did not replicate when looking at the relationship between memory and mean expression of the PINES signature across the entire run. Indeed, these results were neither significant for the emotional ($b = 0.0002$, $se = 0.0003$, $t(28) = 0.572$, $p = 0.572$) nor the neutral ($b = 0.0005$, $se = 0.0004$, $t(28) = 1.228$, $p = 0.23$) run. **CONCLUSIONS:** Whole-brain markers of negative affective responding can predict the likelihood of remembering both neutral and emotional stimuli. Notably the strength of the neural signature of negative affect predicted memory of individual trials but not entire runs, which suggests that this method of identifying emotion-related memory enhancements is quite sensitive to the idiosyncratic strength of an individual's response to a specific stimulus. **ACKNOWLEDGEMENTS AND FUNDING:** The study was supported by CONTE Grant No MH090964 from NIMH.

2-C-2 Continuous expression of multivariate neural signatures during naturalistic imaging

Nir Jacoby¹, Eshin Jolly¹, Tor Wager¹, Luke Chang¹
¹Dartmouth College

In the last decade, one of the more promising developments in functional neuroimaging is the use of multivariate pattern analysis to identify spatially distributed brain representations that are sensitive and specific signatures of specific psychological states (e.g. Pain, Reward, Emotion schemas). These signatures not only have the potential to increase the interoperability and reproducibility of neuroimaging work, but may also facilitate the scientific study of affect in the absence of self-report. However, construct validation of these neural signatures has largely been restricted to simple experimental paradigms, and very little is known about the generalizability of these signatures to broader experimental contexts such as resting state and naturalistic paradigms. In this study, we used 45 existing neural signatures that have been trained to capture various affective states using traditional task-based experimental paradigms and extracted their expression over time from a naturalistic imaging dataset (Friday Night Lights). In a series of exploratory analyses, we find substantial variability between the different signatures and the consistency of their prediction across individuals using intersubject-correlation. We find modest evidence that these signatures may be capturing broad changes in positive and negative affect that aligns with self-reported feelings and behavioral changes in facial expressions using a cross-experiment latent factor analysis. Finally, we observed that the data and methods used to train the models substantially impacts how the models perform in novel contexts. For example, whole brain models trained on visual paradigms (e.g., IAPS) tend to reflect properties of the visual stimulus that are uncorrelated with affect in naturalistic contexts (e.g., luminance). Altogether, these results show some promise for neural signatures in capturing affective experiences in new experimental contexts yet highlight important cautions about the specificity of the psychological constructs being captured when using these models as a continuous measurement of mental states.

2-C-3 Manipulating behavioral avoidance and subjective experience using an encoding model of human amygdala activity

Grace Jang¹, Philip Kragel¹
¹Emory University

BACKGROUND: Emotions—a central feature of the human experience—are thought to be driven by situations evolutionarily linked to survival. Networks centered on the amygdala coordinate the evaluation of threats and defensive behaviors across mammalian species. However, the role of the human amygdala in the subjective experience of emotion, especially of fear, is debated. The amygdala could influence affective experience indirectly through its effects on autonomic and skeletomotor systems, or more directly by encoding information about emotionally significant events. Here we examine the nature of information encoded in the amygdala, and whether variables encoded by the human amygdala play a causal role in behavioral avoidance and emotional experience. **METHODS:** To assess the nature of variables represented in the amygdala, we developed linear encoding models of amygdala activity using archival data of passive viewing of emotion-laden, full length motion pictures. We used deep convolutional neural networks (DCNNs) to extract visual features from these videos and used them to predict patterns of blood-oxygen-level dependent (BOLD) response in the amygdala with multivariate partial least squares regression.

RESULTS: This revealed that earlier layers of the DCNN were better predictors of amygdala response (conv1: $z = 0.111$, 95% CI = [0.092, 0.131]; $p < .0001$) than later layers (fc8: $z = 0.009$, 95% CI = [0.005, 0.014]; $p = .0004$; $\Delta z = 0.102$, 95% CI = [0.086, 0.118]; $p < .0001$), with all layers exhibiting above chance performance. This demonstrates that the amygdala encodes both low-level and abstract visual features that could contribute to threat learning and emotional behavior. **PLANNED ANALYSES:** To test the causal contribution of these visual features to emotional experience, we plan to use the coefficients from encoding models as targets for deep image synthesis. Stimuli will be generated from both early and late layers of DCNNs that maximally activate response patterns in the amygdala and the inferotemporal cortex (a control region). We will evaluate if and how artificial stimuli produce avoidance behaviors and influence subjective emotional experiences in an online study ($n = 100$). The stimuli will be used as reinforcers in an avoidance learning task in which participants learn to select cues to approach or avoid stimuli that activate different brain regions. Repeated measures ANOVAs will be used to compare performance on avoidance learning tasks and subjective self-report ratings between control and amygdala-activating stimuli. We hypothesize that stimuli that enhance amygdala activity will specifically influence avoidance behavior and self-reported fear. **IMPLICATIONS:** The results from this study will provide insight into the involvement of the amygdala in the production of avoidance behaviors and subjective experience. This will provide a more complete and accurate description of the brain mechanisms that underlie emotions.

2-C-4 Dynamic connectome-based predictive model of affective experience during naturalistic viewing

Jin Ke¹, Hayoung Song¹, Zihan Bai¹, Monica Rosenberg¹, Yuan Chang Leong¹

¹University of Chicago

BACKGROUND AND AIM: Affective experience guides human thoughts and actions. Probing affective experience improves our ability to explain and predict behavior. Affective states are often measured using behavioral ratings along affective dimensions (e.g., valence, arousal) or emotion categories (e.g., joy, sad). However, obtaining these ratings continuously during a task is labor-intensive and disruptive to ongoing cognition. The current study derives a continuous and non-intrusive measure of affective experience during naturalistic movie watching and characterizes the neural signature of affective states from dynamic functional connectivity. **METHODS:** We downloaded two publicly available fMRI datasets of participants watching episodes of Sherlock (Chen et al., 2017) and Friday Night Lights (Chang et al., 2021). BOLD activity time series were extracted from the 114 cortical (Yeo et al., 2015) and 8 Brainnetome subcortical ROIs (Fan et al., 2016). To obtain behavioral measures of affective experience during these episodes, we recruited independent groups of participants to continuously rate either valence or arousal while watching one of the two episodes (average $n = 26$ for each condition). We next trained a support vector regression model to predict moment-to-moment, group-average behavioral ratings of valence and arousal from dynamic FC. The model was trained and tested within- and cross-dataset using leave-one-out cross validation. Model performance was computed as the Pearson correlation between behavioral ratings and model predictions. To assess statistical significance, we compared model performance against null distributions generated by computing the correlation between phase-randomized behavioral ratings and model predictions. **RESULTS:** When models were trained and tested on the same dataset, predictions significantly correlated with arousal (Sherlock: $r = .59$, $p < .05$; FNL: $r = .74$, $p < .01$) but not valence (Sherlock: $r = .55$, $p = .17$; FNL: $r = .53$, $p = .06$). Having two datasets enables us to test the generalizability of the models. We applied models trained on one dataset to the other. The arousal models generalized to FNL when trained on Sherlock ($r = .25$, $p < .01$) and to Sherlock when trained on FNL ($r = .22$, $p = .03$). However, the valence models were not generalizable cross-datasets (Sherlock to FNL: $r = -.01$, $p = .50$; FNL to Sherlock: $r = -.02$, $p = .64$). Visualizations of the arousal FC networks revealed the involvement of brain regions across multiple large-scale functional brain networks, including the default and control networks. **CONCLUSIONS:** Using naturalistic viewing data from open fMRI datasets, we built connectome-based predictive models to predict valence and arousal from dynamic FC. The current work presents a promising new approach to probe affective experience from fMRI data. The arousal models yielded significant predictions and generalized across datasets. Ongoing analysis attempts to predict valence from multivariate patterns of fMRI activity.

2-C-5 Dynamic and static non-linear fMRI models have similar performance when predicting subjective fear from fMRI data

Kieran McVeigh¹, Yiyu Wang¹, Ajay Satpute¹

¹Northeastern University

BACKGROUND AND AIM: Emotion experiences are thought to involve dynamic processes. In contrast, most fMRI studies summarize the neural correlates of emotion in a time-invariant manner. Such an approach assumes that a statistical summary over time provides a reasonable representation of the fMRI correlates of emotional experience. To test this assumption, we evaluated the performance between a range of analytical approaches with different temporal and different linearity assumptions. **METHODS:** Concretely, we compared the performance of a recurrent neural network (i.e. a dynamic, non-linear model) against two support vector regressions (a static linear and a static non-linear model). Each model was applied to an fMRI dataset in which participants ($n = 71$) watched 36, 20 second immersive video clips and rated their fear experiences after each video. Models were trained to predict fear ratings on individual videos with 5-fold cross validation procedure. We compared average Pearson's r between the predicted and actual fear ratings across the folds. **RESULTS:** All models performed above chance ($ps < .001$), however, the linear support vector regression performed significantly worse ($r = .44$), followed by the recurrent neural network ($r = .50$) and non linear support vector regression ($r = .50$). Steiger's t -tests showed both non-linear models outperformed the linear model ($ps < .05$), whereas the non linear models showed no significant difference in performance ($p > .05$). A virtual lesion analysis further showed that the patterns of functional network importance were similar between all three models, and exactly the same between the non-linear dynamic and static models. **CONCLUSIONS:** This work supports a nonlinear relationship between the BOLD signal and fear. Additionally this work suggests, at least for the relatively short video

clips used in this study, static and dynamic analyses perform comparably. **ACKNOWLEDGEMENTS AND FUNDING:** This work was supported by Division of Graduate Education (NCS 1835309), and the Brain and Cognitive Sciences Division (1947972) of the National Science Foundation.

2-C-6 Physical and social warmth: Effect of thermal stimuli on neural activity to emotionally evocative images

Alexis Pinela¹, Naomi Eisenberger², Tristen Inagaki¹

¹San Diego State University, ²University of California, Los Angeles

BACKGROUND AND AIM: At the end of the day, we may look forward to the comfort of a steamy shower, the feeling of our pet warming our lap, or being wrapped in the embrace of someone we love. All of which, are defined in part, by a strong sensation of warmth that offers relief and pleasure. Though warmth may not always be social in nature, more recent perspectives suggest warmth may serve as a proxy for social connection in certain contexts. Therefore, we predicted that physical warmth, by itself, would function as a proxy for social connection to reduce threat-related brain activity in response to negative emotional images.

METHODS: In the current study 41 participants completed an MRI scan as they viewed emotionally evocative images from the International Affective Picture System which were rated as both negative and high in arousal. In a block design, participants held a warm, cool, and room temperature object while viewing the images. After exiting the scanner, participants rated the warmth and pleasantness of the three objects and their subjective emotional experience of viewing the images (i.e., "how aversive/pleasant did you find the pictures during this time?"). **RESULTS:** As expected, the warm object was rated as warmer and more pleasant than both the cool and room temperature objects. However, in contrast to hypotheses, the warm (vs. cool and vs. room temperature) object led to increased, rather than decreased, activity in the DACC and AI to the images. Likewise, images were experienced as more aversive when holding the warm object, over both the cool and room temperature objects. Additionally, higher ratings of aversiveness were associated with greater DACC and AI activity to the images when holding the warm object. No association emerged for the cool object. **CONCLUSIONS:** Though findings do not reflect the expected relationship of physical warmth functioning similarly as social connection, this study nevertheless reveals evidence that peripheral information such as thermal feedback affects threat-related brain activity and affective experience. Results illustrate an opportunity for further investigation of how innocuous thermal information, such as warmth, affects general and focused perception in multiple contexts.

2-C-7 The role of heart rate variability in the endorsement of pity and sympathy

Sara Swaneck¹, Maha Rizvi¹, Nakia Gordon¹

¹Marquette University

PURPOSE: HRV is a proxy measure of regulated emotional responses through the autonomic nervous system (Appelhans & Luecken, 2006). While pity and sympathy are a response to an individual's distress, pity has a condescending tone (Geller, 2006) whereas sympathy is an expression of sorrow (Clark, 2010). Despite their affective differences, they are often used interchangeably. While studies have examined the role of HRV in emotional responses, few have examined its role in the endorsement of pity and sympathy. This is important as effective social connection requires individuals to take the perspective and affective tone of another person to communicate understanding while remaining regulated enough to offer prosocial support. Little to no research has examined whether HRV varies when individuals express differing levels of these emotions. This study aims to examine how HRV compares with the endorsement of pity and sympathy. We hypothesize that individuals reporting increased levels of these emotions will have greater HRV. We also hypothesize that individuals endorsing greater levels of sympathy rather than pity will have more fluctuations in HRV as research demonstrates that sympathy involves sharing in another's emotions and motivation to act; individuals endorsing more sympathy may have increased HRV as there is more interpersonal work involved. **METHODS:** Participants completed the two-part study with a friend they have known for at least four months. In the first session, dyads completed the McGill Friendship Questionnaire-Friend's Function (MFQ-FF) and identified three negative emotional stories they had not shared. In the second session, participants shared an emotional and neutral story with one another and provided emotional ratings at baseline and before and after each story (VAS 0-10). After completing the stories and ratings, participants completed the Interpersonal Emotion Regulation Questionnaire (IERQ). EDA, EEG, and HRV were measured throughout the interaction. **DATA ANALYSIS:** We will assess the relationship between pity, sympathy, and HRV. To assess whether individuals reporting increased levels of these emotions will have greater HRV, multiple Pearson correlations will be conducted. We will also investigate whether individuals endorsing greater levels of sympathy compared to pity will have more fluctuations in HRV since sympathy is considered a prosocial emotion. To test this relationship, an independent-sample t-test will be conducted. **IMPLICATIONS:** Our work will contribute to the understanding of the relationship between physiological regulation and real-time interpersonal emotions. This will allow us to develop a more in-depth comprehension of the mind-body connection, including how different emotions result in changes in autonomic nervous system activity. We will fill in gaps in the literature by investigating whether differences in how pity and sympathy are experienced will have behavioral and/or cognitive consequences.

2-C-8 Predicting bittersweet feelings from neural events during naturalistic movie watching

Anthony Vaccaro¹, Helen Wu¹, Rishab Iyer¹, Shruti Shakthivel¹, Nina Christie¹, Antonio Damasio¹, Jonas Kaplan¹

¹University of Southern California

BACKGROUND AND AIM: Most research in affective neuroscience has focused on traditional emotion categories (such as happiness, fear, or disgust) or bipolar scales of valence and arousal. Both of these approaches leave a significant gap in our understanding of affect, particularly for affective experiences subjects describe as mixed. Mixed feelings, reported as experiencing positivity, negativity, and often a sense of conflict simultaneously, are common, and occur across cultures.

Life events that trigger them are often ascribed significant meaningfulness. Mixed feelings also pose large questions for the field of affective neuroscience, particularly in highlighting whether positive and negative valence are processed on a spectrum, as independent constructs, or in some other manner. In this study, we have two main goals: 1) to determine if mixed feelings can be predicted by neural activity 2) to determine if various brain regions and networks differ in their ability to predict mixed feeling states as opposed to solely positive and negative feelings. **METHODS:** Thirty subjects are being scanned with fMRI while watching an animated short, which were previously validated in a separate sample as consistently inducing bittersweet mixed feelings. Outside the scanner, these subjects then re-watch the video and are asked to press buttons on and off to indicate when they felt positively, negatively, and mixed, when they were watching the video in the scanner. Our analysis will apply Hidden-Markov Models (HMM) to each subject's individual pre-processed BOLD signal time course. HMM will be applied to each subject's data to determine how accurately transition points between predicted distinct patterns of BOLD activity align with the times subject's reported that their feelings transitioned. Accuracy for each subject will be determined by the fraction of predicted transitions which occurred within a few second window of the subjectively reported transitions. Analyses will be run using voxels from six regions of interest: insular cortex, ventromedial prefrontal cortex, amygdala, posterior cingulate cortex, early visual cortex, and auditory cortex separately. We hypothesize that: 1) the insula, ventromedial prefrontal cortex, and posterior cingulate will encode distinct patterns of activity for positive, negative, and mixed segments of the film, and thus HMM predicted transitions will accurately align with subjects' self-report 2) amygdala activity will be predictive of periods of positive and negative feeling states, but not of reported mixed feelings 3) predicted transition points in visual and auditory cortex will not align with subjective reports. **IMPLICATIONS:** This study tackles a vastly understudied, yet important, topic for affective neuroscience. The methods used will allow for the study of more complex and difficult to describe affective states, and results will provide new evidence on how valenced experience is constructed.

2-C-9 Attention biases in affective processing assessed with eye-tracking: Measurement reliability and correlations with trait markers of mental health

Ulrike Basten¹, Klara Gregorova², Eva Heide³, Rebecca Rammensee¹, Benjamin Gagl⁴

¹University of Koblenz-Landau, ²University Hospital Würzburg, ³Goethe-University Frankfurt, ⁴University of Cologne

BACKGROUND AND AIM: Attention biases in affective processing have been associated with the development and maintenance of emotional disorders. Problems with the replicability of empirical findings on an association between attention biases and state or trait markers of positive affect and mental health have drawn attention to the low reliability of response time-based measures of individual bias. Dwell time measures acquired with eye-tracking during the free viewing of emotional stimuli were reported to provide more reliable measures of overt attention biases (Lazarov et al., 2018). The aims of the current study were (a) to replicate findings on the reliability of dwell time measures from eye-tracking in a non-clinical sample and (b) to extend previous research on associations between these measures and mental health by exploring associations with personality and resilience in a non-clinical sample. **METHODS:** For a sample of N = 77 adult participants, we collected eye-tracking data during the free viewing of emotional face stimuli. Participants looked at matrices of 4 x 4 photos of happy and sad facial expressions as it naturally occurred to them. We calculated attention bias scores as mean total dwell time on happy faces. To evaluate measurement reliability, we calculated estimates of internal consistency and 2-week test-retest correlations. In addition, we assessed trait markers of mental health using self-report questionnaires on anxiety, depressiveness, optimism, and resilience. Associations between the dwell time measure of attention bias and the trait markers of mental health were explored with correlational analyses. **RESULTS:** Measurement reliability for the attention bias score was excellent regarding internal consistency (mean Spearman Brown-corrected split-half correlation = .82) and acceptable regarding test-retest correlations (.68). In the exploratory analyses of associations with the self-report measures of personality and mental health, a more positive attention bias was associated with higher levels of trait resilience and optimism and lower levels of trait anxiety and depressiveness.

CONCLUSIONS: With our study, we replicate that eye-tracking measures of dwell time during the free viewing of emotional stimuli provide a reliable measure of individual differences in overt attention biases. While previous research had already demonstrated differences in dwell time biases between patients with emotional disorders (depression, social anxiety) and healthy controls, our study extends these findings by showing that differences related to trait markers of mental health can also be observed in non-clinical samples. This finding opens perspectives for using eye-tracking measures of affective processing to identify persons at risk for developing emotional dysfunction that might profit from preventive intervention offers.

ACKNOWLEDGEMENTS AND FUNDING: German Research Foundation, DFG grant SFB1193, project C06, PI: Ulrike Basten

2-D-10 Implicit emotion regulation: Exploring individual differences in the counter regulation of emotions by attentional biases in affective processing

Ulrike Basten¹, Helen Heyer¹, Rebecca Rammensee¹

¹RPTU Kaiserslautern-Landau

BACKGROUND AND AIM: Implicit emotion regulation is assumed to play an important role for resilience and mental health. It has been suggested that automatic attentional biases in favour of stimuli that are opposite in valence to a person's current affective state allow for a counter-regulation that can be understood as a form of implicit emotion regulation (Rothermund, 2003). Little is known about how individuals differ in their ability to regulate affective state by changes in attention biases. This study aimed to a) replicate counter-regulation effects previously shown for a word categorisation task and b) explore the suitability of the task for the assessment of individual differences in implicit emotion regulation. **METHODS:** 78 healthy participants completed a word categorisation task in which the valence of a word had to be evaluated as positive or negative. Correct and fast responses were followed by success feedback (assumed to induce a positive affective state), incorrect or slow responses to failure feedback (assumed to induce a negative affective state). To replicate previous findings, we tested for a counter-regulation effect across participants. To evaluate the suitability of the experimental paradigm for the assessment of

individual differences in implicit regulation, we estimated measurement reliability (internal consistency) for indices of the individual amount of counter-regulation. **RESULTS:** Across participants, we replicated the finding of faster response times for incongruent combinations of target valence and feedback valence ($F(1, 76) = 32.68, p < .001$): After positive feedback participants were generally faster in evaluating negative words and vice versa. In contrast to the original finding, this incongruity effect did occur regardless of whether attention had to be shifted between two consecutive targets of opposing valence (i.e., independent of a valence shift). However, reliability estimates for the individual indices of counter-regulation were rather low, not exceeding $r = .48$. **CONCLUSIONS:** Across participants, our findings support the notion of counter-regulation in valence processing in an even broader sense than previous studies. However, the experimental paradigm does not seem to be suited for a reliable assessment of individual differences in implicit emotion regulation. The observed incongruity effect can be interpreted as reflecting biases in early attentional processes that change with affective state. We discuss options to study the neural mechanisms underlying the effect focusing on event-related potentials modulated by early attentional processes. **ACKNOWLEDGEMENTS AND FUNDING:** The research described in this abstract was supported by the German Research Foundation (DFG grant SFB1193, project C06, PI: Ulrike Basten).

2-E-11 Altered interoceptive sensibility with intact interoceptive accuracy and awareness in functional neurological disorder

L. S. Merritt Millman¹, Eleanor Short¹, Biba Stanton², Joel Winston¹, Timothy Nicholson¹, Mitul Mehta¹, Simone Reinders¹, Mark Edwards¹, Laura Goldstein¹, Anthony David³, Matthew Hotopf¹, Trudie Chalder¹, Susannah Pick¹

¹King's College London, ²King's College Hospital NHS Foundation Trust, ³University College London

BACKGROUND AND AIM: Altered interoception may be a core pathophysiological mechanism in functional neurological disorder (FND). However, there have been inconsistent findings from interoceptive accuracy paradigms, with several studies reporting no significant group differences in comparisons to controls when tested at rest/baseline. This is contrary to evidence for alterations in other interoceptive dimensions including awareness (metacognitive evaluation of interoceptive accuracy) and sensibility (self-reported sensitivity to bodily sensations) in this population. We aimed to measure interoception across several dimensions, with the prediction that individuals with FND would show reduced accuracy, awareness, and sensibility compared to controls. **METHODS:** Individuals with FND ($n=17, 13F:4M, 10$ motor symptoms, 7 motor/seizures) and healthy controls (HC, $n=17, 13F:4M$) completed measures of interoceptive accuracy and awareness (modified heartbeat tracking task [HTT]) and a time estimation task (TET). Participants also completed a validated scale of interoceptive sensibility (Multidimensional Assessment of Interoceptive Awareness-2, MAIA-2). **RESULTS:** The groups were matched for age ($p=.51$), sex ($p=1.00$), and body mass index ($p=.19$). FND and HC groups did not differ in interoceptive accuracy ($p=1.00$) or awareness ($p=.99$), although the FND group displayed lower scores on the "Not-Distracting" ($p<.001, g=1.42$) and "Trusting" ($p=.005, g=1.17$) subscales of the MAIA-2, relative to controls. There was no relationship in either group between HTT and TET scores. There was a significant positive relationship between HTT accuracy and awareness (confidence) in the control group ($r=.61, p=.016$) but not in the FND group ($r=.11, p=.69$). Exploratory correlations revealed a significant positive relationship between interoceptive awareness and the "Self-Regulation" subscale of the MAIA-2 in the FND group ($r=.77, p=.002$). **CONCLUSIONS:** Individuals with FND did not differ from HCs on interoceptive accuracy or awareness, measured at rest. The lower levels of "Not-Distracting" and "Trusting" seen in this FND sample replicated our previous study, suggesting that there may be a separation between trait and state interoceptive awareness in FND, reinforcing the need for interoception to be considered within a multidimensional framework. The lack of relationship between interoceptive accuracy and awareness in the FND group also implies that there may be a disconnect between actual performance and subjective confidence. Our future work will explore the possibility that interoceptive impairments in FND may be state dependent, measuring these interoceptive domains with other paradigms, in larger samples, compared to both healthy and clinical controls. **ACKNOWLEDGEMENTS AND FUNDING:** The study was funded by King's College London and the Medical Research Council.

2-E-12 Investigating the influence of affective stimulation and experiential detachment on subjective functional neurological symptoms-a pilot study

Susannah Pick¹, L. S. Merritt Millman¹, Emily Ward¹, Eleanor Short¹, Biba Stanton², Timothy Nicholson¹, Joel Winston¹, Mark Edwards¹, Laura Goldstein¹, Simone Reinders¹, Anthony David³, Trudie Chalder¹, Matthew Hotopf¹, Mitul Mehta¹

¹King's College London, ²King's College Hospital NHS Foundation Trust, ³University College London

OBJECTIVES/AIMS: Explanatory models of functional neurological disorder (FND) have proposed mechanistic roles for altered affective processing and dissociation. Whilst there is existing evidence of altered affective reactivity and elevated dissociation in FND, their direct influence on subjective FND symptoms has not been examined rigorously. We aimed to pilot a new experimental paradigm to test the hypothesis that exposure to highly arousing affective stimuli would provoke increased FND and associated symptoms. We also sought to explore the potential effects of experiential detachment on FND symptoms during affective stimulation. **METHODS:** Participants were 14 individuals with FND (10F:4M; 10 motor symptoms, 4 motor/seizures) and 13 age- ($p=.71$) and sex-matched ($p=.72$) healthy controls (HCs; 11F:2M). We used validated affective stimuli in 12 blocks of 10 images, including four Positive (high arousal), four Negative (high arousal), and four Neutral (low arousal) blocks. Participants were instructed to either passively observe the images (Watch) or detach from the experience (Distance) in separate blocks. Momentary assessments of FND symptoms (FND group), dissociation, affect, pain and fatigue were obtained at baseline and immediately after each block (Likert-scale, 1-7). The data were analysed with within-groups or mixed ANOVAs. Post-hoc tests were Bonferroni-corrected. **RESULTS:** At baseline, the FND group reported elevated pain ($p<.001$), fatigue ($p=.001$), and derealisation ($p=.015$), compared to HCs, but subjective arousal ($p=.83$), positive affect ($p=.11$), negative affect ($p=.08$), dissociative amnesia ($p=.052$), and depersonalisation ($p=.87$) did not differ. During the task, there was a main effect of image type on FND symptoms ($p=.002$) and an image type x task instruction interaction ($p=.020$). There was a main effect of image

type in the Watch condition ($p=.008$), but not in the Distance condition ($p=.12$). In the Watch condition, FND symptom ratings were highest following Negative images ($M=3.61$, $SD=1.73$), relative to Positive ($M=2.79$, $SD=1.44$) and Neutral ($M=2.79$, $SD=1.33$). During the task, there were group main effects (FND>HCs) for derealisation ($p=.037$), depersonalisation ($p=.046$), dissociative amnesia ($p=.016$), pain ($p<.001$), and fatigue ($p=.004$), but not positive ($p=.94$) and negative affect ($p=.20$), or subjective arousal ($p=.85$). **CONCLUSIONS:** Exposure to affectively arousing negative stimuli resulted in increased subjective FND symptom severity, and this was mitigated when participants were instructed to voluntarily detach from their experiences. The influence of affective stimulation on FND symptoms was not mediated by heightened negative affect or perceived physiological arousal. We will now modify this paradigm for use in a larger functional neuroimaging study, to elucidate the underlying physiological bases of these processes. **ACKNOWLEDGEMENTS AND FUNDING:** The study was funded by King's College London and the Medical Research Council.

2-C-13 Temporal dynamics of cortex-wide activity states encode the value of affectively impactful outcomes

William Villano¹, Brittany Jaso², Travis Reneau³, Christopher Baldassano⁴, Aaron Heller¹

¹University of Miami, ²Reliant Medical Group, ³Washington University in St. Louis, ⁴Columbia University

BACKGROUND: As humans transition between distinct affective experiences, recent work finds that underlying cortical regions (e.g., vmPFC) exhibit corresponding shifts between stable states of neural activity (Chang et al., 2017; Science Advances). While this work suggests that discrete cortical states mark the onset of distinct affective events, it is unclear how the broader temporal dynamics of neural states across the cortex vary with the features of affective events, such as their value signals. Here, in a sample of university students who underwent fMRI scanning as they viewed major exam grades for the first time, we demonstrate that the values associated with affective outcomes—that is, exam grades—drive changes in the temporal dynamics of neural activity across the cortex. **METHODS:** We recruited 40 undergraduate students to undergo fMRI scanning while they received their grades on major chemistry exams (40 participants x 4 exams = 160 scans). Scans were comprised of an anticipation phase, during which participants awaited their grades, a viewing phase, during which participants viewed exam grades for the first time, and a reactivity phase during which participants remained at rest in the scanner after viewing grades. Functional images were mapped to cortical surface space and parcellated into 400 cortical regions defined by their intrinsic functional connectivity (Shaefer et al., 2018; Cerebral Cortex), and we used a data-driven event segmentation model (Baldassano et al., 2017; Neuron) to uncover stable states of neural activity across the cortex. **RESULTS:** Cortical states were less variable in duration during the anticipation phase relative to the viewing and reactivity phases ($B = -1.21$ [0.50], $p = 0.018$), and during the viewing and reactivity phases, lower grades were linked to greater variability in state duration ($B = -0.068$ [0.033], $p = 0.04$). Participants who scored lower on exams did not exhibit overall differences in cortical state duration across the entire scan ($B = -0.056$ [0.037], $p = 0.13$), nor during the anticipation phase in particular ($B = 0.00008$ [0.00008], $p = 0.27$). However, after grades were revealed, participants who scored lower on exams exhibited a significant increase in cortical state duration that persisted for several minutes into the reactivity phase ($B = -0.08$ [0.04], $p = 0.03$). **CONCLUSION:** Our findings suggest that personally relevant outcomes elicit broad changes in neural state dynamics across the cortex, and furthermore, that the duration of cortical activity states during emotional reactivity may encode the value signals associated with affectively impactful outcomes. While future research is necessary, the dynamics of neural states across the cortex may reflect the temporal features of emotional responses.

2-C-14 Separating reappraisal instruction and tactics use: Comparing reappraisal frequency and affective outcomes of reappraisal tactics

Valeriia Vlasenko¹, Ilana Hayutin¹, Chelsey Pan², Emma Gries¹, Joseph Michael-Virakis³, Christian Waugh⁴, Roe Admon³, Kateri McRae¹

¹University of Denver, ²University of Southern California, ³University of Haifa, ⁴Wake Forest University

While a number of neuroimaging studies have focused on cognitive reappraisal (Beauregard et al., 2001; Ochsner & Gross, 2005; Waugh et al., 2016) or various types of temporal cognition (D'Argembeau et al., 2010; Schacter & Addis, 2007; Viard et al., 2011), there is a lack of research on the use of cognitive reappraisal tactics. Specifically, little work has examined temporal variation (current vs. future) of reappraisal tactics. The present research investigated the differences in selection frequency and affective outcomes that are associated with the implementation of different cognitive reappraisal tactics. Participants completed a laboratory task (Study 1, $N = 85$; Study 2, $N = 52$) in which they were instructed to reappraise (Decrease) or not to reappraise (Look) negative images and reported on their use of specific reappraisal tactics for every trial. Using established reappraisal tactic coding by McRae et al. (2012), we assessed how people selected from among common tactics for each image (Study 1) and all tactics (Study 2), and implemented those tactics to reappraise negative images. We also compared reappraisal tactic selection and implementation when used during instructed reappraisal vs. during spontaneous reappraisal, in the non-reappraise condition. Replicating previous findings, results of both studies indicate tactics were used more often when instructed to reappraise vs. not, and negative affect was lower following instructed vs. spontaneous reappraisal (Study 1: $F(1, 3337.1) = 16.30$, $p < .001$; Study 2: $F(1, 2227.6) = 7.43$, $p = .006$). Participants used some tactics (e.g., reality challenge) more frequently compared to the rest of the tactics in both conditions. Other tactics (e.g., change current circumstances) were more effective at decreasing negative affect in both conditions. In Study 3 ($N = 45$), which serves as a pilot for an upcoming neuroimaging study, we focused on three tactics (change current circumstances, change future consequences and acceptance) and replicated the results of Study 1 and Study 2. Once again, tactics were used more frequently and negative affect was lower following instructed vs. spontaneous reappraisal ($F(1, 5801.8) = 11.70$, $p < .001$). Change current circumstances was among the most frequently chosen as well as the most effective tactic. It was chosen significantly more than change future consequences in the Decrease condition ($t(44) = 6.50$, $p < .001$) but not in the Look condition ($t(44) = 0.22$, $p = .779$). Following both instructions, participants reported lower negative affect when using change current circumstances compared to change future consequences (Decrease: $t(5775) = 11.33$, $p < .001$;

Look: $t(5776) = 6.17, p < .001$). Knowing which reappraisal tactics are most frequently selected, and their affective outcomes when used prompted or spontaneously, may help us better understand how to improve people's ability to use reappraisal to achieve their emotional goals.

2-C-15 Quantifying different types of body awareness during meditation using machine learning and fMRI

Helen Weng¹, Sasha Skinner¹, Jarrod Lewis-Peacock², Tiffany Ho³, Mushim Ikeda¹, Maria Chao¹, Rick Hecht¹, Adam Gazzaley¹

¹University of California, San Francisco, ²University of Texas at Austin, ³University of California, Los Angeles

BACKGROUND AND AIM: Body-based meditation exercises cultivate nonjudgmental awareness to different body regions such as the breath, heart, and feet, and are thought to improve interoception and emotion regulation. However, few quantitative measures of distinct types of body awareness exist. **METHODS:** We applied machine learning to fMRI data in order to 1) differentiate between types of body awareness to the breath and feet, and 2) decode an independent breath meditation task for the percent time attending to breath or feet. The task was previously validated to assess 5 forms of attention in 31 adults, including 23 meditators (≥ 5 years of weekly practice) and 8 novice controls. This included a sample of experienced meditators and matched controls ($N=16$; Weng et al. 2020a), and a diverse community sample of meditators from the East Bay Meditation Center ($N=15$; Weng et al., 2020b). In Step 1 of the EMBODY Task, participants were instructed via brief audio instructions with eyes closed to pay attention to 1) sensations of the breath, 2) sensations of the feet, 3) sounds from the scanner, 4) directed thinking about life events, and instructed to 5) stop paying attention which may induce mind wandering. **RESULTS:** Combining both samples, we confirmed that using multi-voxel pattern analysis applied to whole-brain individual-level data (regularized logistic regression applied to 2160 training samples, with a penalty=0.01), all five neural patterns were recognized above chance (all classification accuracies $>40\%$ vs. 20% chance, all one sample $t_{30's} > 6.77, p's < 0.001$), demonstrating that neural patterns associated with each internal mental state were distinct. Notably, attention to the breath was distinguished from attention to the feet. We then used these individual-level classifiers to decode an independent 10-min breath-focused meditation period, and specifically investigated whether percentage time attending to breath vs. feet differed. In line with our hypotheses, when participants were directed to focus on their breath during the meditation task, we found that more time points ($TR=1s$) were classified as attention to breath vs. feet (23.8% vs. 18.4%, $t_{28}=3.54, p=0.001$). Further, in exploratory analyses, during baseline resting periods between task runs (4 min total), this difference in attention was not found (21.4% vs. 21.4%, $t_{28}=0.04, p=0.97$). **CONCLUSIONS:** This suggests that participants were able to direct attention to specific areas of the body during meditation, which was not found in non-meditative states such as resting baseline. Future studies should include longer baseline resting tasks and meditations oriented to other bodily areas (such as the feet) to more fully test whether specific types of body awareness can be measured. In summary, machine learning-based fMRI measure may contribute to tools that can elucidate mind-body mechanisms in which meditation may improve interoception and emotion regulation.

2-D-16 The impact of stimulus intensity on the test-retest reliability of the task-based fMRI activity within the emotion regulation network

Stella Berboth¹, Carmen Morawetz¹

¹University of Innsbruck

BACKGROUND AND AIM: Given the importance of emotion regulation (ER) in affective disorders, it becomes a growing priority to identify brain biomarkers of disease risk, treatment response and brain development. However, the ability to examine individual characteristics of brain functions and to identify biomarkers is fundamentally limited by measurement reliability. Extending previous findings on the reliability of task-based functional magnetic resonance imaging (fMRI) activity within neuronal networks associated with emotion generation and regulation [1], we here aimed to discuss methodological considerations on how to enhance test-retest reliability in ER research by focusing on the task design, more specifically the emotional intensity of stimuli. **METHODS:** 25 healthy participants (21 female, mean age = 22.8 ± 3.3 yrs) performed a well-established ER task using high- and low-intensity stimuli during three scanning sessions separated by one week. We acquired four runs/session and 80 trials (40 high- and 40 low-intensity)/session using the CMRR multiband EPI sequence ($TR=1.4s$; $TE=23ms$; 78 slices; voxel size= $1.5 \times 1.5 \times 1.2mm^3$; 371 whole-brain images per run) at ultra-high field (7 Tesla). We conducted region-wise reliability analyses by computing Intercorrelation Coefficients (ICCs) for previously defined Regions of Interest (ROIs) that are implicated in the ER network, including prefrontal and temporal regions and the amygdala [2] for high- and low-intensity trials, respectively. **RESULTS:** Test-retest reliability of task-based fMRI activity within the neural network associated with ER across the three sessions depended on the respective ROI. We found higher ICCs for cortical regions compared to subcortical regions. Further, stimulus intensity impacted reliability estimates: Test-retest reliability was higher for high- compared to low-intensity trials. **CONCLUSIONS:** The present findings show that test-retest reliability of neural activity within the ER network can be enhanced by taking the intensity of used stimuli into consideration. Our results are especially relevant in light of the growing interest in ER research focusing on individual differences in emotion regulatory processes. [1] Berboth, S., Windischberger, C., Kohn, N., & Morawetz, C. (2021). Test-retest reliability of emotion regulation networks using fMRI at ultra-high magnetic field. *NeuroImage*, 232(February), 117917. <https://doi.org/10.1016/j.neuroimage.2021.117917> [2] Morawetz, C., Bode, S., Derntl, B., & Heekeren, H. R. (2017). The effect of strategies, goals and stimulus material on the neural mechanisms of emotion regulation: A meta-analysis of fMRI studies. *Neuroscience & Biobehavioral Reviews*, 72, 111-128. <https://doi.org/10.1016/j.neubiorev.2016.11.014>

2-D-17 Digital emotion regulation: Linguistic analysis of authenticity in social media

Beatriz Brandao¹, Bryan Denny¹

¹Rice University

BACKGROUND AND AIMS: Social media has become a pervasive part of society and is the way through which many social interactions occur daily. There are many examples of how social media can influence users' emotions and patterns of communication, including their communication authenticity. For example, platforms such as Facebook and Instagram allow users to communicate with others, self-express, and produce and consume different content. This observational study will explore psychological constructs that could underpin emotion regulation on social media. Through the linguistic analysis of Instagram comments, this study will investigate psychological processes that predict authenticity during social media use. **METHODS:** We will first assess levels of social anxiety, emotion regulation ability, the tendency to regulate emotions, and the sense of self-worth related to Instagram use. Then we will perform a linguistic analysis of the authenticity levels of the participants' Instagram comments using standardized algorithms through Linguistic Inquiry and Word Count (LIWC) software. Based on a previous study using similar outcome measures and statistical analysis, the estimated sample size is 200 participants. **ANALYSES:** Multiple linear regression will be performed to assess whether social anxiety and emotion regulation abilities and tendencies predict authenticity, with Instagram contingent self-worth as a mediator. **HYPOTHESES:** (1) higher social anxiety will be associated with lower authenticity; (2) higher use of suppression will be associated with lower authenticity; (3) these results will be mediated by Instagram contingent self-worth, as those with higher social anxiety and greater use of suppression would derive more value and self-esteem from their Instagram use. **CONCLUSIONS:** By examining this linguistic aspect of people's experiences with Instagram, we seek a more comprehensive understanding of how people utilize social media. The findings of this study may provide insight into the psychological processes that predict the authenticity of social interactions online. The results of this study could lead to a better understanding of how people interact online and contribute to future experimental work on the intersection of emotion regulation and social media use.

2-D-18 Intrinsic causal network dynamics of emotion regulation tendency

Mirna Hajric¹, Rebecca Rammensee², Ulrike Basten², Carmen Morawetz¹

¹University of Innsbruck, ²University of Koblenz-Landau

BACKGROUND: Emotion regulation tendency represents the preference for choosing one emotion regulation strategy to regulate emotions over others [1]. Here, we examined how effective brain connectivity (EC) in the absence of task demands relates to the individual regulation tendency. We hypothesised that the EC of reappraisal-related brain regions at rest would be modulated by the tendency to choose the reappraisal strategy. **METHODS:** 40 participants (mean age = 22.53 ± 3.76 years, n = 20 female) underwent a resting-state functional magnetic resonance imaging scan followed by an emotion regulation choice task [2] outside the scanner, which allowed the computation of the individual regulation tendency. A spectral dynamic causal modelling analysis [3] was performed on four predefined neural networks (two prefrontal networks (N1 & N2) involved in emotion regulation; two subcortical networks related to emotion generation (N3 & N4)) [4] to explore the association of regulation tendency and the underlying neural network dynamics. **RESULTS:** The regulation tendency to reappraise in response to high- and low-intensity stimuli is related to a high degree of connectivity between frontal and parietal regions within N1 and between frontal and temporal regions within N2. Similarly, independent of the stimulus intensity, reappraisal tendency within N3 (e.g., within the limbic system) and N4 (e.g., between insular and limbic regions) was associated with a high degree of interconnectivity between subcortical regions. **CONCLUSIONS:** This is the first study to show how effective connectivity within four reappraisal-related networks at rest is linked to the behavioural tendency of choosing reappraisal over distraction.

2-D-19 Predicting individual differences in working memory ability from neural patterns during emotion regulation

Scarlett Horner¹, Roshni Lulla², Helen Wu², Shruti Shaktivel², Anthony Vaccaro², Ellen Herschel², Leonardo Christov-Moore², Colin McDaniel², Steven Greening¹, Jonas Kaplan²

¹University of Manitoba, ²University of Southern California

BACKGROUND AND AIM: The purpose of this study is to identify whether the pattern of brain activity associated with emotion regulation can be used to predict individual differences in working memory. Working memory is an aspect of executive function, which can influence emotion regulation (Schmeichel and Tang, 2015). In addition, previous research has found that working memory is associated with emotion regulation ability (Hendricks & Buchanan, 2016; Opitz et al., 2014). Therefore, we predict that lateral frontoparietal areas associated with cognitive control will be active during emotion regulation and, and BOLD signal in these regions will be related to individual differences in working memory. **METHODS:** Participants have completed emotion regulation fMRI task in which they reappraise and view negative images. Participants have also completed the WAIS-IV, with performance on working memory tasks being of interest. We have collected data for 107 participants and fMRI data has been preprocessed. A standard univariate whole brain analysis contrasting the reappraise negative-view negative BOLD response found greater activity in the lateral prefrontal cortex (PFC) and middle temporal gyrus in the regulate negative condition. For the current study, we plan to use multi-voxel pattern analysis (MVPA) with a whole brain leave-one-subject-out cross validated continuous regression analysis to determine if we can predict working memory performance on the WAIS-IV with the reappraise negative-view negative BOLD contrast. **EXPECTED RESULTS:** We anticipate finding that the pattern in contrast between reappraise negative and view negative predicts working memory scores significantly better than chance. Areas we expect to see predictive activity in include lateral frontoparietal regions, the anterior cingulate cortex, and the amygdala. **CONCLUSIONS:** This study will help uncover cognitive mechanisms of emotion regulation in more detail as well as identify areas involved in both emotion regulation and working memory. **ACKNOWLEDGEMENTS AND FUNDING:** This work was funded by the NSERC Discovery Grant and Templeton World Charity Foundation.

2-D-20 Competitive interactions between cognitive reappraisal and mentalizing

Nadia Kako¹, John Powers¹, Nadia Kako¹, Daniel McIntosh¹, Kateri McRae¹

¹University of Denver

BACKGROUND AND AIM: Cognitive reappraisal is an effective emotion regulation strategy as indicated by many experimental studies. However, many of these studies have used tightly controlled laboratory settings, limiting generalizability. In real-world settings, emotion regulation is typically not performed in isolation, and thus, key contextual factors may affect reappraisal success. We examined how cognitive reappraisal may be affected by the cognitive context of mentalizing. Mentalizing is commonly used in therapy by instructing clients to think about what they might say to a friend in a similar situation. Given that mentalizing and reappraisal may recruit overlapping cognitive processes, we predicted that mentalizing would facilitate the cognitive processing and performance of cognitive reappraisal. **METHODS:** This study used a within-subjects design where reappraisal was crossed with mentalizing. Participants were trained to reframe negative images for themselves and for a close other. Participants completed the task while undergoing fMRI measures to examine neural functions related to mentalizing and its impact on cognitive reappraisal. Participants also rated their self-reported affect and difficulty online, during the task, and retrospectively during a post-task survey. **RESULTS:** Self-report measures of affect and difficulty indicated that mentalizing did not affect reappraisal performance. However, fMRI analyses indicated a significant interaction between mentalizing and reappraisal in five brain regions including left and right inferior parietal lobe, dorsolateral prefrontal cortex, dorsolateral medial prefrontal cortex and left precuneus. The left precuneus activation associated with mentalizing was reduced when reappraisal was added, suggesting that while reappraisal and mentalizing may share common neurocognitive resources, reappraisal might overtake mentalizing. These results indicated that mentalizing activation is reduced when reappraisal and mentalizing are instructed simultaneously. A discrepancy between online and retrospective self-reported ratings of difficulty was found. Participants rated reappraising for others as more difficult retrospectively but not while performing the task. **CONCLUSIONS:** Our results suggest that while mentalizing and reappraisal may share neurocognitive processes, these shared processes may be competitive rather than facilitative. Additionally, the discrepancy between online and retrospective difficulty ratings may reflect biases or expectations of the participants about each instruction type. Future work should examine whether using mentalizing and reappraisal sequentially rather than simultaneously could impact results. Future work should also examine how using more personalized stimuli could impact results. **ACKNOWLEDGEMENTS AND FUNDING:** We'd like to thank the National Science Foundation (CAREER 1554683 to KM), Alexandra Zabelski, Hannah Friedman, Emma Young, Alexander Assila, and Raquel Sherman.

2-D-21 New fathers neural correlates of adaptive and maladaptive coping strategies

Jasmine Liu¹, Haley Betron¹, Jasmin Wang¹, Yael Waizman¹, Ellen Herschel¹, Sofia Cardenas¹, Elizabeth Aviv¹, Pia Sellery², Jonas Kaplan¹, Darby Saxbe¹

¹University of Southern California, ²University of Colorado

BACKGROUND AND AIM: New fathers undergo profound psychosocial and neurobiological changes across the transition to parenthood (Saxbe et al., 2018). Coping strategies may facilitate or impede fathers' adjustment to these wide-ranging changes. Specifically, fathers' coping strategies may be associated with brain activation while engaging in response inhibition (RI). When done effectively, RI--defined as suppressing an automatic response and engaging in a more appropriate action (Logan et al., 1988)--has been found to predict adaptive parenting outcomes in mothers (Jones-Gordils et al., 2021). Despite fathers' vital role in parenting, no work has yet been published on new fathers' use of coping strategies and their neural underpinnings during the early postpartum period. **METHOD:** In our sample of 32 first-time fathers, coping mechanisms were measured using the Brief Coping Orientation to Problems Experienced Inventory (Brief-COPE) questionnaire (Carver, 1987) at approximately six months postpartum. The Brief-COPE questionnaire is a 28-item adaptation of the COPE questionnaire that assesses 14 differential coping responses (Carver, 1987), which can be broadly divided into adaptive coping (active coping, planning, positive reframing, acceptance, humor, religion, using emotional support, and using instrumental support) and maladaptive coping (self-distraction, denial, venting, substance use, behavioral disengagement, and self-blame; Kasi, 2012). Fathers participated in an MRI visit around two weeks following their lab visit. In the scanner, fathers completed the well-validated Go/No-Go task, commonly used to measure RI. **HYPOTHESIS:** We hypothesize that those new fathers who report engaging in more maladaptive coping strategies (as measured by the Brief-COPE) may need to exert greater cognitive effort in brain regions involved in RI (left anterior insula and the fronto-striatal system; see meta-analysis in Hung et al., 2018) to effectively inhibit an automatic response while completing the Go/No-Go task. Analyses will account for data collected during COVID-19, the lag time between the lab and MRI visits, and the child's age at the MRI scan. The child's age is thought to capture the fathers' length of parenting experience and the child's developmental stage. **ANALYSIS:** We propose to conduct a general linear model analysis in FSL by contrasting correct no-go and go trials (e.g., no-go > go) while including Brief COPE scores as a regressor in higher-level analysis. **IMPLICATION/IMPORTANCE:** This project has the potential to shed light on the neural underpinnings that facilitate fathers' engagement in coping strategies that could either support or hinder their adjustment to parenthood. As a future direction, we would also like to explore how these coping strategies and their neural correlates are associated with new fathers' effective parenting outcomes during the early postpartum period.

2-D-22 Intrinsic causal network dynamics of emotion regulation capacity

Carmen Morawetz¹, Stella Berboth¹, Mirna Hajric¹, Rebecca Rammensee², Ulrike Basten²

¹University of Innsbruck, ²University of Koblenz-Landau

BACKGROUND AND AIM: Effective emotion regulation (ER) is a highly adaptive process driven jointly by one's tendency to choose specific regulatory strategies and one's capacity to implement the chosen strategies. A recent meta-analysis determined

four large-scale neural networks underlying ER (Morawetz et al. 2020). It has been shown that the lateral prefrontal cortex, temporal, and parietal regions are related to regulating emotions. In contrast, subcortical regions such as the amygdala, hippocampus, and insula are associated with emotion generation. Here, we tested whether the neural network architecture underlying emotion regulation and generation in the absence of emotional stimulation is related to the individual capacity to regulate emotions using distraction or reappraisal. We hypothesized that intrinsic effective connectivity of ER-related brain regions would be associated with the prospective reappraisal/distraction capacity (RC and DC). We further aimed to determine similarities and differences in the intrinsic network architecture associated with RC and DC. **METHODS:** We analyzed resting-state fMRI data of 40 participants (mean age = 22.53 ± 3.76 years, 20 female) (3.0 Tesla MR scanner; 260 whole-brain images) using spectral dynamic causal modelling (spDCM) to make inferences about the causal interactions between brain regions of a coupled system. We extracted time series from 4 predefined networks. Connectivity profiles in the 4 neural networks were analysed by estimating hierarchical models over the parameters, which were specified within a hierarchical Parametric Empirical Bayes framework for DCM. Outside the scanner, participants performed a standard emotion regulation task, in which they were asked to decrease their emotions in response to negative images by either using distraction or reappraisal. Based on this task, the RC and DC were determined by subtracting the mean emotional state rating after regulation from the control condition (no regulation). RC and DC were used as predictors of interest in the resting-state fMRI analysis. **RESULTS:** Comparing the intrinsic network architecture in relation to RC and DC revealed that across all networks, 50-70% of all connections were modulated by the capacity to regulate with both strategies. More than half of the connections demonstrated the same association with regulation capacity independent of the regulation strategy. Focusing on the differences between strategies revealed that more connections (i) from parietal to frontal areas were positively associated with RC, (ii) from caudate to temporal and frontal areas were positively linked to DC, and (iii) from ventromedial prefrontal cortex to subcortical regions were positively linked to RC. **CONCLUSIONS:** The initial intrinsic causal network dynamics in the same neural networks that support task-related activity during ER may already explain parts of the variance observed in RC and DC.

2-D-23 Cue reactivity in vivo: Links between real world exposure to appetitive cues, neural cue reactivity, and daily behaviors in a diverse sample of teenagers

Emma Moughan¹, Richard Lopez¹, Dylan Wagner², Christopher Browning², Bethany Boettner², Baldwin Way²

¹Worcester Polytechnic Institute, ²The Ohio State University

BACKGROUND AND AIM: Previous neuroimaging research has identified robust neural correlates of reward, regulation, and valuation in the eating and drug domains, with regions such as ventral striatum (VS) and orbitofrontal cortex (OFC) reliably activating to appetitive cues to promote eating and drug-seeking behaviors, while other regions such as dorsolateral prefrontal cortex (DLPFC) serving more regulatory functions to help curb consummatory behaviors. However, relatively little is known about people's incidental exposure to appetitive cues in their immediate physical surroundings (e.g., neighborhoods) and how such exposure might shape neural cue reactivity and subsequent self-regulatory behaviors. This would be especially useful to examine in adolescents, a group whose self-regulatory processes are still in flux, partly due to immature PFC development.

METHODS: In the present study, we conducted preregistered analyses (<https://osf.io/dh4va/>) in a large sample of teenagers residing in the Columbus area (N=252, Mean age = 15.53, SD age = 2.06) who participated in a longitudinal study that employed GPS tracking, an fMRI scanning session that included a cue reactivity task, and ecological momentary assessment to capture daily self-regulatory behaviors. Specifically, we hypothesized that greater exposure to real world appetitive cues, operationalized by physical proximity to fast food restaurants, convenience stores, bodegas, etc. (as captured by GPS), will be associated with higher reward-related activity in VS and OFC as well as greater whole-brain pattern expression of reactivity and valuation (H1a), and lower control activity in PFC, the frontoparietal control network, and less whole-brain pattern expression of regulation (H1b). We also hypothesized that higher reward and/or lower control activity will be associated with less resistance to (and more frequent enactment of) those desires (H2). **RESULTS/CONCLUSIONS:** Results from these analyses will be discussed, as well as implications of the observed findings for other self-regulatory domains. **ACKNOWLEDGMENTS AND FUNDING:** This work is supported by NIDA grant # R01DA042080.

2-D-24 Out of your head and into your body: Experiential processing increases positive affect and decreases dampening appraisals during autobiographical memory recall in an anhedonic sample

Chrissy Sandman¹, Michelle Craske¹

¹University of California, Los Angeles

BACKGROUND AND AIM: Anhedonia is characterized by deficits in positive affect, which may be explained by dampening appraisals, or thoughts that blunt positive emotions. However, no strategies have been identified to mitigate dampening and maximize positive affect, with relevance for clinical interventions. Experiential processing mode, or attending to physical sensations, may enhance the benefit of recalling positive memories, as compared to analytical processing mode, or conceptually thinking about an event. **METHODS:** 96 participants with elevated symptoms of anhedonia completed writing tasks, in which they recalled two positive autobiographical memories and imagined one future positive event. All participants recalled the first positive memory as they naturally would. Participants were then randomized to one of three conditions that corresponded to processing mode instructions for the second memory recall: experiential, analytical, or control (n=32 per condition). Positive affect, negative affect, dampening appraisals, and meaning were measured before and after each writing task, and anticipatory pleasure and behavioral intention were measured after the future event task. The Navon task was also administered before and after the memory recalls as a behavioral measure of global attention, which has been linked to positive affect.

RESULTS: Spontaneous experiential processing during the first memory recall was associated with greater positive affect, whereas spontaneous analytical processing was associated with and greater dampening appraisals. Spontaneous dampening was associated with smaller increases in positive affect, while meaning was associated with greater increases in positive affect.

During the second memory recall, experiential processing resulted in greater positive affect, less negative affect, less dampening, and marginally greater meaning compared to the analytical processing condition. There was no effect of processing mode on change in attention. When collapsing across condition, increases in positive affect after the memory recalls were associated with broadened attention. The processing mode manipulation did not transfer to how participants imagined the future positive event. However, both spontaneous use of experiential and analytical processing of the future event predicted anticipatory pleasure, but only experiential processing predicted behavioral intention. **CONCLUSIONS:** Experiential processing, or attending to sensations, may be a strategy to mitigate dampening appraisals and enhance positive affect. Clinical implications include mindful disengagement from negative thoughts and savoring of pleasant sensations in order to enhance positive affect for patients with anhedonic depression. **ACKNOWLEDGMENTS AND FUNDING:** UCLA Dissertation Year Fellowship.

2-D-25 Instructed reappraisal during writing can have short and long-term effects on narrative language use and affect: A pilot study on COVID-19 experiences

Patricia Sieweyumptewa¹, Olivia Karaman², Javiera Oyarzun¹, Xandra Kredlow³, Jocelyn Shu¹, Elizabeth Phelps¹

¹Harvard University, ²University of California, Riverside, ³Tufts University

BACKGROUND AND AIM: Cognitive reappraisal of negative memories is a strategy that psychologists have long used to improve affect and well-being. In this two-part study (n = 80), we investigated the short and long-term effects of instructed reappraisal on memories of the COVID-19 pandemic through a series of writing exercises. Utilizing the Positive and Negative Affect Schedule to measure affect, we tested whether instructed cognitive reappraisal led to improved affect changes as compared to a control condition in which participants wrote freely about the pandemic. **METHODS:** In session 1, participants recruited via Prolific either wrote a series of responses considering the silver lining in their experiences during the COVID-19 pandemic, or freely wrote a series of responses describing their experiences. One week later, both groups completed session 2 online to write freely about their COVID-19 experiences again. **RESULTS:** Text analyses indicated that, during session 1, the reappraisal group, compared to the free-write group, used significantly more positive ($t(67) = -7.43, p < .001$) and less negative ($t(78) = 9.06, p < .001$) emotion words in their writing, and showed higher positive affect immediately after writing ($F(1,78) = 11.7, p < .001$). One week later, the reappraisal group, compared to the free-write group, spontaneously used significantly more positive words ($t(73) = -2.08, p = .04$) and showed a marginally significant decrease in negative affect ($F(1,78) = 3.1, p = .08$). **CONCLUSIONS:** These results indicate that in the context of a major, real-world stressor, one session of writing exercises implementing reappraisal can have positive and long-lasting effects on affect.

2-D-26 Understanding emotion regulation in context with artificial neural networks

Nilofar Vafaie¹, Philip Kragel¹

¹Emory University

BACKGROUND AND AIMS: Emotion and emotion regulation are part and parcel of daily life, and essential to healthy adaptation and functioning. Of the brain systems involved in emotion processing, several regions are commonly involved in language and semantic processing, including vMPFC, IFG, vmPFC, and precuneus. Recent studies show that representations of words learned by deep language models predict human brain activity across these regions. However, it remains unclear whether language uniquely captures different types of emotion regulation, and if so, whether representations related to different regulation strategies uniquely predict human brain activity. Knowing how regulation changes word representations in a deep language models could elucidate how different stages and types of regulation influence activity in different brain systems. Towards this goal, here we examined how fine-tuning Bidirectional Encoder Representations from Transformers (BERT) to predict human descriptions of emotional events under various regulation strategies changes the meaning of words. **METHODS:** We conducted an online study in which participants either used cognitive reappraisal (n = 30), mindfulness (n = 29), or passively viewed (n = 29) affective video clips that depicted eight different kinds of emotional situations, and then provided a written description of the content of each video. Emotion induction was assessed using a continuous measure of affect and an unconstrained text description of feelings. We fine-tuned three BERT models trained on text descriptions of the same set of videos in each of our regulatory conditions. We then compared the similarity of embeddings from different layers of the fine-tuned models with corresponding layers in the pre-trained counterpart to see how representations differed in terms of regulation strategy, network layer, and situational context using a linear mixed effects model. **RESULTS:** Our results showed that compared to pre-trained BERT, regulation-specific fine-tuning differentially changed word representations across layers ($F(22, 8075) = 2.935, p < .0001$). Furthermore, these differences were qualified by an interaction between layer depth, the context of the emotional situation, as well as the regulation condition ($F(154, 8075) = 1.267, p = .0148$). **CONCLUSIONS:** These findings suggest that emotion regulation systematically alters the meaning of language produced when describing emotional events. The nature of these changes depends both on the type of emotional situation and the emotion regulation strategy employed. Importantly, these changes increased in later layers of the deep language model, potentially explaining how regulation alters representations in brain regions that capture slowly varying changes in semantic context, such as the default network. Lastly, the interaction between model depth and strategy suggests varying patterns of brain activity involving multiple regions may be commensurate with specific regulation use.

2-D-27 Predicting emotion regulation success using brain functional connectivity: A machine-learning approach

Jinxiao Zhang¹, Yi Feng¹, Matt Dixon¹, Philippe Goldin², Carmen Morawetz³, James Gross¹

¹Stanford University, ²University of California, Davis, ³University of Innsbruck

BACKGROUND: Successful emotion regulation has long been thought to be realized by various brain regions working in a coordinated fashion. Prior work has found that the functional connectivity between amygdala and some cortical regions

was associated with emotion regulation success. However, most earlier studies had moderate-sized samples and relied on univariate analysis without cross-validation (i.e. null hypothesis testing). **AIM:** To use machine learning to predict individuals' emotion regulation success using fMRI-measured brain functional connectivity. **METHODS:** The fMRI recordings of 150 adults (81 women) performing a reappraisal-based emotion regulation task were collected. After fMRI data preprocessing, functional connectivity based on a brain parcellation of 268 nodes was calculated as the partial correlation between each pair of nodes. Emotion regulation success was calculated as the difference in self-report negative affect while watching versus reappraising negative self-belief statements. Multivariate regression models (Ridge regression and neural network) were used to predict emotion regulation success with leave-one-out cross-validation (LOOCV). Inside the training data, 200 connectivity edges with strongest correlations with regulation success were selected as input features. All hyperparameters were optimized with an inner 5-fold cross-validation. **RESULTS:** A Ridge regression model using whole-brain functional connectome significantly predicted emotion regulation success, $r = 0.33$, permutation $p = .04$. A neural network regression model (multi-layer perceptron) also significantly predicted regulation success, $r = 0.37$, permutation $p = .02$. Follow-up feature analyses showed that connectivity edges within the subcortical network and those between frontoparietal network and subcortical network were most represented in the predictive features. **CONCLUSIONS:** Extending from existing studies, our results suggest that whole-brain functional connectivity can be used to predict individual's emotion regulation success. In particular, connectivity within the subcortical network and connectivity between frontoparietal network and subcortical network were most predictive.

2-E-28 Patterns of thought characteristics in everyday life as predictors of psychological well-being and possible targets for personalized treatment

Eric Andrews¹, Matthew Grilli¹, Matthias Mehl¹, John Allen¹, Jessica Andrews-Hanna¹

¹University of Arizona

BACKGROUND AND AIM: There is ample evidence in the literature that indicates a relationship between specific types of thinking and specific behavioral traits (e.g., ruminative thought and depression). What is less certain is how patterns of naturalistic thought relate to multiple measures of demographics, traits, and behaviors. **METHODS:** Using data collected via a smartphone app we recently developed, Mind Window, we repeatedly sampled multiple characteristics of daily thought from 2,234 participants (ages 18-89, 1,656 female) as well as asking 99 questions related to demographics, traits, and behaviors. Using agglomerative clustering, participants were grouped into five clusters based on the characteristics of their daily thoughts. **RESULTS:** When comparing the mean and variance of thought characteristics these clusters demonstrated unique patterns, indicating that each group had a 'thought signature' that differentiated them from the others. Bayesian ANOVA was used to indicate areas in which these clusters differed, at a 0.95 probability, with 23 of the 24 traits evaluated found to be probabilistically different. Of particular note was that clusters differed in measures of social connection, valence, and overall psychological well-being-two clusters being on an adaptive end of well-being, while the remaining three were seemingly more maladaptive. Relationships between thought characteristics were also compared which highlighted that more psychologically-well clusters, when compared to others, demonstrated lesser connection between persistent thought and timeframe as well as persistent thought that involved the self. Lastly, linguistic usage was compared across clusters and indicated that some of the notable differences were in the expression of high-valence words, words that reflect cognitive processing, and 'I'-related statements. The relationship with valence showed that one of the 'psychologically-well' groups used more positively-valenced words while the other may gain benefit simply as they used less negatively-valenced ones. **CONCLUSIONS:** These findings illustrate the predictive relationship between patterns of thought characteristics, captured frequently and in a naturalistic environment, and certain traits. As it becomes more clear that precision treatment is a way to increase the efficacy of mental health care, these sort of relationships open the door to understanding which characteristics of thought not only contribute to better well-being, but also that there are multiple ways in which these characteristics work together to potentially influence behavior. For the highest possible level of care, knowing an individual's 'thought signature' may lead to better outcomes in mental health treatment.

2-E-29 Differential trajectories of internalizing symptom domains over the course of the menstrual cycle

Lara Baez¹, Aaron Heller¹

¹University of Miami

BACKGROUND AND AIM: Premenstrual exacerbation (PME) of internalizing symptoms is an understudied but common condition characterized by worsening mood symptoms and emotion dysregulation before the onset of menstruation. The goal of this study was to characterize the trajectories of internalizing symptoms over the course of the menstrual cycle and enhance our understanding of the psychological mechanisms underlying PME development. **METHODS:** 85 participants were recruited from an undergraduate subject pool at the University of Miami and enrolled in a semester-long daily diary study. Participants received SMS messages every evening with a survey assaying five internalizing symptom domains including affective, cognitive, interpersonal, somatic, and pain symptoms. Participants also completed daily ovulation tests to determine the timing of their menstrual cycle. Multilevel spline regression models were used to capture the trajectories of each symptom domain, and first/second derivative plots were used to quantify the rates of change/acceleration and maxima/minima of the trajectories. **RESULTS:** Results suggest that somatic symptoms peak first (at 1.25 days after the start of the menstrual period), then interpersonal symptoms (2 days after the start of the menstrual period), then affective and pain symptoms (2.25 days after the start of the menstrual period), and finally cognitive symptoms (3 days after the start of the menstrual period). The maximum rate of change (i.e. how fast symptoms increase) was relatively lower for affective, cognitive, interpersonal, and pain symptoms compared to somatic symptoms. The first day of positive symptom acceleration can be conceptualized as the day the symptom starts to "ramp up." The affective subscale started to accelerate first (9.25 days prior to the onset of the menstrual period), followed by interpersonal symptoms (9 days prior to the onset of the menstrual period), followed by the cognitive

symptoms (7 days prior to the onset of the menstrual period), then somatic symptoms (6.75 days prior to the onset of the menstrual period), and finally pain symptoms (5 days prior to the onset of the menstrual period). Somatic symptoms accelerated at a rate that was much greater than the other subscales (by a factor of 5 or more). **CONCLUSIONS:** Taken together, these findings suggest that somatic symptoms, with their relatively early and intense speed and acceleration, may be key in marking the monthly onset of PME, while other symptom domains are more important later in the menstrual cycle. Hypothesized neuroendocrine correlates will be discussed. **ACKNOWLEDGEMENTS AND FUNDING:** Funding for this study was provided by the National Science Foundation Graduate Research Fellowship and the McKnight Doctoral Fellowship to Lara M. Baez, and by the NIMH grant R21MH125311 to Aaron S. Heller.

2-E-30 Predicting conduct problem risk using a machine learning approach

Kathryn Berluti¹, Alexandra Potter², Safwan Wshah², Abigail Marsh¹

¹Georgetown University, ²The University of Vermont

BACKGROUND AND AIM: A wide range of factors can predispose children and adolescents to develop conduct problems, including genetic risk factors, neural development patterns, peer influences, parental influences, and factors related to the neighborhood or broader community (Moffitt et al., 1993; Viding & McCrory, 2018). Disentangling the contributions of individual risk factors is difficult, as the interaction or compounding of various risk factors places youth at the greatest risk of a later conduct problem diagnosis (Murray & Farrington, 2010). The use of a large representative longitudinal neuroimaging sample is needed to better identify factors that are the most predictive of later conduct problems. The current study aims to leverage identified mechanisms and the longitudinal Adolescent Brain Cognitive Development (ABCD) study to detect at-risk adolescents. **METHODS:** Participants included children who participated in the ABCD study and completed baseline, year 1, year 2, and year 3 visits. Additionally, the ABCD study includes siblings therefore, one child from each family was randomly selected for inclusion (n= 3517). Features were selected based on prior longitudinal analysis (Moffitt, 2018) and research reviews (Easey et al., 2019; Murray & Farrington, 2010) of early onset, persistent behavior problems in children including features capturing callous-unemotional traits (Frick et al., 2014). Four classifiers (logistic regression, naïve bayes, support vector machine, and random forest) were trained using 39 features to predict conduct problem risk after 1, 2, and 3 years. The most predictive classifier, along with the 10 most important features were selected and the model was retrained to create a simplified classifier. **RESULTS:** A random forest classifier accurately predicted risk for conduct problems diagnosis with an area under the curve of 0.98, 0.97, and 0.97 for year 1, 2, and 3 respectively. Within this classifier feature importance was calculated and relatively consistent across years. The most important features, regardless of year, included prosocial behavior, baseline oppositional defiant disorder diagnostic risk, parental history of internalizing and externalizing, baseline conduct disorder diagnostic risk, and childhood trauma/aversive experiences. The simplified classifier accurately predicted risk for conduct problems with little change in area under the curve, 0.97, 0.96, and 0.97 for year 1, 2, and 3 respectively. **CONCLUSIONS:** These findings suggest an accurate classifier can be trained on a limited number of self-report features achieving a similarly predictive model to classifiers with more features including neuroimaging measures. This suggests key features when predicting conduct problem risk include prosocial behavior, baseline oppositional defiant disorder and conduct disorder, parental history of psychiatric disorders, family income, family conflict, school engagement, and childhood trauma/aversive experiences.

2-E-31 Emotion evoked delta band activity predicts subthreshold depression

Darin Brown¹, Siya Bhola¹, Lillian Hacsı¹, Corinne Dotts¹

¹Pitzer College

Depression is a multidimensional affective disorder characterized by disruptions in emotional and motivational processes. Recent neuroimaging investigations of clinically depressed individuals have revealed the hyperactivation of neural mechanisms towards negative environmental stimuli while positive environmental stimuli tended to evoke a hypoactivation of these same systems suggesting measurements of these phenomena may aid in the diagnosis of the disorder. The current study aimed to investigate the relationship between motivation-related EEG signals and an individual's level of subthreshold depression. For this study, 70 college student volunteers without a diagnosis of depression (46 females) were recruited to perform a simple emotional image viewing task where they were asked to view and rate (pleasantness and perceived arousal) a series of positive, neutral, and negative images. Participants were also asked to complete an inventory of subthreshold depression. Our results revealed that an individual's subthreshold depression was successfully predicted by delta band activity evoked while the person viewed negative images, but not when an individual viewed neutral or positive images. These results further support past research suggesting a hyperactivation of emotional neural mechanisms for negative stimuli, as well as position emotion evoked delta band activity as a diagnostic tool for depression.

2-E-32 Cortical reward circuits involved in liking and learning in depression

James Cavanagh¹, Garima Singh¹, Chris Pirrung¹, Trevor Jackson¹, Mark Lavelle¹

¹University of New Mexico

BACKGROUND AND AIM: The Reward Positivity (RewP) is a positive deflection in the EEG that is elicited by reward receipt. Recent evidence suggests that the RewP is modulated by both reward prediction error ("learning") as well as affective valuation ("liking"). We hypothesize that this latter "liking" feature has an independent cortical generator that is specifically affected in major depression. **METHODS AND RESULTS:** Magnetoencephalographic findings confirmed this hypothesis: individuals with major depression (N=52) had less ventromedial frontal activation to reward than non-depressed controls (N=38). Moreover, both groups had similar activation of anterior midcingulate and insula to positive reward prediction errors, confirming hypotheses of a maintained "learning" system but a deficient "liking" system in major depression. However, other experiments

that combined liking and learning have complicated this simple explanation of separable systems. In a different learning task that used positive affective images for feedback, depressed (N=35) and control (N=40) individuals had similar RewP amplitudes. Yet when examining the single-trial coupling between RewP and reward prediction error (RewP-RPE coupling), depressive symptoms correlated with lower information encoding only in the high-positive affect condition. A separate experiment in non-depressed individuals utilized a sad vs. happy mood induction procedure (N=25 each). Again, there was no difference in RewP amplitudes, but induced deficits in positive affect predicted poorer reward learning due to lower fidelity of RewP-RPE coupling. **CONCLUSIONS:** Together, these findings suggest that when “liking” and “learning” systems need to interact, they are both affected by depression and induced mood. Future work parsing the independent vs. interactive contributions of these separable cognitive constructs will yield a better domain-specific depiction of hedonic deficiencies in depression. **FUNDING:** R01MH119382

2-E-33 Neural basis of cue reactivity and cue-induced craving: A meta-analysis of neuroimaging studies

Nicholas Harp¹, Hedy Kober¹

¹Yale University

BACKGROUND AND AIM: Substance use disorders (SUDs) are the most prevalent and costly of psychiatric disorders. Unfortunately, current treatment strategies are insufficient. Drug cues (e.g., the sight of drugs themselves or paraphernalia) elicit “cue reactivity”-powerful conditioned physiological responses in substance users following repeated pairing of cues with drug effects. One notable form of cue reactivity is cue-induced craving, or the subjective experience of desire for drugs-which is now part of the diagnostic criteria for SUDs and is known to predict drug use and relapse. As such, understanding the neural basis of cue reactivity and cue-induced craving could help guide treatment development efforts. Previous meta-analyses have attempted to consolidate the neuroimaging literature by examining cue reactivity, but these efforts have been limited by low power, a focus on specific drugs (e.g., nicotine), suboptimal analytic methods (e.g., activation likelihood estimate), and inconsistencies with evidence from pre-clinical and human lesion studies (e.g., a role for insula). Here, we provide the largest meta-analysis to date of the neuroimaging literature examining cue reactivity and cue-induced craving, including studies with various substance users (e.g., nicotine, opiates, stimulants). **METHODS:** We followed the Preferred Reporting Items for Systematic Reviews and Meta Analysis (PRISMA system) and implemented a multi-level kernel density analysis approach with family-wise error correction at $p < .05$. **RESULTS:** The omnibus test used 226 contrasts from 189 published reports representing 6,656 participants, revealing widespread activation spanning the midbrain, thalamus, amygdala, ventral and dorsal striatum, prefrontal cortex, insula, and both anterior and posterior cingulate. Conjunction analyses revealed areas of consistent activation among drugs of abuse (e.g., ventral striatum), while other analyses revealed differences among drugs (e.g., in insula). Further, only a subset of the reported regions correlated across studies with the subjective experience of craving (e.g., ventral striatum). **CONCLUSIONS:** Altogether, the results advance our understanding of the neural correlates of cue reactivity and cue-induced craving. For instance, the results provide convergent evidence with pre-clinical and human lesions studies, showing consistent activation in areas, such as the ventral striatum and insula, which have been reported in preclinical studies but were either inconsistent or absent from previous neuroimaging meta-analyses. The results also align with recent advances in the identification of a multivariate neuromarker of craving, which similarly included areas such as ventral striatum, prefrontal cortex, anterior cingulate, and insula. Taken together, the results underscore the brain basis of SUDs and provide insight for future treatment efforts (e.g., transcranial magnetic stimulation). **ACKNOWLEDGMENTS AND FUNDING:** R01 DA043690, T32 DA022975

2-E-34 Machine learning using anhedonia profiles classifies serotonergic antidepressant response at above chance levels

Xiao Liu¹, Stephen Read¹

¹University of Southern California

BACKGROUND AND AIM: Individuals with depression who do not respond to SSRI/SNRI medication are more impaired in reward processing and have greater internalizing symptoms, yet there is no clinically practical way to determine likelihood of treatment resistance based on these symptom dimensions. This case-control study leverages supervised and unsupervised machine learning techniques to distinguish post-treatment differences in self-reported anhedonia and related symptom profiles of antidepressant non-responders from responders and healthy controls as an initial proof-of-concept for relating these indicators to medication responsiveness. **METHODS:** Random forest classifiers were built to model differences in a set of 24 predictors for a sample of SSRI/SNRI treatment resistant, non-resistant, and non-depressed individuals recruited online (N = 393). Feature selection was implemented to refine model prediction and improve interpretability. Unsupervised machine learning methods were then used to explore latent groupings of feature-selected symptom profiles. **RESULTS:** Accuracies for full predictor models ranged from .54 to .71, while feature selected models retained 3-5 predictors and generated accuracies of .42 to .70. Several models performed significantly above chance. Sensitivity for non-responders was greatest when compared to responders only and after feature selection, reaching .82 with 3 predictors. The predictors retained from feature selection were then explored using factor analysis at the item level and cluster analysis of the full data to determine empirically driven data structures. Antidepressant non-responders displayed 3 distinct symptom profiles along internalizing dimensions of anxiety, anhedonia, motivation, and cognitive function. **CONCLUSIONS:** Results should be replicated in a prospective cohort sample for predictive validity; however, this study demonstrates initial proof-of-concept for using a limited scope self-report instrument encompassing internalizing symptomatology for distinguishing between SSRI/SNRI resistant and responsive depression profiles.

2-E-35 Neural dissimilarity predicts loneliness in autistic and neurotypical youth

Kathryn McNaughton¹, Sarah Dziura¹, Paige Munshell¹, Heather Yarger¹, Elizabeth Redcay¹

¹University of Maryland

BACKGROUND AND AIM: Loneliness, the emotional response to the gap between one's actual and one's desired level of social connection, has a critical impact on mental and physical well-being. Loneliness is especially prevalent in autistic youth who report increased loneliness compared to non-autistic peers and are at increased risk for negative mental health outcomes. One factor that may predict loneliness is increased dissimilarity, as similarity facilitates social connection with peers. Dissimilarity can be measured at the neural level to provide a real-time measure of cognitive and affective processing of diverse stimuli without being subject to self-report biases. Here, we test neural similarity as a predictor of loneliness in autistic and non-autistic youth. We predict that decreased neural similarity will predict increased loneliness. **METHODS:** Autistic (n=10) and non-autistic (n=21) youth aged 11-14 (gender: n=10 female, n=19 male, n=2 gender fluid) watched 6 3-6 minute video clips containing social and nonsocial content in the MRI scanner. Data were preprocessed, and time series for regions of interest (ROIs) were extracted according to a 268-ROI parcellation (Shen et al., 2013). Based on previous evidence for neural similarity in ROIs in the ventral striatum contributing to social network ties (Parkinson et al., 2018), 2 parcels corresponding to left and right ventral striatum (VS) were used as a priori ROIs. ROI time series were correlated between all possible pairs of participants. Neural similarity was calculated for each participant to the group as the average of the pairwise correlations including that participant. Loneliness was quantified from youth self-report on the Loneliness and Social Dissatisfaction Scale (Asher & Parker, 1993). **RESULTS:** Autistic youth reported significantly more loneliness than non-autistic youth ($t(29)=4.55$, $p<0.01$). Increased loneliness was significantly predicted by decreased neural similarity in the right VS ($t(27)=-2.36$, $p=0.03$) and marginally predicted in the left VS ($t(27)=-1.70$, $p=0.10$). For both ROIs, there was no significant interaction between group (autistic/non-autistic) and neural similarity in predicting loneliness. **CONCLUSIONS:** For autistic and non-autistic youth, reduced neural similarity in the ventral striatum's response to video clips predicted higher levels of self-reported loneliness. These findings provide evidence for a novel mechanism of loneliness in autistic and non-autistic adolescents: neural dissimilarity. Given the role of the ventral striatum in motivation, learning, and reward, these data suggest that individuals who differ in their engagement of these processes may experience more loneliness. Future work will examine how social experiences may mediate this relationship as well as how behavioral similarity may relate to perceived loneliness. **ACKNOWLEDGEMENTS AND FUNDING:** R01MH125370, F31MH127781

2-E-36 Sensitivity to the incentives for mental effort across clusters of depressive symptoms

Mahalia Prater Fahey¹, Ivan Grahek¹, Amitai Shenhav¹

¹Brown University

OBJECTIVE: Depression is characteristically associated with deficits in cognitive performance, which have often been attributed to diminished capacity. However, recent work suggests that these deficits may not only reflect differences in capacity but also differences in motivation. The motivation to exert mental effort is determined both by the amount of reward expected for performing well, and the extent to which effort is efficacious for achieving those outcomes (versus, e.g., outcomes being determined at random). Differences in mental effort allocation across people can therefore reflect differences in how people evaluate expected reward, expected efficacy, or their interaction (the overall 'expected value of control'). Here, we examine how symptoms associated with depression relate to these different components of motivation, and how this influences variability in mental effort exertion. **METHODS:** 302 participants performed self-paced intervals of an incentivized Stroop task (6-9s each). Across the session, we varied the amount of reward at stake for an interval (small vs. large), and whether those rewards were more likely to be determined based on performance ('high efficacy') or at random ('low efficacy'). Participants completed a battery of questionnaires measuring symptoms of depression and anxiety, impulsivity, and levels of motivation or apathy, which we submitted to an item-level exploratory factor analysis (141 items in total). **RESULTS:** Our factor analysis revealed 5 factors which we grouped as related to: negative mood (e.g., sadness), negative affectivity (e.g., worry), amotivation, effort seeking, and impulsivity. We examined how these factors modulated the influence of efficacy, reward, and their interaction, on performance (i.e. response time and accuracy) in the Stroop task. Response times revealed that higher scores on the amotivation related factor were associated with increased sensitivity to the rewards for effort and higher scores on the worry-related factor were associated with increased sensitivity to both reward and efficacy. Accuracy data further suggested that people lower in this worry-related factor and higher on the sadness-related factor were increasingly sensitive to the interaction between reward and efficacy. Ongoing analyses are using the hierarchical drift diffusion model to provide a mechanistic account of the control strategies employed in response to these components of motivation as a function of symptoms. **CONCLUSIONS:** We find preliminary evidence that symptoms associated with depression are related to variability in the evaluation and adjustment of cognitive control based on the expected incentives for engaging in mental effort.

2-E-37 Representational similarity analysis reveals a common brain network supporting worry and rumination

Nikki Puccetti¹, Caitlin Stamatis², Kiara Timpano¹, Aaron Heller¹

¹University of Miami, ²Northwestern Feinberg School of Medicine

BACKGROUND AND AIM: Heightened negative affectivity that is shared among depression and anxiety may be explained, in part, by repetitive negative thinking (RNT). RNT is the cognitive process shared between worries about the future and ruminations about the past. Yet, little is known about the neural basis of RNT because few fMRI studies 1) examine RNT's content-specific components (worry and rumination) together 2) induce RNT with personalized prompts, and 3) assess RNT dimensionally across diagnostic groups and healthy controls. **METHODS:** To address this, we presented idiographic worry and rumination statements to induce RNT during an fMRI scan in 37 young adults with dimensionally assessed RNT. During imaging, participants reflected on their recent, personal worries and ruminations as well as neutral self-referential prompts.

We characterized RNT in the brain using a searchlight representational similarity analysis, a procedure that identifies clusters of voxels in the brain where the pattern of encoding is maximally similar between worry and rumination and maximally different from neutral prompts. **RESULTS:** This searchlight revealed a distributed set of regions associated with the default mode network (medial PFC, hippocampus) and salience network (amygdala, insula) ($p < 0.0005$). **CONCLUSIONS:** These results support the notion that RNT, independent of specific thought content, can be linked to a common process in the brain. Neural evidence of a higher order RNT process can inform future brain work examining comorbidity and commonalities across clinical disorders, such as depression and anxiety.

2-E-38 Negative affect and craving share a common neural pathway during abstinence from smoking

Golnaz Tabibnia¹, Dara Ghahremani², Jean-Baptiste Pochon², Maylen Perez Diaz², Edythe London²

¹University of California, Irvine, ²University of California, Los Angeles

BACKGROUND AND AIM: Negative affect and craving have traditionally been linked to functions of the brain's threat and reward networks, respectively. However, given that the default mode network (DMN), particularly the posterior cingulate cortex (PCC), participates in self-related thought and internal mental states, we examined whether DMN activity underlies both craving and negative affective states in adults who smoke. **METHODS:** Forty-six adults who endorsed daily smoking were tested at an academic research facility in Los Angeles after abstaining from smoking overnight (~12 h). Participants underwent resting-state fMRI after self-reporting cigarette craving and psychological withdrawal symptoms on the Shiffman-Jarvik Withdrawal Scale and state anxiety on the Spielberger State-Trait Anxiety Inventory (the latter two measures indicating negative affect). Within-DMN functional connectivity using 3 different anterior PCC seeds was tested for correlations with self-report measures. Additionally, independent component analysis with dual regression was performed to measure associations of self-report with whole-brain large-scale network connectivity of the DMN component. **RESULTS:** Craving correlated positively with connectivity of all three anterior PCC seeds with posterior PCC clusters ($p_{\text{corr}} < 0.04$). The measures of negative affective states correlated positively with connectivity of the DMN component to various brain regions, including posterior PCC ($p_{\text{corr}} = 0.02$) and striatum ($p_{\text{corr}} < 0.008$). Craving and state anxiety were correlated with connectivity of an overlapping region of PCC ($p_{\text{corr}} = 0.003$). Unlike the state measures, nicotine dependence and trait anxiety were not associated with PCC connectivity within DMN.

CONCLUSIONS: Although negative affect and craving are distinct subjective states, they appear to share a common neural pathway within the default mode network, particularly involving the posterior cingulate cortex. **ACKNOWLEDGEMENTS AND FUNDING:** The authors would like to thank Ms. Andrea Donis, Ms. Diana Paez, Ms. Citlaly Cahuantzi, Ms. Tinisha Sakhrani, and Mr. Hector Diaz, whose contribution to data collection helped make this work possible. The authors also thank the Staglin One Mind Center for Cognitive Neuroscience in the Semel Institute for Neuroscience and Human Behavior, where the fMRI scans were conducted. This research was supported, in part, by a grant from the National Institute on Drug Abuse (NIDA) (R37 DA044467, EDL) and endowments from the Thomas P. and Katherine K. Pike Chair in Addiction Studies and the Marjorie M. Greene Trust (EDL). Dr. Perez Diaz was supported by a Ruth L. Kirschstein Postdoctoral Individual National Research Award from NIDA (F32 DA049500-01A1). Dr. Tabibnia is supported by a Research Supplement to Promote Re-Entry and Re-integration into Health-Related Research Careers from NIDA (3R37DA044467-05S1).

2-E-39 Chronic pain and sleep disturbance in youth with chronic pain

Alexandra Tremblay-McGaw¹, Lauren Harrison¹, Laura Simons¹

¹Stanford University School of Medicine

BACKGROUND: Chronic musculoskeletal (MSK) pain affects the lives of over a quarter of youth, with societal costs exceeding \$19.5 billion dollars in the U.S. each year. Chronic MSK pain in childhood predicts symptom continuity across the lifespan and is a documented risk for opioid misuse, the effects of which have been deemed a public health crisis. Furthermore, chronic MSK pain impacts multiple domains including social, emotional, and behavioral functioning. Previous research demonstrates a strong association between sleep quality and emotional functioning and is a critical component of healthy development during adolescence. Approximately 30% of children and the majority of adolescents experience sleep inefficiency increasing their chance of developing psychopathology later in life. Additionally, previous research has also found poor sleep to be associated with prolonged chronic pain. However, little is known about how sleep and mood differs among youth with chronic pain and pain-free youth. The present study examines sleep quality and emotional functioning (anxiety, depression) in a cohort of youth with chronic MSK pain compared to pain-free peers. **METHODS:** The present study utilizes an existing dataset collected during a larger study between 2017 and 2021. Youth ($N=78$) were between 10-18 years old (68% female). Of these youth, 54 had a diagnosis of chronic pain, the remaining youth were pain-free peers. We examine associations of sleep (PROMIS: Sleep Disturbance Scale), depression (Child Depression Inventory), and anxiety (State-Trait Anxiety Inventory-TRAIT) across the entire sample of youth. Independent samples T-tests were conducted to examine differences in variables between youth with chronic pain and pain-free peers. **RESULTS:** Pearson's correlations demonstrated significant associations between sleep disturbance and depression for youth with chronic pain ($r=0.52$, $p < .001$) and pain-free peers ($r=0.60$, $p=.012$). Sleep disturbance was also significantly associated with increased anxiety in youth with chronic pain ($r=0.41$, $p=0.10$). Independent samples T-tests demonstrate youth with chronic pain had significantly worse sleep compared to pain free peers ($t=4.07$, $p < 0.001$).

Further, youth with chronic pain report significantly higher depression compared to pain-free peers ($t=4.22$, $p < 0.001$). **CONCLUSION:** Sleep is a problem for all youth and is associated with poorer emotional functioning in youth living with chronic pain and pain-free peers. However, youth with chronic pain report worse sleep and depression compared to pain-free controls. Given that poor sleep and mood is known to be associated with increased pain chronicity it is important to target these symptoms when treating chronic pain. Future research should examine objective measures of sleep in this population, as well as possible moderators of sleep quality in youth with chronic pain. **ACKNOWLEDGEMENT:** Supported by The National Institutes of Health (No. R01HD083270 to LES)

2-F-40 It is not what you look at that matters, it is what you see: Take II

Yaara Yeshurun¹

¹Tel-Aviv University

BACKGROUND AND AIM: Recent political polarization has highlighted the extent to which individuals holding opposing views experience ongoing events in markedly different ways. Moreover, the dynamics of the political scene in Israel highlighted the extent to which the same individuals may considerably change their opinions on specific political figures and events. In this study, we explored the brain mechanisms underlying these phenomena. **METHODS:** We conducted a functional magnetic resonance imaging (fMRI) scanning right- and left-wing participants watching political videos before and after the 2019 elections in Israel. Due to the unstable political situation during those times, the scans were two and a half years apart. **RESULTS:** As for the pre-elections session, as expected, we observed significant differences between left- and right-wing participants in their interpretation of the videos' content. Furthermore, neuroimaging results revealed partisanship-dependent differences in activation and synchronization in higher-order regions. Surprisingly, such differences were also revealed in early sensory, motor and somato-sensory regions. We found that the political content synchronized the responses of primary visual and auditory cortices in a partisanship-dependent manner. These differences were pronounced to the extent that we could predict political orientation from the early brain-response alone. Importantly, no such differences were found with respect to neutral content. Analysis of the post-election session showed that, as a result of the political changes that took place in the years between the two scans, participants' interpretations and responses to the political stimuli dramatically changed. Preliminary neuroimaging results revealed differences in the brain response that depended on changes in participants' interpretation and emotional response to the video clips. These differences were most pronounced in the hippocampus, amygdala and reward regions. **CONCLUSIONS:** These results suggest that political polarization is not limited to higher-order processes as previously thought, but rather already emerges in motor and sensory regions. Moreover, political-dependent differences in individual's interpretation were reflected in regions involved in emotion and memory.

2-G-41 The neural representation of self-concept

Marie Levorsen¹, Ryuta Aoki², Kenji Matsumoto³, Constantine Sedikides¹, Keise Izuma⁴

¹University of Southampton, ²Tokyo Metropolitan University, ³Tamagawa University, ⁴Kochi University of Technology

BACKGROUND AND AIM: The knowledge about who we are, the self-concept, shapes human experience. Social cognitive neuroscience has made strides addressing the question of where and how the self is represented in the brain. The answer, however, remains elusive. The aim of the present study was to examine where and how the self is represented in the brain.

METHODS: In the present research, two functional magnetic resonance imaging (fMRI) experiments examined this question. In Experiment 1, twenty-eight participants completed two online questionnaires where they provided attributes about their self-concept. In this way they were presented with unique stimuli whilst they performed the self-reference task and the word-class judgement task (control task) inside an fMRI scanner. In Experiment 2 (which was pre-registered), thirty-five participants completed similar questionnaires where they provided attributes about their own self-concept, as well as the self-concept of a close friend. In an fMRI session, they were presented with the unique stimuli whilst they performed the self-reference task and the other-reference task (control task). The data was analyzed using searchlight representational similarity analysis (RSA). **RESULTS:** Across two experiments, we consistently found that the importance of attributes to self-identity was represented in the medial prefrontal cortex (mPFC), whereas mPFC activation was unrelated both to self-descriptiveness of attributes (Experiments 1-2) and importance of attributes to a friend's self-identity (Experiment 2).

CONCLUSIONS: Our research provides a comprehensive answer to the abovementioned question: The self-concept is conceptualized in terms of self-importance and represented in the mPFC. **ACKNOWLEDGEMENTS AND FUNDINGS:** We thank Atsushi Miyazaki, Mika Oosawa and Maoko Yamanaka for the assistance with fMRI data collection. This research was supported by a Japan Society for Promotion of Science (JSPS) KAKENHI Grant Number JP19K24680 (to K.I.) and the Ministry of Education, Culture, Sports, Science and Technology (MEXT) as part of Joint Research Program implemented at Tamagawa University Brain Science Institute, in Japan.

2-J-42 Emotional intensity of angry and happy vocal expressions elicits a differential response in the temporal gyrus

Katherine Billetdeaux¹, Whitney Mattson¹, Eric Nelson¹, Kristen Hoskinson¹, Michele Morningstar²

¹The Abigail Wexner Research Institute at Nationwide Children's Hospital, ²Queen's University

Specialized regions of the brain are found to track variations in facial muscles that convey changes in the emotional intensity of facial expressions. Comparatively, little is known about how the brain responds to analogous vocal cues of emotion, especially in children and adolescents. Acoustic cues in a speaker's tone of voice can communicate both the type and intensity of another person's emotional expression. To better characterize neural responses to non-facial nonverbal cues of emotion, the current study investigated whether activation in regions of the brain specialized for auditory processing also varies as a function of emotional intensity in vocal expressions. We performed fMRI on a group of healthy adolescents while they listened to a series of vocal expressions of increasing emotional intensity, morphing linearly from neutral to high-intensity anger/happiness. 59 participants (age 8-21; 27 male) underwent event-related fMRI. Stimuli consisted of previously validated recordings of youth expressing short sentences of ambiguous emotional text in neutral, angry, and happy tones of voice. These original recordings were altered to generate a series of morphed vocal expressions ranging from neutral (0% emotion) to 33%, 66%, and 100% angry and happy expressions (8 of each type). Across two 6-min runs, these stimuli were presented in random order to participants who were instructed to indicate the intended emotion (angry, happy, or neutral) on each trial. Whole brain analysis was performed for angry and happy categories separately, examining the association between a parametric regressor for emotional intensity and neural response (using 3dttest). Cluster correction thresholds were applied using a Monte Carlo

based 3dClustSim procedure. For angry recordings, there was an effect of emotional intensity level on activation in a large bilateral cluster of activation in the left superior temporal gyrus, $t=3.56$, $k=413$, $xyz=[-64.5, -1.5, +1.5]$, and right superior temporal gyrus, $t=4.35$, $k=401$, $xyz=[+70.5, -19.5, -1.5]$. For happy recordings, no clusters survived cluster correction, although a subthreshold region was apparent in similar areas. However, a significant bilateral activation in the superior/middle temporal gyrus was found for both for angry and happy voices when the analysis collapsed across intensity levels. Our findings indicate that while both angry and happy voices elicited activation in the temporal gyrus, activation to angry voices was modulated by the intensity of the emotion. Although a similar pattern was evident for happy voices, the modulation of activation by emotional intensity was not as robust. This may indicate that there is a greater sensitivity to intensity in angry voices within the temporal gyrus. This research compares with similar studies using visual displays of faces and lays the foundation for future studies on the neurobiology of affective prosody across typical development and different adolescent populations.

2-J-43 Testing a three dimensional model of early life adversity and relations to alexithymia in young adulthood

Genesis Flores¹, Francesca Querdasi², Bridget Callaghan²

¹University of Southern California, ²University of California, Los Angeles

BACKGROUND AND AIM: Alexithymia, a trait characterized by difficulty identifying and describing emotions, has been implicated in emotion dysregulation and a range of psychopathologies. Early life adversities, including threat, deprivation, and unpredictability, are strongly associated with poor affective functioning across the lifespan (Ellis et al., 2022) and may have the capacity to influence neurocognitive processes impaired in alexithymia (Kooiman et al., 2004). Prior research suggests that emotional neglect, an adversity commonly ascribed to deprivation, is most strongly linked to alexithymia, but adversities associated with threat (e.g., physical and sexual abuse) have also been linked, to a weaker degree (Khan & Jaffee, 2022). Because children's emotional abilities are largely socialized through early interactions with caregivers, adversity may impair development of emotional expression and labeling, especially in the context of deprivation where stimulation is low. In this study, we aim to evaluate a factor model of adversity characterized by dimensions of threat, deprivation, and unpredictability, and test whether these dimensions predict alexithymia in young adulthood. **METHODS:** The proposed study will present data from a diverse sample of 315 young adults (22.4 ± 2.03 years, range = 18-25 years) living in the United States who, as part of a larger study, completed questionnaires assessing adversity and health symptoms. Participants retrospectively reported experiences of adversity using the Childhood Trauma Questionnaire, Assessment of Parent and Child Adversity, and Questionnaire of Unpredictability in Childhood. Participants also reported difficulties identifying and describing emotions using the Toronto Alexithymia Scale. **ANALYTIC PLAN:** We will perform a confirmatory factor analysis to evaluate a dimensional model of early adversity characterized by underlying factors of threat, deprivation, and unpredictability in our dataset. Based on prior empirical and theoretical work (Ellis et al., 2022; Usacheva et al., 2022), we expect this three-factor model to provide adequate fit. If fit is not adequate, we will perform an exploratory factor analysis to characterize the structure of adversity in our dataset. Multiple linear regressions will be run to predict alexithymia from each empirically derived dimension, controlling for participant age and gender. We hypothesize that greater early life experiences of threat and deprivation will predict higher alexithymia in young adulthood, with deprivation explaining the most variance due to alexithymia's strong associations with neglect. We do not have hypotheses for how unpredictability may relate to alexithymia, as no study has examined this relationship. **CONCLUSIONS:** Understanding how different adversity experiences impact a subclinical cognitive-affective trait, alexithymia, may inform interventions aimed at improving emotional well-being, particularly among those exposed to early adversity.

2-J-44 Electrophysiological correlates of pain processing in the affective priming: an exploratory study

Anna Gilioli¹, Eleonora Borelli¹, Francesca Pesciarelli¹

¹University of Modena and Reggio Emilia

BACKGROUND AND AIM: Pain plays a fundamental role in the well-being of the individual, and its semantic content may have specific properties compared to other negative domains (i.e., fear and anger) which allow the cognitive system to detect it in priority. Considering the influence of the affective context in which stimuli (targets) are evaluated, it is possible that their valence could be differently processed if firstly preceded by negative stimuli (primes) associated to pain respect to negative stimuli not associated to pain. Thus, the present study aims to investigate the electrophysiological correlates of the implicit processing of words with pain content by using an affective priming paradigm. **METHODS:** Event-related potentials (ERPs) were recorded while participants were presented with positive and negative word targets (not associated to pain) that were preceded by positive, negative (not associated to pain), and pain words primes. Participants were asked to judge the valence of the target word. **RESULTS:** Results showed faster reaction times (RTs) and a larger P600 ERP component when negative targets were preceded by pain primes rather than negative (not associated to pain) or positive primes. **CONCLUSION:** These results reaffirm the importance that valence has in establishing the priority with which stimuli are encoded in the environment and highlight the role that pain has in the processing of stimuli, especially negative stimuli, supporting the hypothesis according to which the valence and the semantics of a stimulus interact with each other generating a specific response for each type of emotion.

2-J-45 The click moments: Modulation of broadband EEG on communication dynamics

RUI Liu¹, Aliaksandr Dabranau¹, Ivana Kovalinka¹

¹Technical University of Denmark

BACKGROUND AND AIM: Human communication has been formulated as an information compression problem: interlocutors produce and comprehend communicative signals with forward and inverse models of form-meaning association. However, a fundamental question is how interlocutors communicate when the form and meaning are not given in the first place.

METHODS: In this study, we investigate the behavioral and neural dynamics of how interlocutors co-construct a communicative system from scratch over time, by using the Embodied Communication Game (ECG) paradigm. In the experiment, two participants were randomly paired and sat in separate rooms, while their electroencephalograms (EEG) were simultaneously recorded. The pairs of participants controlled the movement of an icon on a screen with the goal of coordinating their choices when shared form and meaning were lacking. The movements were visible to both participants, and feedback was provided at the end of each trial. Their task was thus to establish a shared form-meaning system using only their movements of the screen icon. **RESULTS:** We found that both the communication outcome and dynamics varied across the interacting pairs. Each pair converged on different form-meaning signaling systems, and showed unique temporal signatures of communication. Moreover, preliminary results suggest that broadband EEG activity may track the pair-specific communication dynamics, independent from the occurrence of specific movements. **CONCLUSIONS:** These results suggest that emergence of a shared signaling system requires interlocutors to mutual infer and co-construct each other's behavior, and that this process may be associated with a fundamental change of the generative models of the interlocutors over time than specific sensorimotor output per se.

2-J-46 Decoding the neural representation of valence and arousal across affective states

Roshni Lulla¹, Jonas Kaplan¹

¹University of Southern California

The field of social and affective neuroscience has debated about how our brains encode and represent affective states. One conception of these affective states is that they vary on dimensions of valence and arousal, containing differing degrees of positive or negative attributes. Yet there is little agreement as to the neural processes that relate to valence and arousal. Current literature examining valence in the brain with neuroimaging has generally employed univariate analyses, focused on identifying brain regions associated either with bipolar representations of valence and arousal or with more global representations of these attributes. In contrast to univariate approaches, Representational Similarity Analysis (RSA) focuses on patterns of similarity across attributes of stimuli, allowing the quantification of the correspondence between neural activity patterns and psychological states. This study will investigate the distributed encoding of valence and arousal using RSA in a searchlight fashion across the whole brain. **HYPOTHESIS:** We hypothesize that there will be specific areas of the brain in which neural patterns of activation in response to affective stimuli will have high representational similarity to independent valence and arousal ratings of these stimuli. Furthermore, the spatial maps of representational similarity will differ for valence and arousal with some regions of overlap. **METHODS:** Functional neuroimaging data was collected on 100 participants at the Dornsife Neuroimaging Center at the University of Southern California. Participants were exposed to 45 images in the scanner, counterbalanced across five emotional categories: happy, sad, fear, disgust, and neutral. Data will be preprocessed and registered to the standard MNI space using fMRIPrep and then processed using the General Linear Model to create z-statistic maps for each of the 45 affective stimuli. An independent set of participants reported ratings of valence and arousal for each image. Using a searchlight approach, we will perform an RSA by creating a spherical region around every voxel in the brain to determine how similar the pattern of neural activation within that region is to the pattern of valence and arousal ratings across stimuli. We will create a representational dissimilarity matrix (RDM) within each sphere, then measure the Euclidean distance between neural activation patterns for image pair. This neural RDM will be correlated with two behavioral RDMs, one of valence ratings and one of arousal ratings. Each correlation will result in one similarity value per voxel sphere, representing the degree of similarity of neural activation patterns within that region to the pattern of ratings. This analysis will result in two maps of similarity values, allowing me to identify brain regions with a representational structure that matches the psychological structure of these two variables.

2-J-47 It's how you say it: Support giver's pitch is associated with social emotion regulation outcomes across three samples

Razia Sahi¹, Siyan Nussbaum¹, João Guassi Moreira¹, Emilia Ninova², Elizabeth Gaines¹, Naomi Eisenberger¹, Jennifer Silvers¹

¹University of California, Los Angeles, ²NA

BACKGROUND AND AIM: Social reappraisal is an effective strategy for regulating someone else's emotions that involves trying to help them change how they think about an emotional event. Despite considerable variability in how individuals communicate during such supportive interactions, little is known about how features of vocal expression—such as pitch—might shape social regulatory outcomes. Higher pitch has been associated with greater affective arousal in the speaker (Kamiloğlu et al., 2020) and enhanced attention and learning in infant listeners (Fernandez & Knörnschild, 2020). Thus, we anticipated that higher support giver pitch would be associated with better social emotion regulation outcomes. **METHODS:** We tested this question in three separate datasets (N1 = 40 dyads; N2 = 40 dyads; N3 = 60 dyads; all same-gender friend pairs) where participants recorded scripted reinterpretations (i.e. reappraisals) of aversive stimuli to support their friend's efforts to regulate emotion. We measured pitch as the support giver's average fundamental frequency (F0) across an utterance. Our primary outcome variable of interest during the task was the negative affect ratings of the person receiving support. As a measure of friendship quality, we used self-report on the Inventory of Peer Attachment (Armsden & Greenberg, 1987), consisting of three subscales (i.e. trust, communication, and alienation). **RESULTS:** Using a Bayesian statistics approach, we found that higher support giver pitch was consistently associated with lower negative affect in their friend during the task (study 1: $b = -0.13$, 89% HDI: [-0.20, -0.05]; study 2: $b = -0.10$, 89% HDI: [-0.16, -0.04]; study 3: $b = -0.08$, 89% HDI: [-0.13, -0.03]). Additionally, support giver pitch during the task was positively associated with how the friend perceived the quality of their relationship with the support giver more generally (study 1: $b = 0.83$, 89% HDI: [0.15, 1.64]; study 2: $b = 0.80$, 89% HDI: [0.30, 1.31]; study 3: $b = 0.72$, 89% HDI: [0.39, 1.02]), particularly the perceived quality of communication in the relationship. Results from our gender-split sample (study 3) indicate that these effects are driven by women friend-pairs. **CONCLUSIONS:** This work informs how we can communicate to effectively support others by demonstrating a role of vocal features in regulatory and relationship outcomes. As a next step,

we are collecting functional magnetic resonance imaging data using this social emotion regulation paradigm to assess how pitch shapes neural responsivity to social support. **ACKNOWLEDGEMENTS AND FUNDING:** This work was supported by funds from the Bernice Wenzel and Wendell Jeffrey Term Chair in Developmental Neuroscience to Dr. Jennifer Silvers. We are grateful for the efforts of Maya Lee, Zhouzhou He, Devika Shenoy, Ngoc Ngo, Audrey Lai, and Evie Lee in supporting data collection.

2-J-48 In or out of sync? A psychophysiological approach to digital collaboration

Maylis Saigot¹, Rob Gleasure¹, Ioanna Constantiou¹, Andreas Blicher¹

¹Copenhagen Business School

BACKGROUND AND AIM: Geographically-dispersed teams are increasingly tasked with creative work. However, decades of research indicate that certain digital media can make communication less effective, cumbersome, and demotivating. Recent research suggests that videoconferencing hampers team members' ability to broaden their focus, leading them to produce fewer creative ideas than face-to-face teams. This study aims to provide a physiological explanation of why in-person teams may generate more ideas than virtual teams. We suggest physiological linkage as a moderator of divergent and convergent thinking. **METHODS:** Participants are grouped into dyads, assigned to an in-person or online condition, and asked to complete four trials of an alternative use task. Before the task, participants partake in an individual mood induction task where they play a frustration or a regular version of a Pac-man game, resulting in each dyad either being in different or similar moods. Instruments include self-reporting measures of affective states, cognitive consensus, team processes, and perceived affective friction. Objective measures include eye movements, heart rate, skin conductance, and facial expressions. H1: Dyads in different moods experience greater affective variation during the task; H2: In-person dyads experience greater affective variation than online dyads; H3: Affective variation increases the number of ideas generated by a dyad; H4: Affective convergence increases the creativity of the idea selected by a dyad. **ANALYSIS PLAN:** We use physiological synchrony to develop affective variation and convergence measures. Within each dyad, we will use a set of analytical techniques to measure physiological synchrony. We will also use self-report measures of affective state and perceived affective friction. The task outcome is based on originality, fluency, flexibility, and elaboration. To increase the explanatory power of our model, we will further augment our findings by analyzing gaze overlap signals, which have been associated with affective engagement. Finally, we will analyze speech and voice tone data to look for evidence of vocal mimicry. **IMPLICATIONS:** To maintain sustainable flexible work arrangements, we must understand the asymmetrical effects of collaboration modes on group creativity, team processes, and connectedness. This study will help identify some of the affective processes that can explain these. This experiment can help practitioners build on empirical evidence to determine the appropriate mode of communication for creative tasks and the affective consequences of the selected media. It can further advance the state of research on hybrid teams by emphasizing the often overlooked role of affective processes for effective collaboration. **FUNDING:** This research is funded by a Carlsberg Foundation Young Researcher Fellowship awarded to Associate Professor Rob Gleasure, titled "Mood synchronicity, collaboration media, and task outcomes."

2-J-49 Being mimicked for choices increases perception of warmth, not competence

Antonia Hamilton¹, Paula Wicher¹, Eva Krumhuber¹

¹University College London

BACKGROUND AND AIM: It is widely believed that being mimicked makes us like the person more (Chartrand and Bargh, 1999). Can we get different benefits depending on what we copy -physical movements or something more abstract like preferences? **METHODS:** Here, we compared the social consequences of copying choices and copying hand movements in the context of making art choices. Participants completed an in-lab mimicry task with 3 different 'confederates' who either mimicked their hand movements, art choices or did 50/50 of both. They believed the confederates were real people on a Zoom call, when in fact they were pre-recorded videos. Then they completed measures of perceived warmth and competence to assess first impressions. **RESULTS:** In general, the results showed that participants liked 'confederates' who mimicked their choices more than the ones who mimicked their hand movements. Moreover, copying preferences increased social perceptions of warmth and copying hand movements increased competence scores. **CONCLUSIONS:** These results suggest copying choices seem to be a stronger driving factor in likability judgments than copying motor movements. **FUNDING:** UCL Division of Psychology and Language Sciences

2-M-50 Effects of ketamine on the perception and neural representation of dynamic facial expressions

Annkathrin Boeke¹, Sven Wasserthal¹, Mirko Lehmann¹, Claudia Neumann¹, Achilles Delis¹, René Hurlmann², Ulrich Ettinger¹, Johannes Schultz¹

¹University of Bonn, ²University of Oldenburg

BACKGROUND AND AIM: Facial expressions, in particular in their dynamic form, carry an extensive amount of social information. A key region of the neural system involved in perceiving and recognizing social information from dynamic stimuli is the posterior part of the superior temporal sulcus (pSTS). Schizophrenia (SZ) is associated with deficits in the perception and recognition of social information, as well as with aberrant pSTS responses to stimuli rich in social information. As the administration of a subanesthetic dose of the glutamatergic N-methyl-d-aspartate (NMDA) uncompetitive antagonist ketamine induces cognitive symptoms similar to those of SZ, we hypothesized that ketamine might influence pSTS responses to dynamic face stimuli. Here, we addressed this question by administering ketamine to healthy participants performing a face processing task during functional magnetic resonance imaging. **METHODS:** In a parallel-group, double-blind, randomized trial, 69 participants received ketamine (Ketamin-Ratiopharm 500 injection solution, Ratiopharm©, Ulm, Germany, administered as a 2 mg/mL solution with a constant target plasma level of 100 ng/mL by a bolus and continuous intravenous infusion) or placebo. 63 data sets were analyzed for this study. During the task, participants were presented with dynamic facial expressions (i.e., videos of facial expressions) and control stimuli and judged the smoothness of these stimuli. **RESULTS:** Ketamine did not

decrease participants' performance in the task. Univariate region of interest (ROI) analyses of the blood oxygenation level dependent (BOLD) responses to the facial expressions in pSTS were not significantly influenced by ketamine. Next, to investigate the impact of ketamine on the neural representations of the different facial expressions displayed in the stimuli, we performed an exploratory multivariate representation similarity analysis. We constructed a representational dissimilarity matrix (RDM) coding for the differences in the social information contained in the stimuli, and searched for neural responses reflecting this RDM in the pSTS ROI and the whole brain. This analysis revealed that activity in a large extent of the occipital and lateral temporal cortex showed similarity with this RDM in the placebo group. Under ketamine, we observed a decrease in the similarity between the RDM and neural data in one cluster located in the middle temporal gyrus. **CONCLUSIONS:** These findings suggest that a subanesthetic dose of ketamine does not alter the magnitude of the pSTS BOLD response to dynamic facial expressions, but alters the neural representation of the social information that these stimuli contain. As such, our findings provide further insight into the role of the glutamatergic system in social-cognitive processes and potential neural bases of the social cognitive impairments observed in schizophrenia.

2-M-51 Evidence of dopamine-dependent pathways in a limbic-motor network

Leah Mann¹, Mathieu Servant², Kaitlyn Hay³, Alexander Song¹, Paula Trujillo³, Bailu Yan¹, Hakmook Kang¹, David Zald⁴, Manus Donahue³, Gordon Logan¹, Daniel Claassen³

¹Vanderbilt University, ²Université de Franche-Comté, ³Vanderbilt University Medical Center, ⁴Rutgers University

BACKGROUND AND AIM: Parkinson's disease (PD) is a neurodegenerative disorder characterized by dopamine dysfunction, for which pharmacologic restoration of dopamine tone can dramatically improve motor function. One commonly encountered non-motor symptom of PD is impulsive compulsive behaviors (ICBs), whereby patients develop overactive participation in rewarding activities associated with sex, eating, gambling, and shopping. Investigations into ICBs have established important distinctions in mesocorticolimbic systems, with these patients showing evidence of biologic differences in dopamine receptor expression in the ventral striatum, enhanced dopamine release in this region, greater mesolimbic metabolism in response to dopamine therapies, and altered connectivity among the midbrain, amygdala, and ventral striatum. Additionally, imaging studies of response inhibition in PD patients have revealed mesocorticolimbic regulation of action control, as greater D2-like binding potential (BPND) in the amygdala and hippocampus is associated with enhanced inhibitory control. Together, these findings offer a unique opportunity to assess the limbic-motor network and the effect of dopamine on this system by applying methods that assess D2-like receptor status, dopamine release, and action-control proficiency. We sought to further determine the role of extrastriatal dopaminergic pathways in action control. **METHODS:** We evaluated 29 PD patients (10 female and 19 male) using the Simon conflict task in a single-blinded D-amphetamine (dAMPH) study (N = 16). Participants completed [18F]fallypride positron emission topography (PET) imaging in two conditions, following either placebo or dAMPH administration. **RESULTS:** A region of interest (ROI) examination revealed that longer non-decision time is associated with greater D2-like BPND in the amygdala (coefficient = 67.375, p = 0.0002), substantia nigra (coefficient = 108.691, p = 0.0038), ventral striatum (coefficient = 10.372, p = 0.0038), orbitofrontal cortex (coefficient = 19.236, p = 0.0038), and hippocampus (coefficient = 174.426, p = 0.0008). A voxel-wise analysis confirmed this positive relationship bilaterally in the amygdala, hippocampus, and insular cortex, and in the right posterior orbitofrontal cortex. Additionally, an ROI examination showed that the relationship between the change in non-decision time from placebo to dAMPH conditions and baseline D2-like BPND trends toward an effect in the globus pallidus (coefficient = 19.662, p = 0.0575). **CONCLUSIONS:** These findings reveal a limbic-motor loop through which dopaminergic activity in mesial temporal areas influences motor output. The implication of a translational limbic-motor interface, with mesial temporal and globus pallidal activity, provides a compelling demonstration of the rich interactions between limbic processing and motor behavior. **ACKNOWLEDGEMENTS AND FUNDING:** 1K24AG064114 and 5R01NS097783

2-N-52 Neural responses to peers faces predict vulnerability to loneliness during COVID-19

Jeesung Ahn¹, Yoona Kang¹, Laetitia Mwilambwe-Tshilobo¹, Danielle Cosme¹, Mia Jovanova¹, Danielle Bassett¹, Zachary Boyd², David Lydon-Staley¹, Peter Mucha³, Kevin Ochsner⁴, Emily Falk¹

¹University of Pennsylvania, ²Brigham Young University, ³Dartmouth College, ⁴Columbia University

BACKGROUND AND AIM: Perceived social isolation, or loneliness, is a painful emotional state that arises when discrepancies exist between one's desired and perceived levels of social connection. Loneliness is not synonymous with objective social isolation and being alone, which are characterized by being physically lacking or removed from social connections. The COVID-19 pandemic and related social distancing measures provided a natural manipulation of objective social isolation. The current study tested whether fMRI-measured neural responses to self-relevant social stimuli (i.e., photos of peers' faces) predict individual differences in loneliness at baseline (i.e., pre-pandemic loneliness) as well as longitudinal changes in loneliness in response to objective social isolation during the pandemic. **METHODS:** We collected two waves of loneliness data before and in the middle of the pandemic (N = 76; Wave 1: February 2019-March 2020; Wave 2: May-September 2021). Loneliness was measured using a single-item scale ("In the last week, how often did you feel lonely?"). Using linear regression, we related individual loneliness scores to neural responses while participants viewed photos of their peers from on-campus social groups. We focused on two groups of brain regions of interest (ROIs), including regions implicated in 1) reward/valuation, which was assessed using a priori ROIs in ventral striatum, ventromedial prefrontal cortex, amygdala and a whole-brain reward map retrieved from the Neurosynth database, and 2) mentalizing, which also was assessed using a priori ROIs in temporoparietal junction, superior temporal sulcus, precuneus, dorsomedial prefrontal cortex, as well as a whole-brain mentalizing map retrieved from Neurosynth. **RESULTS AND CONCLUSION:** At baseline (pre-pandemic), individuals who reported feeling lonely more frequently showed greater amygdala responses to peers' faces ($\beta = 0.18$, $P = 0.03$). Greater loneliness was also associated with lower activation in some, but not all, mentalizing-related regions in response to peer faces (L precuneus $\beta = 0.22$, $P = 0.03$; R $\beta = -0.2$, $P = 0.04$). During the pandemic, greater increases in loneliness were associated with stronger responses to peers' faces in

reward/value-related brain areas. This relationship was robust when controlling for gender, depression, housing situations, and the amount of social interactions during pandemic-related social distancing (whole-brain reward map $\beta = 0.66$, $P = 0.02$; amygdala $\beta = 0.34$, $P = 0.01$). Together, our findings are consistent with previous work suggesting that lonelier individuals may orient to and prioritize encoding of self-relevant social stimuli (i.e., stronger amygdala responses to peers' faces). Furthermore, individuals who show greater reward sensitivity to peers' faces might be more vulnerable to loneliness in response to social stressors such as social isolation.

2-N-53 Exploring contextual factors in vagal tank theory

Samantha De Leon Sautu¹, Saeedeh Sadeghi¹, Marlen Gonzalez¹

¹Cornell University

BACKGROUND AND AIM: The Vagal Tank Theory postulates that Baseline HRV, a self-regulatory marker, correlates with adaptive HRV reactivity and recovery. However, few studies to date empirically test this model. We tested if Reactivity and Recovery during a CO₂-enhanced (7.5%) breathing challenge were associated with baseline HRV as predicted by the model. **METHODS:** The CO₂ task was used because of its reliability to safely induce panic symptoms and psychological distress. One-hundred and thirteen participants came in with a partner. Baseline ECG (BIOPAC system) was collected for a period of 2 minutes. Next, participants completed a relaxation task (meditation or deep breathing) either alone or with their partner. Following this, participants completed the CO₂ challenge, while we simultaneously collected ECG and subjective units of distress. Participants then completed trait psychological questionnaires at home related to anxiety, meditative practice, and social traits. HRV was modeled as the root-mean square of successive R-R intervals (RMSSD) at baseline, after relaxation (with CO₂ mask), during CO₂ inhalation, and after CO₂ inhalation. Reactivity was modeled as the difference in RMSSD from the pre-CO₂ and the during CO₂ inhalation portions of the task. Recovery was modeled as the difference in RMSSD between the post-CO₂ task and the pre-CO₂ portions of it. Two multiple regression linear models tested whether Reactivity or Recovery were predicted by baseline accounting for interactions between social and relaxation conditions, and the covariates of anxiety sensitivity (Anxiety Sensitivity Index) and gender. The Recovery model included an interaction term for the increase or decrease in RMSSD during the task. All models were checked for linear assumptions. **RESULTS:** Contrary to the hypothesis, reactivity was not significantly associated with baseline HRV ($t = 2.6$, $p > .05$), but was related to anxiety sensitivity ($t = -2.1$, $p < .05$), though the full model was not significant ($F(3,94) = 1.54$, $R^2 = 0.05$, adjusted $R^2 = 0.02$, $p = 0.21$). Though not predicted by the theory, recovery was significantly associated with baseline HRV ($t = -2.32$, $p = 0.02$) and the model was significant ($F(7,90) = 3.87$, $R^2 = 0.23$, adj. $R^2 = 0.17$, $p = 0.00$). Exploratory analysis suggests that models are interacting with gender (Reactivity $F(16,80) = 1.86$, $R^2 = 0.27$, $p = 0.03$, gender $t = -2.95$, $p = 0.004$; Recovery $F(16,81) = 2.02$, $R^2 = 0.29$, $p = 0.02$, gender $t = -1.00$, $p = 0.32$). **CONCLUSIONS:** Exploratory models are difficult to explain from Vagal Tank theory alone, and future research should account for possible gendered effects. This study suggests that the vagally-mediated component of self-regulation in a stress task, may be sensitive to demographic and contextual factors, and calls for an ecological approach in following studies. **ACKNOWLEDGEMENTS AND FUNDING:** UVA Contemplative Science Center funded the data collection for this study.

2-N-54 Examining resting heart rate variability on daily emotion polyregulation use in undergraduate students

Eva Dicker¹, Bryan Denny¹

¹Rice University

BACKGROUND AND AIMS: Emotion regulation is an essential part of handling stressful events (Gross 1998, 2015). Effective emotion regulation relies on an adaptive strategy choice for the person and present situation (Doré et al., 2016; Sheppes et al., 2012). Emotion regulation is typically modeled as the selection and implementation of one strategy per identified emotional stimulus. However, people consistently report multiple strategy use, or emotion polyregulation (Aldao & Nolen-Hoeksema, 2013; Demaree et al., 2006; Ford et al., 2019). Despite observations of multiple strategy use in real-world emotion regulation, there remains a need to further characterize the adaptiveness of polyregulation in particular. Aim 1: To investigate the adaptivity of different profiles of daily emotion polyregulation and self-reported measures of negative affect, stress, and depressive symptoms in undergraduate students. I hypothesize that high proportionate use of psychological distancing will predict improved affective outcomes. Aim 2: To study how heart rate variability and cognitive control moderate the effect of emotion polyregulation on negative affect, stress, and depressive symptoms. I hypothesize that high heart rate variability and cognitive control will moderate the impact of emotion polyregulation on affective outcomes. **METHODS:** Eighty undergraduates over the age of 18, fluent in English, with a smartphone will be recruited to participate. Data collection for this study will begin February 2023. At baseline (T0), participants will provide demographic information and complete measures assessing emotion dysregulation (Gratz & Roemer, 2004), perceived stress (Cohen et al., 1983), positive and negative affect (Watson, Clark, & Tellegen, 1988), and depressive symptoms (Radloff, 1977). Attention, working memory, processing speed, and mental flexibility will be assessed (Gaudino et al., 1995; Delis et al., 2001; Lezak et al., 2004). For the next 7 days (T1-T7), participants will receive 4 text messages per day, consisting of the baseline questionnaires and questions asking them to rank to what extent they used different emotion regulation strategies in response to a recent negative event. **RESULTS:** Data will be analyzed using multilevel structural equation modeling. We will examine person-level classes with negative affect and depressive symptoms moderated by cognitive control scores and heart rate variability with age, sex, education, and socioeconomic status as covariates. **CONCLUSIONS:** Emotion polyregulation may be a more accurate means of addressing the complexity of emotion regulation strategy selection and implementation. Findings from this research will motivate the investigation of interventions involving polyregulation as a means of more adeptly addressing the impacts of psychological stress in healthy adults. **ACKNOWLEDGMENTS AND FUNDING:** This research was supported by the Rice University Department of Psychological Sciences.

2-N-55 Implementation intentions training in emotion regulation as a function of stressor intensity and probability of recurrence

Pauline Goodson¹, Bryan Denny¹, Richard Lopez²

¹Rice University, ²Worcester Polytechnic Institute

BACKGROUND AND AIMS: Emotion regulation (ER) is crucial for wellbeing and everyday life. Recent work has begun to investigate adaptive ER as a function of person, situation, and strategy factors. In these, individuals vary in both their tendencies/preferences to use particular strategies at certain times, as well as their efficacy in using those strategies at those times. However, there is a need for experimental work that employs novel ER interventions that train specific strategies based on the interplay between person, situation, and strategy factors. Therefore, this preregistered study aims to deliver ER training in such adaptive matching patterns via implementation intentions (II) training as assessed using daily diary methods.

METHODS: We will examine two principal situational factors influencing II's: stressor intensity and probability of recurrence of the emotion-eliciting stimulus. We will use a seven-day, smartphone-based between-groups design with 3 factors: stressor intensity; stressor probability of recurrence; and ER strategy use (reinterpretation, distraction, distancing, or situation selection/modification). Seven randomly assigned groups (G) will be trained in various ER strategies based on 4 situational context pairings: (i) high stress, high-recurrence situations; (ii) high stress, low-recurrence situations; (iii) low stress, low-recurrence situations; and (iv) low stress, high-recurrence situations. G1 will be trained to use distancing for (i), reinterpretation for (ii), and situation selection/modification or distraction for (iii) and (iv); G2 will receive training as G1 with (i) and (ii) reversed; G3-6 will receive training in one strategy across all situational contexts (e.g., G3 is trained in distraction only), and G7 will receive no intervention training. We hypothesize that (H1) across all groups, participants who report more successful ER implementations will report lower levels of negative affect compared to those who report less successful ER. Further, we predict that (H2) G1 is expected to show the lowest self-reports of negative affect and the greatest reports of health and well-being relative to G2-7. To test H1, we will conduct a linear mixed effects model with perceived ER success, stressor intensity, and likelihood of recurrence predicting affect ratings, using age, gender, baseline depression scores, strategy implementation effort, and baseline stressor frequencies as covariates. To test H2, we will conduct a linear mixed effects model with the interaction of group assignment, stressor intensity, and likelihood of recurrence predicting affect ratings, using covariates from H1. Investigating the contexts in which ER is adaptive can lead to translatable ways of improving health and well-being outcomes through targeting ER. II training for ER is a promising approach to experimentally test the effectiveness of specific strategy-situation pairings and could be incorporated into new treatments and prevention efforts.

2-N-56 Altered white matter microstructure as a function of ethnic racial discrimination exposure in preadolescent Latina girls

Jordan Mullins¹, Dana Glenn¹, Kalina Michalska¹

¹University of California, Riverside

BACKGROUND AND AIM: Chronic stress exposure can alter several indices of white matter microstructure in the brain, including fractional anisotropy (FA), mean diffusivity (MD), axial diffusivity (AD), and radial diffusivity (RD) (Lei et al., 2015). However, prior work has largely focused on associations between widely experienced forms of stress (e.g., loss of a loved one, serious illness) and neurocircuit structure (Lautarescu et al., 2020). Less attention has been paid to stressful events unique to minoritized groups such as ethnic racial discrimination. A recent neuroimaging study of older Black women observed that experiences of ethnic racial discrimination were associated with reduced FA in multiple white matter tracks implicated in trauma exposure (Fani et al., 2022). The current study seeks to complement these early findings in adults by examining whether associations between ethnic racial discrimination and both FA and AD are observable earlier in life, in a sample of preadolescent Latina girls residing in the United States. **METHODS:** Twenty-five Latina girls (M_{Age}=9.84, SD=1.11 years, 100% Mexican) completed T1-weighted magnetic resonance and diffusion weighted imaging scans. Image processing, cortical reconstruction, and extraction of FA and AD metrics were performed via Analysis of Functional NeuroImages (AFNI) and FMRIB's Software Library (FSL). Participants also reported on their experiences of ethnic racial discrimination via an adapted version of the Perceptions of Racism in Children and Youth (Pachter et al., 2010). Responses assessed the total number of discriminatory experiences endorsed, as well as the frequency and severity of these experiences. **RESULTS:** Accounting for child age, linear regression analyses revealed significant effects of ethnic racial discrimination frequency (M=15.24, SD=18.86) on AD in the fornix (b=2.86E-6, p=.041), cingulum (b=2.36E-6, p=.013), and posterior thalamic radiation (b=2.48E-6, p=.006). These effects were not observed for any FA metrics, all p's>.069. **CONCLUSIONS:** The current findings suggest previously observed associations between more conventionally studied forms of stress exposure and microstructure modifications assessed with AD may likewise extend to ethnic racial discrimination in minoritized youth. This suggests that effects of ethnic racial discrimination are far reaching and highlight the deleterious impact of such experiences in development. Effects were specific to the frequency of discriminatory experiences, not the severity or sheer number of distinct types of experiences endorsed. No associations with FA emerged. Ongoing work attempts to replicate these findings in a larger longitudinal sample and explore their implications for racial- and ethnic-based health disparities, including anxiety.

2-N-57 A neural network model of depression: How chronic stress downregulates the ventral striatal dopaminergic reward system and leads to anhedonia

Stephen Read¹, Riley Carter¹, Tailai Shen¹, Grace Hughes¹, Christian Horgan¹, Andy Chen¹, Evans Alvarez¹

¹University of Southern California

BACKGROUND AND AIM: A defining feature of depression is anhedonia or lack of interest in potential rewards. Chronic stress is a major cause of depression and anhedonia; one possible mechanism is downregulation of dopamine (DA) activity in the ventral

striatal dopaminergic reward system (VS), a system central to motivation. We simulate how chronic stress can downregulate DA activity in the VS, leading to anhedonia and depression, using our neural network(NN) model of motivation (Read et al., 2010; Read & Miller, 2022). **METHODS:** Our model focuses on the role of the VS in calculating the incentive salience or “wanting” of a stimulus. The VS is organized into two systems, an Approach system sensitive to reward and an Avoidance system sensitive to punishment. The Approach system is populated by medium spiny neurons(MSN) that express D1 receptors excited by DA, whereas MSNs in the Avoidance system mainly express D2 receptors inhibited by DA. The ventral tegmental area(VTA) projects to VS, sending both tonic and phasic bursts of DA, exciting Approach system D1 neurons and inhibiting Avoidance system D2 neurons. Tonic inputs influence the baseline activity of VS and phasic inputs signal phasic changes to the VS. Our model has two other major inputs to the VS, one from cortical layers representing potential rewards, and the other from regions, such as hypothalamus and insula, that provide signals about the current interoceptive state of the organism. These two inputs, in conjunction with the baseline activity of the VS (influenced by VTA inputs) jointly determine the incentive salience of the stimuli (Berridge et al., 2009; Zhang et al., 2009). One result of this tri-partite integration is that incentive salience is strongly influenced by the baseline activity of the VS and that factors that downregulate that activity, such as chronic stress, reduce the incentive salience or interest of stimuli, resulting in anhedonia. **RESULTS:** We simulate one way(Muschamp & Carlezon, 2013) chronic stress can downregulate VS DA activity. The Approach system MSN express dynorphin, in addition to D1 receptors. Chronic stress induces the transcription of CREB, which increases dynorphin expression by the D1 MSN. Dynorphin reduces release of DA by acting on inhibitory kappa opioid receptors on DA terminals in the VS and VTA cell bodies. Since D1 receptors are excited by DA and D2 receptors inhibited, reduced DA will decrease the baseline activity of the Approach system D1 MSNs and increase the activity of Avoidance system D2 MSNs. This should decrease approach motivation and increase avoidance motivation, resulting in decreased incentive salience and anhedonia. This is simulated in our model by having high levels of chronic stress inhibit tonic activity of the VTA and baseline activity of the VS, resulting in decreased incentive salience. **CONCLUSIONS:** We demonstrate how varying key parameters of our model can increase understanding of the mechanisms of depression.

2-J-58 Examining network connectivity patterns in response to flow: An fMRI replication study with implications for the synchronization theory of flow

Rene Weber¹, Paula Wang¹, Richard Huskey², Rene Weber¹

¹University of California, Santa Barbara, ²University of California, Davis

BACKGROUND AND AIM: ‘Flow’ (Csikszentmihalyi, 1990) is a psychological state obtained when skilled individuals face challenges that leave them creatively stimulated, attentionally immersed, and flourishing. Efforts to create a neurological measure of flow stem from the limitations of relying on self-report measures alone (Nakamura & Csikszentmihalyi, 2002), such as one’s ability to recall details of flow, and the inability to examine flow during the time that it occurs. The Synchronization Theory of Flow (Sync Theory; Weber et al., 2009) operationalizes flow as (H1) the synchronization of attention and reward neural networks which (H2) occurs in discrete states. Weber and colleagues (2018) ran a study that offered preliminary evidence for both H1 and H2 of Sync Theory. That study, however, was critically underpowered, with a dataset of only 13 subjects from the University of Tübingen in Germany. This study replicates the method of Weber et al. (2018) using a new dataset of 35 subjects, taken from Huskey et al. (2021). While the primary goal is to reinforce the support for Sync Theory’s hypotheses, this study also serves as a critical examination of the validity of Sync Theory’s claims. **METHODS:** In the MRI machine, participants completed a primary video game task designed to incite flow along with a red light distractor task. Two sets of data were extracted: (a) a time series for distraction that was calculated using the reaction time of the red light distractor task, and (b) the neural time series of seed regions within the executive attention network (Posner & Petersen, 1990). To examine synchrony, a customized form of the psychophysiological interaction model (PPI; Friston et al., 1997) was used, with distraction as the psychological regressor, the activation time series of various attentional regions in the brain as a physiological regressor, and two interaction terms were included, for both a linear interaction and a nonlinear interaction. **RESULTS:** Results found that attentional connectivity is indeed nonlinearly related to distraction, but that only some local frontal, thalamo-frontal, occipitotemporal- frontal, and thalamo-occipitotemporal regions display the increase in connectivity given low distraction as hypothesized by Sync Theory. **CONCLUSIONS:** The implication of a partial replication suggests the existence of a flow subnetwork that spans only select regions across the attention and reward networks. We therefore call for a revision of Sync Theory, which was unspecific in its statement regarding the subcomponents of attention and reward networks that should or should not be implicated within flow. This study also highlights the need for future research to implicate such a specific flow subnetwork by uncovering the connectivity patterns within-and-across attention and reward neural networks in the face of flow.

2-D-59 Viewer engagement with autonomous sensory meridian response videos (ASMR): Is there neurological evidence for their therapeutic relevance in stressed and lonely individuals?

Sungbin Youk¹, Hyeon Lee², Sungbin Youk³, Yoon Lee⁴, Musa Malik³, Rene Weber³

¹University of California Santa Barbara, ²Ewha Womans University, ³University of California, Santa Barbara, ⁴Syracuse University

BACKGROUND AND AIM: ASMR videos are a popular, user-generated form of online content that is assumed to solicit ASMR experiences—an involuntary tingling sensation that permeates the head, neck, and body of viewers (Barrat & Davis, 2015). Self-report evidence suggests that ASMR videos can reduce viewers’ stress by promoting relaxation (Valtakari et al., 2019), and reduce loneliness by fostering intimacy with the person in the video (Smith & Snider, 2019). Although ASMR videos are assumed to have therapeutic relevance, the neuroscientific evidence supporting their effects is nascent. Previous ASMR-fMRI studies (e.g., Fredborg et al., 2021) found some evidence relating ASMR videos to relaxation and social processing. However, these studies had (a) sample size of less than 40; (b) WEIRD samples, which hinder generalizability of the findings (Rad et al., 2018); (c) analysis using contrast logic, although ASMR videos are complex naturalistic audiovisual and content analysis of audiovisual ASMR features indicates inconsistency and obscurity in what is a non-ASMR video; (d) overlooked relationships between neural

activity and individual characteristics, such as stress and loneliness. **HYPOTHESES:** Considering the audiovisual triggers of ASMR videos and their effects, we hypothesize neural synchrony in auditory and visual processing regions, mPFC, ACC, PCC, somatosensory cortex, and insula. Assuming the therapeutic relevance of ASMR videos, more stressed and lonely participants should show higher neural synchrony in the specified networks. **METHODS:** After completing a survey that measured participants' daily stress level and loneliness, 72 participants from South Korea were invited for an fMRI scanning session. They watched three ASMR videos that were carefully selected using manual and computational content analysis (i.e., low level audiovisual features). **ANALYSIS/RESULTS:** After conducting whole brain function parcellation ($k = 50$) using Neurosynth, intersubject correlation analysis was conducted to examine the brain regions that were synchronous across participants. Consistent with previous ASMR-fMRI studies, the results indicate that mPFC, somatosensory cortex, ACC, insula, inferior lateral occipital complex, primary auditory cortex, PCC/precuneus, V1, and V2 were significant. Inter-subject representational similarity analysis (IS-RSA) using the Anna Karenina model was conducted to examine the variance in brain synchrony that was explained by participants' stress level and loneliness. There was weak evidence for the correlation between participant's brain activity and their stress and loneliness. **CONCLUSIONS:** Inconsistent with the conclusions derived from self-reports, it is an overstatement to say that ASMR videos are therapeutic tools for stressed and lonely individuals. However, other individual differences may explain their popularity and viewers' extensive engagement with this form of online content.

2-D-60 Neural predictors of gaming disorder: Longitudinal evidence for the competing neuro-behavioral decision system theory using the adolescent brain cognitive development (ABCD) dataset

Kylie Woodman¹, Sungbin Youk², Paula Wang², Rene Weber²

¹UCSB, ²University of California, Santa Barbara

BACKGROUND AND AIM: In a recent meta-analysis (Stevens et al., 2020), 3% of video gamers worldwide met the criteria for Gaming Disorder, with 8.5% of early adolescents meeting the criteria (Karaca et al., 2020). Gaming disorder is associated with two consistent correlates throughout research: (1) trait impulsivity and (2) emotion dysregulation (Mihara & Higuch, 2017). These correlates can be related to atypical functioning in the prefrontal cortex and reward processing centers within the brain's limbic system (Shin et al., 2020). However, current research fails to provide a consensus regarding the distinction between behavioral correlates and these two brain regions. Competing Neuro-behavioral Decision System Theory (CNDS) provides a framework to ameliorate current literature on the development of gaming disorder, stating that behavioral dysfunctions emerge from a hyperactive reward-processing limbic system (System 1) relative to the executive control system of the prefrontal cortex (System 2; Bickel et al., 2018). Identifying the neurological mechanisms underlying the development of gaming disorder progresses the understanding of gaming disorder through a framework for methodological advancements. **HYPOTHESES:** We hypothesize that hyperactivity in System 1 relative to System 2 (negative intersystem correlation) at Baseline (BSL) will predict higher game addiction scores, higher emotion dysregulation, and higher impulsivity at the 2-Year Follow-up visit (H1; 2YR). We further hypothesize that the relationship between trait impulsivity (BSL) and gaming disorder scores (2YR), and between emotion dysregulation (BSL) and gaming disorder scores (2YR), to be mediated by correlation in System 1 and 2 (H2). **METHODS:** Data from the Adolescent Brain Cognitive Development Study (ABCD), a national longitudinal study of over 11,000 youth participants, will be used for the analyses. Two neuroimaging and behavioral time points will be used from the ABCD study: BSL (ages 9-10) and 2YR (ages 11-12). We will use the ABCD preprocessing pipeline for brain imaging data. **ANALYSIS PLAN/RESULTS:** Both hypotheses are tested using structural equation modeling to (1) analyze the correlations between the prefrontal cortex and limbic system during a BSL and 2YR fMRI reward anticipation task, gaming disorder (Video Game Addiction Questionnaire4), emotion dysregulation (Internalizing Subscale of the CBCL), and impulsivity (UPPS Impulsive Behavior Scale) and (2) conduct a mediation analysis, of the intersystem imbalance (BSL) of the relationships between individual factors (BSL) and gaming disorder scores two years later. **CONCLUSIONS:** Support for our hypotheses would (1) suggest imbalances in cognitive processing of rewards as an underlying cause of common behavioral correlates of gaming disorder and (2) determine the mediating role of CNDS in the predictive power of behavioral correlates of gaming disorder.

SANS Conference Abstracts



Poster Session 3
Saturday, April 29
14:00 - 15:30

3-B-1 Seeing myself in my group: Generalizing from the self-concept to the ingroup via similarity and contrast-based mechanisms.

Jacob Elder¹, Tyler Davis², Brent Elder¹

¹University of California, Riverside, ²Independent Researcher

People desire to see themselves as similar to the groups they belong to. One possible mechanism to achieving social identification is by projecting one's own attributes onto how one perceives one's ingroup (i.e., self-anchoring). Prior investigations of self-anchoring have claimed that self-anchoring is a generalization/inductive process, but have neglected explicitly modeling similarity-based generalization. Moreover, contextual factors may play a role in how people classify traits as typical of the ingroup or outgroup, such as what specific outgroup the ingroup is being contrasted against. Here, we investigate how relational similarity-based mechanisms allow for the generalization from the self-concept to the ingroup, and how outgroup contrast-based mechanisms facilitate this process. We generate the relational similarity of 148 traits based on an independently constructed semantic trait network. Participants self-evaluate on a subset of the 148 traits, and then classify whether all of the 148 traits are more characteristic of the ingroup or the outgroup. We conduct this study in across three different designs. Study 1 was a proof-of-concept using minimal groups (Estimators). Study used real groups of different social status, specifically universities of differing prestige than the participants' university. Finally, Study 3 used racial groups, and contrasted Asian/Latino vs. Latino/Asian or vs. White, to determine if a majority or minority outgroup contrast affected generalization. We develop a computational model that tests the extent of similarity-based generalization to ingroup relative to outgroup, and participants project strongly towards the ingroup while projecting away from the outgroup. Participants project to the ingroup based on similarity, even for traits they never self-evaluated on. Finally, the tendency to segregate the classification of traits by ingroup vs. outgroup (e.g., nominate similar traits as ingroup-typical, and different groups of similar traits as typical of outgroup) is associated with levels of group identification and investment. The findings suggest little evidence for status playing a role in self-anchoring, but that people project more when compared against another minority group than when compared against a majority group, perhaps reflecting a greater need for differentiation when contrasting two minority groups. Altogether, findings provide a mechanism focused account for how people achieve group identification by projecting to the ingroup via similarity-based mechanisms, and that contextual, contrast-based factors contribute to the extent of generalization. People may infer that their group is like them using similarity-based generalization, and projection to the ingroup may be motivated not only by a drive to achieve similarity with the ingroup but to distinguish oneself from the outgroup.

3-B-2 People generalize threat more readily to racial outgroup than ingroup members: Physiological and behavioral evidence

Julia Hopkins¹, Arshiya Aggarwal², Dana Glenn², Kalina Michalska², Nicholas Camp³, Brent Hughes²

¹Social Neuroscience Lab, ²University of California, Riverside, ³University of Michigan

BACKGROUND AND AIM: People tend to see members of their own racial groups as individuals but consider members of other groups as interchangeable and indistinct. People also tend to see Black individuals as more threatening than White individuals. Do these tendencies lead people to generalize a negative or stressful experience across outgroup members more readily than ingroup members, and is this effect exacerbated for Black faces? Our research examines this question by assessing generalization in a threat learning paradigm, using a combination of skin conductance response (SCR) and behavioral reports.

METHODS: In an initial learning phase, participants learn to pair an aversive scream and fearful facial expression with one Black and one White neutral male face (CS+). In the following generalization phase, participants view the CS+ faces along with new faces that were morphed to vary in their similarity to the CS+ faces (ranging from 0% to 100% similarity to the CS+ faces in 20% increments). After each face presentation, participants evaluate whether the face was paired with the scream. Finally, participants complete individual differences measures that assess intergroup contact and intergroup anxiety. We predict that regardless of race people will generalize learned threats in two ways: First, people will more readily nominate Black identities as the CS+ compared to White identities, and second, skin conductance responses (SCR) will remain elevated as faces decrease in similarity to CS+ faces for Black vs White faces. We test threat generalization in two ways. First, we compare the threshold, or point of subjective equality (PSE), that participants identify faces as the CS+ across White and Black faces. Next, we test whether SCR is greater for Black vs White faces across varying levels of similarity to the CS+. To do so, we calculate SCR for each face presentation during threat generalization as the percent signal changes from baseline, and average signal change for each level of similarity for each participant. Then, we compare signal change at each similarity level for Black and White faces. **RESULTS:** Preliminary data trends support our hypotheses: participants exhibit increased PSEs for Black vs White faces, mistaking more novel Black identities as the CS+, and exhibit increased SCR to these novel Black versus White identities. We also predict that individuals with higher intergroup contact and low intergroup anxiety will exhibit a reduced PSE (i.e., an increased individuation ability) and reduced SCR signal change differences between race identities at each similarity percentage.

CONCLUSIONS: This research will help reveal how learned stereotypes about outgroup members disrupt the learning of new associations and inform future research on race-based disparities and outcomes.

3-B-3 Psychological and brain mechanisms underlying disparities in clinicians pain treatment decisions

Elizabeth Losin¹, Theoni Varoudaki¹, Nikta Kalilkhani², Morgana Gianola²

¹The Pennsylvania State University, ²University of Miami

BACKGROUND AND AIM: Unequal prescribing of analgesics among demographic groups contributes to two major health disparities in the United States. Overprescribing of opioid analgesics, especially in non-Hispanic whites and men, has fueled an epidemic of opioid abuse. Underprescribing of opioid and non-opioid analgesics in minorities and women reduces the effectiveness of pain management in these groups. Existing literature suggests two non-exclusive hypothesized mechanisms

underlying analgesic prescribing disparities: Clinicians may adjust analgesic prescriptions based on inaccurate demographic stereotypes about pain sensitivity and tendencies to abuse opioids. Clinicians may also experience less shared pain as indexed by reduced activation of pain-related neural systems, when observing the pain of demographic outgroup vs ingroup patients, resulting in reduced analgesic prescription to these patients. Our goal was to test the relative importance of these mechanisms in contributing to patterns of unequal prescribing of analgesics across demographic groups. **METHODS:** We conducted two medical simulation studies with medical students as mock clinicians. In the first study, a national sample of clinicians each saw 6 patient actors with shoulder injuries via simulated telemedicine appointments. Clinicians took medical history, chief complaint, performed a telemedicine shoulder exam, and made a diagnosis, pain assessment, and treatment recommendations. In the second study, a sample of clinicians from the Miami metro area each saw 36 shoulder injury patients in virtual medical interactions while undergoing fMRI. Clinicians saw a written patient profile, video of mock patients experiencing evoked pain as exam snapshots, and made a pain assessment and treatment recommendations. In both studies, 1/3 of mock patients identified as Black or African American, Hispanic white, and non-Hispanic white. Clinicians rated the patient's pain intensity and unpleasantness, their likelihood of prescribing both opioid and non-opioid analgesics, and likelihood of prescribing various non-pharmacological treatments. Clinicians also reported their clinical experience and ethnic/racial pain stereotypes. In the fMRI study, we will also derive two neural markers of clinician's vicarious pain experience when viewing each patient in pain. Our pre-registered analysis plan is to use structural equation modeling to test the contributions of clinician's pain stereotypes (and vicarious pain in the fMRI study) to their assessment of patient's pain and pain treatment decisions. We predict pain stereotypes will have more influence on pain treatment than patient's rating of their own pain and that in the fMRI study, vicarious pain will have a greater influence on pain assessment and treatment decisions and pain stereotypes. Results of pre-registered and exploratory analyses will be presented at the meeting.

3-B-4 Linking racial bias in pain perception to the out-group homogeneity effect

Peter Mende-Siedlecki¹, Alexis Drain¹, Azaadeh Goharзад¹, Jingrun Lin², Azar Tuerxuntuoheti³, Patrick Gilbert Mercado Reyes⁴, Brent Hughes¹

¹University of Delaware, ²University of Virginia, ³Rutgers University, ⁴Duke University

BACKGROUND AND AIM: White perceivers display more stringent thresholds for seeing pain on Black vs. White faces, in part due to disruptions in configural face processing (Mende-Siedlecki et al., 2019). A separate literature demonstrates well-established effects of race on identity processing. Perceivers show worse memory for racial out-group faces (e.g., the Cross-Race Effect) and are more attuned to perceptual differences between racial in-group faces (e.g., the out-group homogeneity effect). These perceptual deficits may also arise due to disrupted configural face processing associated with faces of racial out-group members. Indeed, the fusiform face area, a structure engaged by configural face processing, supports more sensitive individuation of White (vs. Black) faces (Hughes et al., 2019). To investigate the link between biases in pain and identity processing, the current studies set out to a) replicate previous findings showing perceptual insensitivity to the identities of Black (vs. White) faces (Exp. 1; N=98), b) demonstrate a complementary perceptual insensitivity to pain expressions on Black vs. White faces (Exp. 2; N=107), c) assess the relationship between these two biases in perceptual sensitivity (Exp. 3; N=157), and d) test the consequences of these biases for gaps in pain treatment (Exp. 4; N=553). **METHODS:** Across experiments, we adapted our paradigm from the primary task used in Hughes et al. (2019). In Exp. 1, participants saw blocks of five computer-generated face stimuli varying in target race (Black or White) and identity similarity (0%, 30%, 50%, 70%, 100%). Exp. 2 used the same structure and timing, but faces varied in pain expression intensity from 40% to 0% variability to (i.e., in 40% blocks, expressions ranged from 30% to 70% intensity in increments of 10%). In both tasks, participants rated the similarity of the faces (or expressions) within each block. In Exps. 3 and 4, participants completed both the pain and the identity sensitivity task--plus an additional pain treatment measure in Exp. 4. **RESULTS:** Target race influenced sensitivity to identity and pain. Participants rated blocks of Black faces (Exps. 1, 3, 4) and Black pain expressions (Exp. 2-4) as being more similar to each other than corresponding blocks of White stimuli. Critically, these perceptual biases were associated with one another (Exp. 3-4): to the extent that participants were less sensitive to changes in identity on Black faces, they were also less sensitive to changes in pain expressions on Black faces. Moreover, a serial mediation model (through identity sensitivity and then pain sensitivity) best accounted for the effect of target race on treatment (Exp. 4). **CONCLUSIONS:** These data provide novel evidence for a link between the out-group homogeneity effect and racial bias in pain perception, and laid the groundwork for ongoing work examining overlap between these biases at the neural level.

3-C-5 Experimental assessment of interpretation biases in affective processing: Reliability and correlations with measures of mental health

Diana Armbruster-Genc¹, Rebecca Rammensee², Stefanie Jungmann³, Michele Wessa³, Ulrike Basten²

¹University of Kaiserslautern-Landau, ²University of Koblenz-Landau, ³University of Mainz

BACKGROUND AND AIM: Interpretation biases in the processing of ambiguous affective information are assumed to play an important role in the onset and maintenance of affective disorders. Reports of low reliability for experimental measures of cognitive biases have called into question previous findings on the association of these measures with markers of mental health and demonstrated the need to systematically evaluate reliability for measures of cognitive biases in affective processing. With the current study we assessed the reliability and validity of an indirect experimental measure of interpretation biases derived from the Ambiguous Cue Task (ACT). **METHODS:** From a large sample of university students (N=353), we collected data on approach vs. avoidance decisions regarding ambiguous affective stimuli in the ACT. Retest data after 14 days was collected from a subsample (N=118). Individual interpretation bias scores were calculated as the mean across all approach and avoidance decisions on ambiguous stimuli. Reliability was estimated with Cronbach's alpha, permutation-based split-half correlations, and intraclass correlation coefficients (ICCs). To evaluate the validity of ACT interpretation bias scores, we (a) calculated correlations

with questionnaire measures of traits related to mental health (e.g., well-being, trait resilience, optimism, depressiveness, and anxiety) and (b) compared those measures for extreme groups. **RESULTS:** Measurement reliability for the ACT interpretation bias score was very good regarding internal consistency (Cronbach's alpha = .91; mean Spearman Brown-corrected split-half correlation = .91), and acceptable regarding test-retest correlations (Pearson's $r = .63$, ICC 2 = .61). In the correlational analyses, a more positive interpretation bias was associated with higher levels of trait optimism ($r = .19$, $p < .001$). The comparison of extreme groups characterized by particularly high positive vs. negative interpretation biases revealed significant differences in trait depressiveness ($t(64) = -2.4$, $p = .02$). **CONCLUSIONS:** Our study shows that the ACT allows for a reliable assessment of individual differences in interpretation biases. It constitutes an important contribution to the recently acknowledged need to establish measurement reliability for experimental measures of cognitive biases. Both the finding that an individual tendency to interpret ambiguous information as more positive is related to higher levels of trait optimism and the finding that individuals with a negative as compared to positive interpretation bias exhibit higher levels of depression are consistent with cognitive models of vulnerability versus resilience to emotional disorders. **ACKNOWLEDGEMENTS AND FUNDING:** German Research Foundation, DFG grant SFB1193, project C06, PI: Ulrike Basten

3-C-6 Guided episodic future thinking to promote physical activity among mid-life adults

Morgan Brucks¹, Austin Baldwin², Sara Levens³, Sandra Billinger⁴, Chrystyna Kouros², Richard Yi⁴, Colin Lamb², Laura Martin¹

¹University of Kansas Medical Center, ²Southern Methodist University, ³University of North Carolina at Chapel Hill, ⁴University of Kansas

OBJECTIVE: Novel intervention strategies to increase physical activity need to reduce barriers to exercise and increase adherence to achieve optimal brain health benefits. Prior research primarily focused on barriers to exercise rather than strategies to increase adherence. Increasing positive affect associated with exercise through Positive Affective Imagery (PAI) can be a motivator for exercise. Furthermore, focusing on one's future self through Episodic Future Thinking (EFT) can increase regulation indexed by a preference for future rewards (i.e., delay discounting). These approaches leverage neurobiological models suggesting that regulation and reward systems support adherence to healthy behaviors. The objective of this study is to develop, test, and refine a guided imagery approach to increase exercise adherence. **METHODS:** Mid-life adults will complete an online study and be randomized to receive EFT or Episodic Recent Thinking (ERT) and PAI or Neutral Affective Imagery (NAI). EFT will target the regulation systems indexed in delay discounting. PAI will target the reward systems indexed by increased positive affect for exercise. Data analysis will use an ANOVA to assess the main effects and interactions of targeting the regulation and reward systems on delay discounting and positive affect. In addition, we will explore the acceptability of the guided imagery approach to inform future intervention studies. **HYPOTHESES:** 1. Individuals randomized to receive EFT compared to ERT will show increased preference for larger delayed rewards compared to smaller immediate rewards. 2. Individuals randomized to receive PAI compared to NAI will show increased positive affect related to exercise. **GENERAL IMPLICATIONS:** The proposed study will provide proof-of-concept data to support a novel, brief enhancement for an exercise intervention. If successful, the guided imagery approach could be implemented to increase adherence to physical activity and promote brain health benefits among mid-life adults. **ACKNOWLEDGEMENTS AND FUNDING:** This work is supported by an R61 Grant from the National Institute on Aging (R61AG078087).

3-C-7 Cross-modality models uncover differential psychological processes driven by polarized ideology

Pin-Hao Chen¹, Po-Yuan Hsiao¹, Wei-Ling Peng¹, Yu-Ze Chen¹, Feng-Chun Chou¹

¹National Taiwan University

BACKGROUND AND AIM: People with different ideologies see the world through different lenses. In other words, when presented with the same stimuli, individuals with opposing ideologies tend to reveal divergent responses. Although past studies have found that individuals show stronger neural synchrony with those having the same ideology, it is still largely unknown what underlying psychological processes may drive this synchronization phenomenon. In the current study, we focused on the Taiwanese nationality ideology and examined whether individuals having high ideology scores process Against-China videos (e.g. 2019 Hong-Kong anti-extradition movement) differently from those having low scores in a naturalistic viewing paradigm. **METHODS:** In order to explore the above research question across different modalities, we recruited a high-ideology (N=26) and a low-ideology group (N=29) of participants with their neural responses collected in the fMRI scanner, and separately, we also recruited another two groups (N=15 for High; N=18 for Low) with their facial non-verbal behaviors collected. In the fMRI groups, we applied eight well-established multivariate brain models, which reflect distinct psychological processes, such as negative emotion, fear, reward, vicarious pain, and empathetic care to our naturalistic neuroimaging data. We then calculated the similarity between each brain model pattern and each TR whole-brain pattern, and a total of eight model-similarity time series were computed for each participant. Intersubject correlation (ISC) was then used to calculate each participant's average in-group ISC score for each brain-model time-series data. These average ISC scores were then used as features in the brain machine-learning model. In the facial behavior groups, we used OpenFace to extract the facial dynamics of 17 action units (AUs) while participants viewed the videos and applied ISC to calculate each participant's average in-group ISC score for each AU. These average AU-ISC scores were then used as features in the facial machine-learning model. **RESULTS:** By using a linear SVC model for the neuroimaging data, we achieved a high classification accuracy of 77% ($p < 0.001$) and found that individuals with high Taiwanese nationality ideology revealed stronger in-group synchrony in the expression of empathetic care and vicarious pain model. By using a similar SVC model for the facial behavioral data, we also achieved a high accuracy of 83% ($p < 0.001$) and found that the expression pattern of AU betas from the model was highly similar to the expression of disgust and sadness. **CONCLUSIONS:** To sum up, this study took a computational approach to innovatively disentangle what underlying psychological processes may drive in-group synchrony. By taking this approach, future studies are able to get a deeper understanding of how ideology shapes how we see the world. **FUNDING:** This research was supported by NSTC (111-2423-H-002-008-MY4 to P.-H.C.) in Taiwan.

3-C-8 The role of affective arousal in the description experience gap of risky decision making: A skin conductance response (SCR) study

Israel Smitherman¹, Colleen Frank¹, Kendra Seaman¹

¹The University of Texas at Dallas

Until relatively recently, affective processes have largely been ignored in studies of risky decision making. However, increasing evidence suggests that affect may play an integral role in explaining certain patterns of choice behavior. For example, Kahneman and Tversky (1979) documented that people tend to be more risk-averse for decisions involving potential gains and more risk-seeking for decisions involving potential losses—a phenomenon known as the reflection effect. However, more recently, this has been found to be reversed in particular contexts. While decisions from description (DD; i.e., participants are provided with probabilities and outcomes before making a decision) typically result in the reflection effect, decisions from experience (DE; i.e., participants learn about probabilities and outcomes through sampling before making a decision) result in the opposite pattern such that people are more risk-seeking for gains and more risk-averse for losses (Hertwig & Erev, 2009; Ludvig & Spetch, 2011). It has been proposed that this reversal of the reflection effect may be partially explained by an increased level of affective arousal during DE (Ludvig & Spetch, 2011). Yet, this has yet to be tested empirically. Thus, in the present study, we use skin conductance responses (SCRs)—a physiological measure of affective arousal thought to reflect the affective evaluation processes of options during choice—to compare arousal between DD and DE. We will collect SCRs via electrodes on the distal phalanges using the Biopac MP36 data acquisition unit. Participants will then complete a computer gambling task (Ludvig & Spetch, 2011) where they will make a series of choices between two options, each associated with a distinct probability of either winning or losing a certain number of points. Some of the options are fixed (i.e., always result in the same outcome), whereas other options are risky (e.g., a large gain occurs 50% of the time). For the DD trials, the probabilities of each possible outcome are provided during the decision period. For the DE trials, probabilities are not explicitly stated and participants must learn about the probabilities and outcomes through sampling during a training phase where feedback is provided after every trial (N = 104 trials). After the training phase, there will be six alternating blocks of DD and DE choice trials (N = 144 trials per condition) where feedback is only provided at the end of each block. We will use a linear model to compare affective arousal measured via SCR between DD and DE conditions. We predict that SCRs during the choice trials will be stronger for DE gambles compared to the DD gambles. If correct, this would imply that the affective arousal experienced during the DE gambles may partially explain the reversal of the reflection effect. Data collection of an initial sample will occur in early 2023, followed by analysis.

3-C-9 Associations between neural markers of spontaneous food craving regulation and feeding behavior in parents of preschool-aged children

Mandilyn Ward¹, Nicole Giuliani¹

¹University of Oregon

INTRODUCTION: In the absence of regulation instructions, affective cues often elicit activity in brain regions commonly recruited during regulation (e.g., dorsolateral prefrontal cortex; dlPFC). This activity could index spontaneous regulation, which would be associated with behavioral markers of affect regulation. Parents' self-reported eating and child feeding behaviors may be able to function as such markers, as they are associated with self-regulation. We hypothesized that spontaneous regulation activity while viewing energy-dense foods would be negatively correlated with emotional eating, restrictive and instrumental feeding behaviors (e.g., using food to influence behavior and emotion), and positively associated with healthy feeding behaviors.

METHODS: In the present study, 79 mothers of preschool-aged children viewed food cues while undergoing functional magnetic resonance imaging, and completed questionnaires assessing their eating and child feeding practices. Activity in the dlPFC, inferior frontal gyrus (IFG), and dorsal anterior cingulate cortex (dACC) while looking at personally craved energy-dense foods compared to energy-dense foods they do not crave was used as an index of spontaneous regulation during food cue reactivity. We correlated this activity with self-reported eating behavior via the Dutch Eating Behavior Questionnaire (DEBQ) and child feeding via the Comprehensive Feeding Practices Questionnaire (CFPQ) to examine whether spontaneous regulation was associated with eating and feeding behaviors. **RESULTS:** There were no significant associations between DEBQ-reported eating behavior and spontaneous regulation activity in our regions of interest. The food as reward subscale of the CFPQ was significantly negatively correlated with left dlPFC activity ($p = .03$), CFPQ restrictive feeding for health was significantly negatively correlated with right dlPFC activity ($p = .011$), and CFPQ teaching about nutrition was significantly negatively correlated with bilateral activity in the dlPFC (right: $p = .022$, left: $p = .01$), IFG (right: $p = .02$, left: $p = .02$) and dACC ($p < .001$). **DISCUSSION:** In this sample of mothers of preschool-aged children, more activity during cue reactivity in traditionally regulation-related regions was associated with less use of instrumental and restrictive feeding practices, and less teaching about nutrition. These results provide mixed support for our hypotheses, and suggest that activity in brain areas typically associated with regulation evoked when passively viewing a craved food may play a role in how parents feed their children. Findings provide insight into where efforts should be placed when developing interventions to assist parents in understanding and providing feeding behaviors to their children.

3-D-10 Gender differences in the effect of humor on cognitive control of IGT performance: An ERP study

Jorge Flores¹, Lidia Gómez¹, Kateri McRae², German Campos³, Eugenio Rodríguez³

¹Universidad de Málaga, ²University of Denver, ³Pontificia Universidad Católica de Chile

BACKGROUND/OBJECTIVES: To assess the effect of humor on IGT decision-making as a function of gender, and to explore the neural correlates underlying this effect. **METHOD:** We randomly assigned participants (N = 60; 30 men and 30 women) to either an experimental Humor Group (Hg) or a control non-Humor Group (NHg) and asked them to perform a long-version (500 trials) of the Iowa Gambling Task (IGT). Participants' EEG response was recorded while solving the IGT. **RESULTS:** Men in the Hg

demonstrated impaired monitoring and learning of the task compared to men in the NHg. Later, women in the Hg, exhibited more integrated attention to rewards and punishments along with a decrease in random choices when compared with women in the NHg. Behavioral and EEG results support that humor is beneficial for women's cognitive control of IGT performance but impairs it in men's. **ACKNOWLEDGEMENTS:** The authors thank Claudio Artigas for supporting the execution of the study. This work was supported by the NSF CAREER Award under Grant [1554683] and the Agencia Nacional de Investigación y Desarrollo (ANID, Chile) under Grant [Doctorado Nacional 21140098].

3-D-11 Strengthened connections through emotion regulation measured by neural synchronization

Keara Kangas¹, Nakia Gordon¹

¹Marquette University

BACKGROUND AND AIM: Emotion is fundamental to interpersonal physiology. For instance, gamma and alpha frequency bands measured by EEG have been associated with emotion and understanding a partner's emotional state, respectively. Adapting to and regulating one another's emotions can promote physiological synchronization between partners (Anderson et al., 2003). Indeed, partners with strong relationship bonds display increased synchronization (Marsh, 1963). Likewise, synchronization is an essential part of maintaining and forming these long-term bonds (Lumsden et al., 2012). The current study used an emotionally provocative interaction task to investigate neural synchrony and emotion regulation (ER). First, we will test the hypothesis that higher scores on interpersonal ER positively predict neural synchronization strength. Additionally, we aim to document how ER in social contexts improves social connectedness/synchronization. We will test our second hypothesis, which is that higher scores on interpersonal ER use will significantly moderate and increase the positive relationship between synchronization and friendship quality. **METHODS:** Participants selected one close same-sex friend to accompany them in this study, resulting in 54 dyads. People completed the IERQ (Hofmann et al., 2016), which assessed their trait tendencies to use other people to help them regulate their emotions. They also completed the ERQ (Gross & John, 2003), which measured their ongoing, routine use of cognitive reappraisal and suppression. Their friendship quality was measured using the MFQ-FF (Mendelson & Aboud, 1999). Next, friend dyads participated in a video recorded conversation task designed to induce emotion. They engaged in four conversations where they each detailed a neutral experience and a negative unshared experience. Neural activity was measured using EEG with the EMOTIV EPOC+ headset. At the conclusion of each conversation, dyads reported their state affect and perceived emotional connectedness. **ANALYSIS PLANS:** We will assess the relationship between neural synchronization (gamma and alpha bands), emotion regulation, and friendship quality. To assess our first hypothesis a linear regression will be used to evaluate this relationship. To assess our second hypothesis, a moderation analysis will be conducted to assess if adaptive ER moderates the relationship between neural synchronization and friendship quality; exploratory moderations will be conducted with the subscales of ER as predictors. **GENERAL IMPLICATIONS:** The sharing of emotions between partners supports prosocial behaviors such as interpersonal ER, which improves the quality of the relationship (Levy-Gigi & Shamay-Tsoory, 2016). Our study will add to the current research on how ER positively reflects the quality of the relationship and strengthens neural connectivity. We will fill gaps in the research by investigating the psychological and neurobiological mechanisms of synchrony.

3-D-12 Melatonin affects a failure of emotion regulation in social decision-making

Misa Kurihara¹, Natsuki Saito¹, Hideki Ohira¹

¹Nagoya University

BACKGROUND AND AIM: Recently, melatonin, a sleep hormone, has been considered to relate to aggression and social decision-making in humans. In the social decision-making task, the Ultimatum Game (UG), melatonin treatment increases the selection of rejection to unfair offers. However, it has been unclear whether melatonin contributes to emotion control in this game. Although melatonin did not increase emotional responses in self-reports, some animal studies have shown that melatonin receptors are found in various regions such as the striatum and ventral tegmental area (VTA), and melatonin modulates dopamine neurons in these regions that project to the amygdala in which relates to emotions. This study aims to explore whether melatonin contributes to a failure of emotion regulation in social decision-making using psychophysiological measurements. **METHODS:** Upon arrival, participants completed several questionnaires to ask about sleepiness, mood, impulsivity, circadian rhythm, and introspection. We collected saliva from samples to measure their basal melatonin level. After that, they joined the Ultimatum Game. Each offer was randomly displayed four times, and there were 48 rounds for a game. During the game, we recorded the change in their heart rate (HR) and electrodermal activity (EDA) to measure their emotional responses to offers. Participants also rated the emotion they felt towards offers. They participated in the Emotional Go/Nogo task after the game. **RESULT:** We found that melatonin increases the selection of rejection in the UG only when emotional responses increase. When there was a small increase in the EDA, melatonin did not increase the selection of rejection to unfairness. However, when there was a large increase in the EDA, which means emotions increased, melatonin increased the selection of rejection to unfair offers. Controlling for sleepiness, mood, fairness perceptions, and self-reports of emotions, this finding has existed. Melatonin did not affect response inhibitions to emotional stimuli in the Emotional Go/Nogo task. **CONCLUSIONS:** This study supports that melatonin modulates the selection of rejection to unfair offers through emotional responses. Melatonin might affect emotion control in social decision-making. In this study, melatonin affects emotional responses but not response inhibitions to emotional stimuli. This means that melatonin increases emotional responses resulting in a failure of emotion regulation. Melatonin might affect emotional responses by modulating dopamine neurons which code reward prediction errors and emotions. Although melatonin did not affect emotions in self-reports, we could find it from psychophysiological measurements. Therefore, it is expected to explore the further relationship between melatonin and emotions using psychophysiological methods including fMRI in the future. **ACKNOWLEDGEMENT AND FUNDING:** We acknowledged the advice from Dr Osumi and Dr Oba and this research grant supported by KAKENHI.

3-F-13 The emotionally evocative statements task: A novel paradigm to assess recognition and moral permissibility of the emotional consequence of behavior

Elise Cardinale¹, Abigail Marsh²

¹The Catholic University of America, ²Georgetown University

BACKGROUND AND AIM: Understanding the emotional consequences of social actions is critical to the understanding of social behavior. The majority of studies focusing on how people understand others' emotions rely on emotional facial expression stimuli, which confound low level perceptual cues inherent to emotional expressions with the emotional content expressed.

METHODS: We therefore developed the Emotionally Evocative Statements Task (EEST), which instead assesses respondents' ability to infer the emotional consequences and permissibility of various social behaviors. The EEST consists of brief emotionally evocative statements designed to elicit anger, disgust, fear, happiness, or sadness. Participants rate the moral permissibility of making each statement and the emotion each statement would most likely to elicit in a forced-choice paradigm (mirroring the format of a facial emotion recognition task). **RESULTS:** We present data from 7 studies regarding the development of the EEST and its utility for use in community, clinical, adult, and pediatric samples. Using the EEST we identify novel relationships between emotional inferences and empathy and antisocial behavior (Marsh & Cardinale, 2012a; Cardinale & Marsh, 2015); alexithymia (Brewer et al, 2015); and amygdala function (Marsh & Cardinale, 2012b; Cardinale et al 2018). We also present new data in an amygdala lesion patient (SM) that sheds new light on prior emotion recognition results in this patient (Cardinale et al, 2021).

CONCLUSIONS: Together, this work provides strong evidence for the EEST as a useful empirical tool for assessing respondents' ability to infer emotional consequences of social behaviors, an ability we link to a range of social and clinical deficits.

3-F-14 What you say and how you say it: Identifying verbal and nonverbal communication strategies for helping listeners empathize

Eleanor Collier¹, Genesis Garza Morales¹, James Sobrino¹, Brent Hughes¹

¹University of California, Riverside

Understanding others' emotions, and having one's emotions understood, are crucial for interpersonal relationships. Yet little research has examined how speakers can improve their communication to help listeners understand them. In this study, we recorded pairs of friends disclosing personal stories. Listeners' empathic accuracy was assessed. Using linguistic and vocal analyses, we identified several verbal and nonverbal markers of emotional expression that may improve listeners' empathic accuracy. These included emotionally intense and vivid language, third-person pronouns, faster speech rate, and convergence between vocal and linguistic emotional intensity. Using unsupervised learning, we also identified two distinct narrative trajectories that characterized the emotional arcs of stories. Analyzing these trajectories revealed that to help listeners understand them, speakers may use a range of positive and negative language to create arcs of tension and release. Our study bridges the gap between research on emotional expression and emotion perception, and could inform future interventions to improve communication between conversation partners.

3-F-15 Reduced salience network integrity and social cognitive deficits in symptomatic frontotemporal dementia patients

Shanny Foo¹, Colleen Hughes², Alfie Wearn¹, David Cash³, Simone Ducharme¹, Genetic Frontotemporal Dementia Initiative GENFI³, Nathan Spreng¹

¹McGill University, ²Montreal Neurological Institute, ³University College London

INTRODUCTION: A robust feature characterising frontotemporal dementia (FTD) from other dementias are early deficits in social cognition. Correspondingly, the insula, which is widely implicated in emotional and social cue processing, is one of the earliest regions to show cortical atrophy in FTD and is a core region within the salience network, a group of brain regions studied using resting-state functional connectivity (RSFC). We hypothesize that RSFC may be sensitive to group differences among non-symptomatic non-mutation carriers (NMC) compared to non-symptomatic mutation carriers (PMC).

METHODS: Adults (N=981; mean age=49y±14; 55%F, 45%M) of a first-degree relative with a known pathogenic mutation in MAPT, GRN, or C9orf72 were recruited as part of a large-scale genetic FTD initiative. The sample comprised NMC (n=374), PMC (n=392) and symptomatic mutation carriers (SMC, n=215). A subsample completed measures of social cognition (Mini-Social and Emotional Assessment), empathy (Interpersonal Reactivity Index), emotion sensitivity and social presentation (Revised Self-Monitoring Scale), social reasoning (Faux Pas Recognition Test), and facial emotion recognition (Ekman 60 Faces). An ANCOVA, controlling for age, gender, and education, evaluated between-group differences. A common MRI protocol was used across sites and RSFC data was preprocessed using CONN. Group differences in RSFC were analyzed using partial least squares, which is model-free and multivariate. **RESULTS:** Poorer social cognitive ability was exhibited in SMC compared to NMC and PMC, who did not differ from each other (Figure 1A): social cognition, $F(1,381)=90.09$, $p<.001$, $\eta^2=.19$; empathy, $F(1,408)=35.62$, $p<.001$, $\eta^2=.08$; emotion sensitivity and self-presentation, $F(1,379)=45.20$, $p<.001$, $\eta^2=.0.11$; social reasoning, $F(1,382)=62.85$, $p<.001$, $\eta^2=.14$; facial emotion recognition, $F(1,409)=73.60$, $p<.001$, $\eta^2=.0.15$. A distributed pattern of RSFC dissociated NMC and PMC from SMC (Figure 1B-D; 93.55% covariance explained, $p<.001$). As hypothesized, SMC had weaker RSFC within the salience, default, and frontoparietal control networks. Conversely, SMC had stronger between-network RSFC of the somatomotor network with the dorsal attention, salience and frontoparietal control networks. **CONCLUSIONS:** We provide evidence that symptomatic FTD is associated with deficits across multiple dimensions of social cognition and wide-scale RSFC differences. FTD symptoms across all social cognitive domains may reflect the advanced stage FTD at recruitment. Supporting this idea, we observed wide-scale and large magnitude RSFC differences that may reflect disruption to efficient brain organisation in FTD. Speculatively, weaker RSFC between salience and neurocognitive networks central to executive control and decision-making

could be why such broad social cognitive impairment is observed in symptomatic FTD. It may be that the presymptomatic FTD is best captured using longitudinal changes compared to static.

3-F-16 Neurobiological predictors of differences in pain report across language contexts and cultural orientations of Spanish-English bilingual adults

Morgan Gianola¹, Maria Llabre¹, Elizabeth R. Losin Losin²

¹University of Miami, ²The Pennsylvania State University

BACKGROUND: Social and cognitive processes known to influence pain perception, such as attention and stress, vary across language contexts within bilingual persons. We previously found that Spanish-English bilingual participants rated painful heat stimuli as more intense in their culturally preferred language. This fMRI study characterized how neural systems involved in somatosensory, attention, semantic, and pain processing contribute to differences in pain report across English and Spanish contexts for bilingual adults. **METHODS:** During separate fMRI scanning runs conducted in English and Spanish, 39 (18 male) early Spanish-English bilingual participants rated pain intensity and unpleasantness of thermal stimulations. Painful heat was intermixed between culturally evocative images which primed the appropriate cultural and linguistic frame. Measures of language use and acculturation were combined to assess participants' relative preference for US-American or Hispanic culture ("cultural orientation"). Neural data were analyzed via univariate GLM to measure single-trial pain-evoked activity at each voxel. Activations were averaged in three regions of interest (ROIs) defined by 1) a semantic localizer task, 2) "attention", and 3) "somatosensory" masks from Neurosynth.org. Expression of the pain-predictive multivariate Neurologic Pain Signature (NPS) served as a metric of pain-specific brain activity during each trial. Run language and cultural orientation effects on neural outcomes and explicit pain report were tested via mixed effects models with random effects for participant in R v3.6.1. **RESULTS:** Consistent with our previous findings, pain intensity (but not unpleasantness) ratings were sensitive to the language condition. Participants reported higher pain intensity in Spanish (language effect $b=0.21$, $p=.004$). Pain-specific neural (NPS) activity increased in participants' culturally preferred language (language by orientation interaction $b=-14.45$, $p<.001$), as did pain-evoked activity in the somatosensory ($b=-37.19$, $p<.001$) and attention ROIs ($b=-33.07$, $p<.001$), but not in the semantic ROI. **CONCLUSION:** This study reveals that language and culture synergistically impact bilingual adults' pain experience. Pain-specific neural processing differs across language contexts depending on one's cultural connection to each language. This differential pain processing may largely be driven by increased attention and somatosensory activity when experiencing pain in one's culturally preferred language context. That is, Hispanic oriented participants showed higher pain-evoked activity in these areas in Spanish leading to higher pain report. This research offers insight into documented pain and health disparities among the US Hispanic population and may inform culturally targeted approaches involving language choice as a relevant factor in pain assessment and treatment. **FUNDING:** University of Miami startup funds and Dingwall Foundations of Language Fellowship.

3-F-17 Human cerebellar projections to the ventral tegmental area: Implications for social and affective dysregulation

Linda Hoffman¹, Katie Jobson¹, Holly Sullivan-Toole¹, Blake Elliott¹, Julia Foley¹, Ingrid Olson¹

¹Temple University

Recently, the cerebellum--a cellularly dense brain structure traditionally thought to subserve fine-tuned motor and balance functions--has been implicated in the pathophysiology of affect dysregulation. Blunted affect constitutes the second most common of the emotion-related sequelae following damage to the cerebellum suggesting the need for rigorous neuroimaging investigations into this complex structure and its topographic structural connections to the reward and emotion centers. In a recent review article, we proposed that the cerebellar vermis might modulate mood through a pathway to the ventral tegmental area (VTA; Frazier, Hoffman et al., 2022). The VTA contains dopamine neurons critical for signaling reward value and modulating approach behavior. Perturbation of the white matter linking the cerebellar vermis to the VTA may result in too much inhibitory output from the cerebellum (due to the overwhelmingly inhibitory nature of the cerebellar Purkinje cells) to the VTA, which in turn, may cause downstream over-inhibition of the subcortical reward circuitry terminating in frontal areas known to be implicated in melancholia. What is currently missing from this theoretical model is the reconstruction of the purported cerebello-midbrain pathway in humans. Thus far, our only data come from rodents (Carta et al., 2019). Reconstructions of this pathway in human in vivo, as well as this path's correlation with measures of depressed mood, are needed to advance the current understanding of the pathophysiology of affect dysregulation. Moreover, such advancements are crucial for informing future research on deep-brain stimulation (DBS) and pharmacological interventions for treating intractable mood disorders. In the current study we aim to fill this gap by performing probabilistic tractography between the primary output nucleus of the cerebellum--the dentate nucleus--and the VTA in 100 young adults from the Human Connectome Project dataset. We hypothesize that both micro- and macrostructure of the proposed tract will positively correlate with measures of depression and anxiety, social withdrawal, and internalizing symptoms.

3-F-18 Using AR tangram and muse EEG to study collaborative tasks: A naturalistic hyper-scanning paradigm

Richard Huskey¹, Xuanjun (Jason) Gong¹, Michael Andrews¹, William Weisman¹, Jorge Peña¹, Valerie Klein¹, Sophia Sarieva¹, Raymond Kang¹, Ralf Schmälzle², Jeffrey T Hancock³

¹University of California, Davis, ²Michigan State University, ³Stanford University

BACKGROUND AND AIM: Interactional synchrony, described as mirroring the actions or facial expressions of people we interact with, is linked with task performance. This phenomenon ties closely with inter-brain synchrony, which is when one's brain activity synchronizes with others' brain activities during social interaction. A commonly used method for studying these phenomena is EEG-based hyperscanning. **METHODS:** We use ARTangram, a mobile-phone-based application that uses augmented reality to allow pairs of participants to simultaneously complete a naturalistic tangram shape-matching task.

Tangram matching is a procedure that measures trust, mutual understanding, coordination, and partner impression. In this hyperscanning study, we recorded EEG data using the MUSE headset while pairs of participants completed three rounds of the ARTangram task. Intersubject correlation (ISC) was calculated for each electrode for each session in each pair of participants. **RESULTS:** Preliminary MANOVA results show that ISCs do not significantly vary between sessions for the electrodes. A regression model with ISCs, time spent on each session, and session as independent variables significantly explains task performance (number of correctly matched shapes; $F(6, 31) = 3.051, p = 0.0183, \text{Adjusted } R^2 = 0.25$). Both AF8 ISCs ($b = 18.160, se = 6.876, t = 2.641, p = 0.013$) and session ($b = 1.364, se = 0.573, t = 2.381, p = 0.024$) have a significant positive effect on task performance. **CONCLUSIONS:** These preliminary results showcase that ARTangram performance increases are a function of session (performance increases over time) and ISCs in the AF8 electrode (which has previously been associated with linguistic processing).

3-F-19 A neural signature of social support mitigates affective responses to negative memories

Rui Pei¹, Andrea Courtney¹, Ian Ferguson¹, Jamil Zaki¹

¹Stanford University

BACKGROUND AND AIM: Social support can mitigate the impact of distressing life events. Such “stress buffering” tracks activity in many brain regions, but it remains unclear whether a stable brain representation of support can predict buffering across people. **METHODS:** Participants ($n = 95$) provided stressful autobiographical memories in a pre-scan visit, and during neuroimaging responded to these autobiographical memories either naturally (self), or by imagining a conversation with a peer about the memory (imagined support). We applied demixed Principal Component Analysis (Kobak et al., 2016), a method that combines supervised and unsupervised machine learning, to extract temporal dynamics that maximally separated the two conditions. **RESULTS:** We developed and validated a whole-brain neural signature of social support that can discriminate between simulating social support and naturally processing a stressor with 69% decoding accuracy in new participants. The weights that contribute most to the model are located in regions that have previously been associated with mentalizing and cognitive control (Fig. 1A-B). We further demonstrate that the expression of this neural signature is related to behaviorally meaningful indices. Trials with higher expression of this neural signature are likely to be followed by less negative emotion ratings (Fig. 1D-E), and people with an overall higher neural signature expression in imagined support trials reported higher life satisfaction, more perceived social support, and less loneliness. **CONCLUSIONS:** These findings demonstrate that our neural signature of social support is able to capture aspects of neural processes that are relevant for behavioral outcomes, and provide the potential utility of using this neural signature to complement self-report ratings to evaluate successful emotion regulation of life stressors. **ACKNOWLEDGEMENTS AND FUNDING:** This research was funded by National Institute of Mental Health (1R01MH125974-01). We thank Dean Baltiansky, Wicia M. Fang, Samantha Grayson and Daniel Ogunbamowo for their contribution to this project.

3-F-20 Investigating the association between social touch preference and sensory perception in adults

Helen Powell¹, Jason He¹, Khushika Magnani¹, Ria Bessler², Nicolaas Puts¹

¹King's College London, ²Technische Universitat Dresden

BACKGROUND AND AIM: Social touch plays a vital role in social bonding and cognition. While the role of touch in social function is well-documented, less is known about how low-level (perception) and higher-level (affect) sensory processes shape how we experience social tactile interactions. Elucidating the mechanisms underlying social touch preference, and the contribution of perception, has important implications for understanding social development. This has clinical relevance to conditions such as autism, in which social and sensory differences are common. Here, we use novel quantitative approaches to characterise subjective pleasantness of social touch. We then investigate the association of sensory perception, as well as autistic traits, with social touch preference in a general population. **METHODS:** 26 neurotypical adults aged 18-38 years (15F, 11M) were included. Social touch preference was assessed using a computer task showing images of social touch interactions from different touch partners. Tactile perception was assessed using psychophysical vibrotactile tasks. Autistic traits and touch attitudes were measured using the Autism Quotient (AQ-10) and Touch Experiences and Attitudes Questionnaire (TEAQ), respectively. Linear mixed modelling and Pearson correlations were used in the statistical analyses. **RESULTS:** Group mean pleasantness scores differed significantly between touch giver roles. Female participants rated same-gender friend touch as more pleasant, and different-gender stranger touch as less pleasant, than male participants. Non-social (object) touch was not significantly different from partner or friend touch (from either gender). Amplitude discrimination (ADT) thresholds significantly correlated with social touch preference scores, in which higher (i.e. worse) thresholds were associated with a lower preference for social over non-social touch. This was also associated with a reduced preference for unfamiliar touch (TEAQ sub-score). AQ scores negatively correlated with ADT thresholds, however, no associations were found between AQ scores and social touch preference or TEAQ scores. **CONCLUSIONS:** Consistent with previous literature, we found that role and gender of the touch giver influences subjective pleasantness of social touch. Findings that individuals with worse discrimination ability have a higher preference for non-social over social touch and find unfamiliar touch less pleasant, suggest a role of discrimination in driving context-dependent preference of touch. Our finding that a higher level of autistic traits was related to better discrimination ability, but unrelated to social touch preference, could suggest that perceptual differences in autism are linked to universal touch differences, rather than social factors. These findings have implications for conditions involving atypical sensory or social processing. **ACKNOWLEDGEMENTS AND FUNDING:** Supported by an MRC DTP scholarship to Helen Powell.

3-F-21 Disrupted neural synchrony during naturalistic perception is linked to social disconnection in schizophrenia

Yixuan Shen¹, Carolyn Parkinson¹, Melodie Yen¹, Eric Reavis¹

¹University of California, Los Angeles

BACKGROUND AND AIM: Social dysfunction is a core feature of schizophrenia. Many individuals with schizophrenia experience social disconnection (i.e., a lack of social contact with others), which is linked to reduced quality of life and increased health risks. Recent social neuroscience research introduces a framework that may help explain social disconnection in schizophrenia and provide the basis for a new biomarker of social functioning. Specifically, research examining inter-subject correlations (ISCs) of neural responses measured with functional magnetic resonance imaging (fMRI) shows that healthy people with more social connections share more normative neural responses to naturalistic stimuli (i.e., video clips), whereas people with fewer social ties tend to respond more idiosyncratically. Thus, forming and maintaining social relationships may build upon similarities in how people perceive and experience the world. Converging evidence suggests that individuals with schizophrenia tend to perceive stimuli more idiosyncratically, which may help to explain why social disconnection is prevalent in schizophrenia. ISC methods have not yet been used to study social dysfunction in schizophrenia and therefore the relationship between ISC-based measures and social disconnection in schizophrenia remains unclear. The current study aims to fill this gap by investigating how ISCs in neural activity while perceiving naturalistic stimuli relate to social disconnection in schizophrenia. **METHODS:** Individuals with schizophrenia and healthy controls completed an fMRI study where they viewed naturalistic video stimuli. They also provided measures of objective and subjective social disconnection (i.e., of social isolation and loneliness, respectively).

RESULTS: Members of the schizophrenia sample showed lower within-group ISCs than healthy controls across multiple brain regions, including areas of the default mode network (DMN; e.g., temporoparietal junction, medial prefrontal cortex) and dorsal attention network (DAN). Further, processing normativity in DMN and DAN areas was negatively associated with both objective and subjective social disconnection in schizophrenia. **CONCLUSIONS:** As these brain regions have been implicated in generating high-level interpretations of stimuli, mental state understanding, and top-down orienting of attention, the current findings suggest that these mental processes may unfold particularly idiosyncratically in individuals with schizophrenia and that greater idiosyncrasies in these mental processes are associated with social disconnection in schizophrenia. Taken together, these findings provide preliminary support for a new approach to studying the neural basis of social disconnection in schizophrenia, which could, in turn, provide the basis for developing a novel biomarker of social dysfunction in the disorder.

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3-F-22 Do you like me back? Motivated perceptions and cognitive effort for potential romantic partners

Benjamin Silver¹, Christopher Baldassano¹, Lila Davachi¹, Kevin Ochsner¹

¹Columbia University

BACKGROUND AND AIM: Forming and maintaining successful social relationships is of the utmost importance in daily life. To do so effectively requires several different psychological processes: Upon meeting someone, we must assess their traits, dynamically update our assessment of them as we learn new information, and form memories of our encounters with them to be used in future interactions. In the current study, we used the context of romantic dating to investigate how our socio-affective motivations affect how we form and update our impressions of potential romantic partners, and the effort we put into remembering information about them. **METHODS:** 30 participants watched "dating profile" videos of eight potential romantic partners during fMRI. For each of the eight targets, participants watched two videos. After each video, participants rated the target on five dimensions, including romantic compatibility and physical attractiveness. In between the two sets of videos, participants received pseudo-random feedback from the target indicating the target's beliefs about their romantic compatibility with the participant. Participants also completed a verbal cued-recall memory test for each video during fMRI. **RESULTS:** For all five rating dimensions, participant ratings were higher after receiving positive feedback than after receiving negative feedback (smallest effect, physical attractiveness: $B = 1.07$, 95% CI = [0.51, 1.65]). In addition, when compared to romantic compatibility ratings after each target's first video, romantic compatibility ratings became more positive after receiving positive feedback, and became more negative after receiving negative feedback (video x feedback interaction: $B = 1.38$, 95% CI = 0.68, 2.06). Finally, participants spent more time in seconds on the cued-recall test for participants they reported being more romantically compatible with ($B = 1.07$, 95% CI = [0.37, 1.77]). **CONCLUSIONS:** Our results demonstrate that people change their perceptions of others according to their motivational relevance; participants updated their ratings of potential romantic partners in the direction of the romantic compatibility feedback they received. This was also true of perceptions that are not directly impacted by romantic compatibility, such as physical attractiveness. In addition, motivational relevance of the targets also determined how much effort participants were willing to exert in a cognitive task in this case, remembering information about the target. Future analyses of fMRI data to be included in a conference presentation/poster will determine whether neural representations for targets in the dmPFC are more similar after receiving congruent feedback than after receiving incongruent feedback. In addition, we will determine if more motivationally relevant targets are more frequently reactivated in the hippocampus during post-video rest.

3-F-23 Decoding moral intuitions during dynamic narrative processing

Rene Weber¹, Frederic Hopp², Rene Weber¹

¹University of California, Santa Barbara, ²University of Amsterdam

BACKGROUND AND AIM: In everyday life, moral judgments are embedded in dynamic, contextualized environments. Yet, prior research has studied the neural basis of moral judgment based on participants' responses to abstract, highly controlled, and decontextualized stimuli that rarely simulate the naturalism of our lived experience. This has raised concerns regarding the

generalizability of the “moral brain” from the lab to the wild. We examine whether neural representations of moral intuitions derived during abstract moral judgment can be decoded when moral actions are embedded in increasingly contextualized, dynamic narratives. Thus, we aim to demonstrate whether multivariate activation patterns of moral intuitions are transmodal, shared across individuals, and predict subsequent moral judgment. **METHODS:** In three fMRI experiments, participants (n = 64) evaluated textual moral vignettes, auditory moral stories, and audiovisual political attack advertisements. The vignettes span 120 descriptions detailing the violation of one of seven moral intuitions as well as one non-moral, social norm transgression category. The auditory stories feature 10 fictional movie summaries in which the main character violates one of the moral intuitions (2 different stories per intuition) and is subsequently either rewarded or punished. The political attack advertisements feature 20 audiovisual clips targeting either Hillary Clinton or Donald Trump and span a range of political topics. **RESULTS:** A multivariate, leave-one-subject-out pattern classifier (moral intuition decoder; MID) was trained on neural responses to vignettes to distinguish between moral intuitions. We found that the MID was able to distinguish between all seven moral intuitions with above chance accuracy. Next, we provide evidence that the MID can accurately recognize when and which moral intuition is violated by a character during narrative listening. We also found that neurally decoded moral intuitions predict subsequent moral judgment of story characters. Finally, the MID revealed that Democrats and Republicans experience polarized moral intuitions during the processing of audiovisual political advertisements. In turn, these decoded moral intuitions predicted post-scan moral judgment of political candidates. **CONCLUSIONS:** Our study corroborates that shared neural patterns during abstract moral judgment are stable in naturalistic contexts, highlights the role of narratives as effective tools for studying real-world moral cognition, and provides evidence that moral judgments are driven by modality-general neural representations of moral intuitions.

3-G-24 Socially sensitive: Loneliness corresponds with heightened neural response to self-relevant social feedback

Andrea Coppola¹, Erin Maresh², David Sbarra¹, Jessica Andrews-Hanna¹

¹University of Arizona, ²Independent researcher

BACKGROUND AND AIMS: Social connection and belonging are critical to human survival; a key aspect of belonging is sensitivity to social feedback. Sensitivity to positive social feedback may promote social connection, whereas sensitivity to negative social feedback may impede social connection. Loneliness, a risk factor for depression, is an increasingly common experience associated with a variety of negative health consequences. However, we know little about the neural processes behind how lonely people respond to social feedback. **METHODS:** Fifty (n = 50) healthy participants completed an fMRI task where they received feedback, assumed to be from other participants, about how likable they appeared. Whole-brain analyses were conducted across positive, negative, and neutral self-feedback trials. Here we examined the fMRI response to both positive and negative feedback in relation to individual differences in loneliness and repetitive negative thinking (RNT), measured with trait questionnaires and daily diaries over 1 week following the scan. **RESULTS:** The positive > neutral and negative > neutral feedback contrasts revealed widespread activity throughout the brain including the medial prefrontal cortex, anterior cingulate cortex, and precuneus. Higher loneliness scores corresponded with increased activity during positive compared to neutral feedback (positive > neutral contrast) in the orbitofrontal cortex and anterior insula. Additionally, higher loneliness scores were associated with increased activity during negative feedback compared to neutral feedback (negative > neutral contrast) in the medial prefrontal cortex, rostral anterior cingulate cortex, amygdala, and anterior insula. While activity in many of these regions also related to individual differences in a composite measure of RNT, loneliness explained additional independent variance in brain activity in the medial prefrontal cortex and amygdala during negative feedback compared to neutral. **CONCLUSIONS:** These preliminary findings suggest that loneliness is associated with heightened neural responses to positive and negative social feedback in brain regions commonly associated with reward and threat processing respectively. Additionally, the effects observed in this study persist when accounting for RNT, which helps characterize the specific features of loneliness that may be associated with social feedback detection and monitoring. **ACKNOWLEDGEMENTS AND FUNDING:** Mind & Life Institute Varela Grant, National Institute of Mental Health Grant (1R01MH125414-01)

3-G-25 Enhanced interoceptive processing by self-related positive emotion

Shengbin Cui¹, Tamami Nakano¹

¹Osaka University

BACKGROUND AND AIM: Interoception, the ability to perceive information from one's own bodily states, plays an important role in emotion perception. Previous studies have shown that interoceptive processing changes by emotions of others, such as happiness, sadness, and fear. However, the relationship between self-emotion processing and interoception remains unclear. We investigated whether interoceptive processing differs when people perceive their own and others' positive and negative emotions. **METHODS:** A total of 21 participants' electroencephalogram and electrocardiogram were recorded when they viewed their own and others' facial expressions for positive (joy) and negative (sad) emotions in videos. Then, the heartbeat-evoked potentials (HEPs), a biomarker of interoceptive processing, were compared. **RESULTS:** The HEP amplitude over the fronto-central region between 380 and 480 ms relative to the onset of the R-peak was higher for facial expressions of positive emotions than for facial expressions of negative emotions in both self and other conditions. The HEP amplitude of this fronto-central region was significantly greater for the self face than for the other face for each emotion within the same time period. Furthermore, both genders showed similar trends of HEP amplitudes, while female participants showed greater HEP amplitude for each condition, especially in Self-Sad and Other-Joy conditions. **CONCLUSIONS:** The results revealed that positive emotions facilitate interoceptive processing more than negative emotions, and this facilitation of interoceptive processing was stronger when emotional information was related to the self. Gender differences suggested the focus of females on their negative emotion and their surroundings.

3-G-26 Diminished error-related negativity in people low in trait self-control following anxiety

Paige Faulkner¹, Kyle Nash¹

¹University of Alberta

Trait self-control is commonly considered an advantageous personality trait, with good reason. People high in trait self-control tend to be healthier, happier, more psychologically secure, and socially connected. However, the processes by which trait self-control confers such positive outcomes are less clear. For example, recent work shows that trait self-control does not correlate with state self-control in reaction times tasks or with daily resistance of temptations. The present research examines one idea in which trait self-control moderates the cognitive consequences of anxious experiences. We suggest that anxiety disrupts performance monitoring processes for low, but not high, self-control people. Using archival data, we examined the interaction between trait self-control and anxiety manipulation on error-related negativity (ERN), an index of performance monitoring. In the anxiety-inducing condition, we found diminished ERN amplitudes followed incorrect responses on the Stroop task in those with low trait self-control. This result suggests anxiety may influence performance monitoring in those with low trait self-control. This research provides further insight into conditions under which self-control may affect cognitive processes.

3-G-27 Self-focused by default: Spontaneous medial prefrontal cortex and DMN core subsystem activity during rest predicts the desire to think about the self

Danika Geisler¹, Meghan Meyer¹

¹Dartmouth

BACKGROUND AND AIM: People are remarkably self-focused, choosing to think and talk about themselves at disproportionately high levels. When people are instructed to think about the self in a task, activation occurs in the medial prefrontal cortex (MPFC). MPFC is also involved in subjective value. Those observations suggest that if people are self-focused—they want to think about themselves—MPFC may be involved. MPFC is also part of the default network, which reliably activates “by default” as soon as our minds are free. We hypothesize this tendency to “default back” to MPFC as soon as we have a mental break sets our self-focus in motion. **METHODS:** Participants in a long scanning session were told that in our task they were selecting the trials they would think about in a separate task that follows. Each task trial started with a pre-trial jittered rest, then the trial in which subjects chose who (themselves, a designated friend, or Biden) they wanted to think about in a later task. The final part of the task is a mental palate cleanse task trying to get participants minds off their last choice before the next jittered rest. **RESULTS:** Parametric modulation analysis of the pre-trial jitter activation with response time to the next trial as the parametric modulator revealed the MPFC during pre-trial rest more strongly predicted self (vs friend and Biden) decisions. In other words, stronger “default” MPFC activation during brief rest biases self-focus on a moment-by-moment basis. Additionally, multi-voxel pattern analysis (MVPA) revealed that spatial patterns in the MPFC during pre-trial rest predict the subsequent choice to think about the self (vs. others) on the next trial. Given that the MPFC is a key node in the core default mode network (DMN) subsystem, we next focused on DMN subsystem parcellations and found that the DMN core is able to predict the subsequent choice to focus on the self (vs. others) more accurately than a) other DMN subsystems and b) the whole brain. Finally, we applied the DMN core MVPA pattern to each TR of a baseline resting state scan that occurred prior to the experimental tasks. During this rest scan, participants periodically rated the extent to which they were thinking about themselves, others, the past, and future. Participants with DMN core patterns during rest that were highly similar to the pre-trial MVPA pattern reported higher self-focused during their rest scan. Thus, the DMN core pattern predicted self-focus outside of the specific task it was created with. **CONCLUSIONS:** We know from both previous research and this study that people are particularly self-focused. Yet, the basic brain mechanisms that bias us towards self-focus remain unclear. The current results suggest that “defaulting back” to the MPFC and DMN core subsystem nudges us toward this self-focus. **ACKNOWLEDGEMENTS AND FUNDING:** This work was supported by an R01 grant from NIMH. Courtney Jimenez, Sasha Brietzke, Christina Huber, and Luke Chang.

3-G-28 Dyadic neural representations of personal narratives

Taylor Guthrie¹, Robert Chavez¹, Jack Kapustka¹

¹University of Oregon

This study aims to test the influence of social relationship strength on shared brain responses during perception of natural speech in interpersonal narratives. We recruited 29 dyads from the community, who filled out self-report and relationship surveys, and provided audio recordings of personal narratives. During fMRI scans, participants were presented with stories from themselves, their partner, and a stranger. We will analyze the results to investigate how the strength of a social relationship influences the degree of correlation between partner's brains during the narrative task, as well as to examine if there are differences in brain activity when listening to stories from oneself, a close other, or a stranger. This work will provide further insight into the role of social relationships in neural processing, with potential implications for social cognition research.

3-G-29 Interoceptive sensitivity predicts individual differences in the degree of internalization for preference decisions

Yuri Kim¹, Hackjin Kim¹

¹Korea University

Interoception, which refers to sensing visceral signals, is known to play a pivotal role in recognizing oneself as an integrated individual, working in conjunction with exteroception. Previously, individual differences in interoceptive sensitivity have been found to influence various psychological functions such as emotion processing and social cognition. The present study investigated whether interoceptive sensitivity is also related to individual differences in the degree of internalization for preference decisions. Participants were instructed to choose between two movie titles based on either subjective preferences

(preference condition) or the luminance of the characters written (luminance condition). The perceptual decisions based on external visual signals were included for the purpose of comparison to the preference decisions based on interior signals. In each task condition, half of the trials were the congruent condition, where the more preferred movie has higher luminance, while the remaining trials were the incongruent condition, where the less preferred movie has higher luminance. Interoceptive sensitivity was measured through the heartbeat counting task. Repeated-measures analysis of variance on response time revealed the significant main effect of congruency, indicating more time needed for incongruent vs. congruent trials. The congruence effect was significantly larger in the preference than in the luminance condition. Importantly, lower interoceptive sensitivity was related to larger increases in response time as the cognitive resources allocated for processing the preference decision at the previous trials increased. These results can be interpreted as lower interoceptive sensitivity associated with more cognitive resources required for preference decisions, thus suggesting that the interoceptive sensitivity measured via the heartbeat counting task can be an indicator of individual differences in the degree of internalization for preference decisions. This research was supported by the Bio & Medical Technology Development Program of the National Research Foundation (NRF) funded by the Korean government (MSIT) (No. 2021M3E5D2A01022483).

3-G-30 Sex-induced synesthesia is associated with dissociative and paranormal experiences

Cathy Lebeau¹, François Richer¹

¹Université du Québec à Montréal

BACKGROUND: In sex-induced synesthesia, sexual intercourse triggers visual experiences (e.g. colors, shapes). We report 15 cases of sex-induced synesthetes describing altered consciousness and dissociative phenomena during and outside of their synesthetic phenomena. **METHODS:** We compared these synesthetes to 11 non-synesthetes on semi-structured interviews as well as on the OAV questionnaire of altered states of consciousness during intercourse, the Dissociative Experience Scale (depersonalization/derealization, absorption, amnesia) and the O-LIFE questionnaire of schizotypy. Most synesthetes also had common synesthesia validated by an on-line battery (grapheme-color, tone-color, time-space...). **RESULTS:** Sex-induced synesthesia were mostly induced when emotional engagement was present and evokes colors, shapes, scenes, or patterns. Compared to controls, the sex-synesthetes scored higher on experience of unity and bliss and reported more dissociative phenomena (absorption, mirror face distortion, Capgras syndrome, out-of-body experiences, body image distortions, time/space alterations), more cognitive disorganization, and more unusual experiences (deja-vu, premonitions, mind reading). Sex-synesthetes also reported other synesthesia linked to interoception, pain and taste which have been related to anomalies of the limbic system, in particular the insula. **CONCLUSIONS:** Thus, our results suggest that sex-induced synesthesia is often associated with altered consciousness both during sexual trance and daily life. Results also suggest atypical limbic or insular cortex function.

3-H-31 Mental state concepts emerge from learning transition dynamics

Amisha Dharmesh Vyas¹, Milena Rmus², Mark Thornton¹, Diana Tamir¹

¹Dartmouth College, ²University of California, Berkeley

BACKGROUND AND AIM: Understanding people's thoughts and feelings is integral to navigating everyday social interactions. How do people construct a conceptual understanding of these mental states? That is, how do we learn that some states are similar-like joy and relief-and others are different-like happiness and grief? Previous accounts have focused on the static features that these states share in common, under the assumption that states with similar features will acquire similar concepts. We suggest that this view is incomplete: mental state dynamics-in particular, the transition probabilities from one state to another-also shape mental state concepts. **METHODS:** In a noisy inference task, participants played the role of xenopsychologists charged with learning about the mental states of an alien creature. In this role, they inferred an alien's latent mental states by way of a manifest cue: its changing eye colors. Reflecting properties of real-world mental state inference, the eye colors were conditionally independent, noisy indicators of the alien's mental states in a continuous state space. During a learning phase, participants watched 10 1-minute long videos of the alien's changing mental states, while periodically making predictions about the alien's future states. In a post-test, participants rated the similarities between the alien's states and their valence, and matched each with a real human mental state term. **RESULTS:** Consistent with our main prediction, participants' ratings of the similarity between the alien's states reflected the states' transition dynamics. Specifically, states with higher transition probabilities between them were rated as more similar. This result was further supported by participants' valence ratings and forced-choice matching between the alien's states and real human mental state terms, both of which also reflected the alien's transition dynamics. **CONCLUSION:** Together, these results indicate that mental state transition dynamics shape the emergence of mental state concepts. **ACKNOWLEDGEMENTS AND FUNDING:** This work was supported by NIMH grant R01MH114904 to Diana Tamir.

3-I-32 Reward enhances musical memory in adolescents

Dana Bevilacqua¹, Suzan Elshamshery², Mia Robbins², Brandon Carone¹, Pablo Ripollés¹

¹New York University, ²Grace Church School

BACKGROUND AND AIM: Music is known to acts as an abstract reward, stimulating the dopaminergic system and boosting cognitive functions such as learning and memory. While this has been previously established in adults, no studies have explored whether rewarding music positively impacts memory across development and to what degree. **METHODS:** Here, we implement behavioral methods by Ferreri et al. 2021 in an adolescent group to explore whether effects replicate in adolescents. We recruited 40 high school subjects from Grace Church School in New York City. Participants were tested across two days with a consolidation period of 24 hours between sessions on day 1 and day 2. On day 1, participants were presented with a set of

unfamiliar musical excerpts and provided reward ratings for each of them. After a 24 hour period, participants completed a memory test in which old and new excerpts were presented. **RESULTS:** Memory on day 2 was enhanced for highly rewarding music excerpts. **CONCLUSIONS:** This shows that enhanced memory performance for rewarding music is found in adolescents as well as adults. **ACKNOWLEDGEMENTS AND FUNDING:** We would like to thank Grace Church School and New York University for supporting this research. The Center for Language, Music and Emotion (CLaME) provided funding for supplies and research materials and Grace Church School supported travel and conference funds.

3-I-33 Relations between neuromelanin in substantia nigra and peer-based aggression in adolescents are potentiated by irritability

Ronan Cunningham¹, Megan Quarmley¹, Margherita Calderaro¹, Tessa Clarkson¹, Clifford Cassidy¹, Johanna Jarcho¹
¹Temple University

BACKGROUND AND AIM: Peer relations become more important in adolescence. Social rejection paired with risk factors like elevated irritability can promote aggression-related externalizing behavior. Identifying neural mechanisms that predispose adolescents toward aggression may provide intervention targets. In adults, dopamine (DA) system function is linked to proactive and reactive aggression. Because DA system function is typically assessed with PET, requiring radioactivity counter indicated in children, no studies have examined the relation between DA system function and aggressive behavior in youth. Neuromelanin sensitive MRI (NM-MRI) of the substantia nigra (SN) provides a non-invasive index of DA system function. Using NM-MRI in conjunction with an ecologically-valid social interaction paradigm, we tested the relation between DA system function and peer-based aggression in adolescents, and the extent to which this relation varied by symptoms of irritability. **METHODS:** Adolescents (N=45, 42% female) 10-15 years of age (12.38 ± 1.45 years) with a range of irritability symptoms (Affective Reactivity Index), underwent NM-MRI and completed the Virtual School task. In this task, participants engage in real-time interactions with purported peers who are programmed to be 'nice' or 'mean' a majority of the time by providing 60-80% positive or negative feedback, respectively. After these interactions, participants played a game in which they sent a "noise blast" at a volume of their choosing (1 None to 5 Max) to the same purported peers. Proactive and reactive aggression were operationalized as the average volume chosen for each nice and mean peer, respectively. A within-subjects t-test assessed differences in proactive and reactive aggression. Voxelwise analyses were performed within an anatomically-defined SN mask (1879 voxels) to test for correlations between NM-MRI intensity and aggression, and aggression by irritability interactions. Significance was determined through voxelwise permutation tests. All analyses covaried for age. **RESULTS:** Reactive aggression ($3.57 \pm .93$) was greater than proactive aggression ($3.23 \pm .97$; $t(44)=3.13$, $p=.003$, Cohen's $d=.47$). However, a negative association between NM-MRI intensity only emerged for proactive aggression (560 voxels, $p=.04$). This relation was potentiated by irritability such that more severe irritability was associated with a stronger negative relation between aggression and NM-MRI intensity for proactive (593 voxels, $p=.04$) and reactive aggression (612 voxels, $p=.03$). **CONCLUSIONS:** Results provide preliminary evidence that adolescents with low DA system function exhibit more proactive aggression. Adolescents with more severe irritability may be sensitive to DA system function, as low NM-MRI intensity is associated with more proactive and reactive aggression. The DA system may be a promising target for aggression-based interventions. **ACKNOWLEDGEMENTS AND FUNDING:** JMJ:R21HD093912; MQ:F31MH125478; TC:F31MH122091

3-I-34 A longitudinal study of directional associations between neural and behavioral correlates of self-evaluation in adolescent girls

Victoria Guazzelli Williamson¹, Samantha Chavez¹, Jennifer Pfeifer¹
¹University of Oregon

BACKGROUND AND AIM: Self-evaluation is a foundation process for identity development that undergoes dynamic changes during adolescence (Pfeifer & Peake, 2012). Notably, self-evaluation is markedly different among girls, who display steeper declines in trajectories of self-esteem (Baldwin & Hoffman, 2002; Rahal et al., 2020). Self-evaluation is instantiated in brain activity among both adults and adolescents (Denny et al., 2012; Pfeifer & Berkman, 2018) =. However, the longitudinal trajectories of the neural and behavioral correlates of self-evaluation across adolescence are relatively undocumented. Does brain activity in core self-evaluative regions (such as the ventromedial prefrontal cortex (vmPFC)) predict self-evaluative behaviors? Do behavioral and neural correlates of self-evaluation exhibit transactional associations? Our goals for this study are to i) test our hypothesis that both cross-lagged paths will be significant and ii) compare the estimates of the cross-lagged path to identify which path is stronger than the other. **METHODS, RESULTS, AND CONCLUSION:** A unique opportunity to advance this essential research is provided by the Transitions in Adolescent Girls (TAG) study, which has four waves of behavioral and neural indices of self-evaluation (N=174, initial ages 10.0-13.0, 18 months between waves). Participants complete a self-evaluation fMRI task wherein they decide whether traits from three social domains (prosocial, antisocial, and social status) describe them. The behavioral metric will be the global self-worth subscale of the Self-Perception Profile for Adolescents (SPPA; Harter, 1988, 2012). The neural index of self-evaluation will be comprised of a univariate analysis of vmPFC activity during self-evaluation of positive trait words contrasted over vmPFC activity during negative self-evaluation. The vmPFC region of interest will be identified through vmPFC activity during the same self-evaluation task in an entirely independent sample of 113 late adolescents (age 18 years; Cosme et al., 2019) thresholded at a $X=8$. In order to control for trait-like variability, we will use a random intercept cross-lagged panel model (Hamaker et al., 2015). This model will allow us to derive directional associations between neural and behavioral indices of self-evaluation. The detailed analytic plan will be preregistered on the Open Science Framework (OSF) prior to conducting any analyses. To minimize researcher degrees of freedom, interim results are not presented in this abstract but will be presented at the 2023 Social and Affective Neuroscience Society (SANS) conference. **ACKNOWLEDGEMENTS AND FUNDING:** We thank participants of the Transitions in Adolescent Girls study and the National Institutes of Mental Health (R01MH107418; PI Pfeifer) for funding this important work.

3-I-35 Testing the mediating role of pubertal hormones on age-related changes and sex differences in adolescent behavioral inhibition and activation

Adam Omary¹, Taylor Heffer¹, Graham Baum¹, Mark Curtis², Natalie Colich¹, Patrick Mair¹, Deanna Barch², Leah Somerville¹

¹Harvard University, ²Washington University in St. Louis

BACKGROUND AND AIM: Reinforcement sensitivity theory posits two fundamental motivational systems related to reward and punishment: the behavioral inhibition (BIS) and behavioral activation systems (BAS) (Gray & McNaughton, 2000; Berkman et al., 2009). Reward and punishment sensitivity have been associated with neurodevelopmental changes in reward and inhibitory control regions of the brain, particularly during adolescence (Braams et al., 2015; Kim-Spoon et al., 2016; Urošević et al., 2012). Recent research suggests that these changes observed in adolescence are driven by puberty, and potentially by increases in testosterone (TES) and estradiol (E2) levels associated with puberty (Braams et al., 2015; Harden et al., 2018; Op de Macks et al., 2016). Moreover, rodent research suggests that TES increases reward sensitivity and dopamine neurotransmission in adolescent male rats (Engi et al., 2015), while E2 increases punishment sensitivity and decreases seeking behaviors in female mice (Morgan & Pfaff, 2001). TES and E2 may therefore explain age-related changes in BIS/BAS scores during puberty, and higher BIS scores in females (Pagliaccio et al., 2016; Vermeersch et al., 2009). The present study aims to formally investigate the mediating role of TES and E2 on age-related changes and sex differences in BIS/BAS scores. **METHODS:** We will use three-wave longitudinal data (N = 224, ages 9-18, 48.7% male) from the Human Connectome Project in Development (Somerville et al., 2018). As age effects on pubertal development, hormone levels, and psychological outcomes may be nonlinear (e.g., Grisanzio et al., 2022; Herting et al., 2021), we will fit generalized additive models to capture possible nonlinear effects of age, puberty, and hormones on BIS/BAS scores. We will then examine the mediating role of puberty on the associations between age and BIS/BAS, as moderated by sex. Lastly, we run a second mediation model examining the parallel mediation roles of TES and E2 on the relationships between pubertal development and BIS/BAS scores, with exploratory moderation by sex. **HYPOTHESES:** We hypothesize that pubertal development will be positively associated with BIS/BAS scores, partially mediating the effects of age, and that pubertal development will be more strongly associated with BIS scores in females and BAS scores in males. We hypothesize that TES will be positively related to BAS scores and inversely related to BIS scores, and partially mediate the effects of puberty on BIS/BAS scores, in both sexes. Analyses of E2 will be conducted in an exploratory manner. **CONCLUSION:** Understanding these relationships will advance our understanding of the role puberty plays on adolescent behavioral activation and inhibition, and the hormonal mechanisms by which this process unfolds. **ACKNOWLEDGEMENTS & FUNDING:** Human Connectome Project in Development Consortium; NIH Blueprint for Neuroscience Research; NIH grants U01MH109589 and U01MH109589-S1.

3-J-36 The role of linguistic similarity in successful communication

Genesis Garza Morales¹, Eleanor Collier¹, Brent Hughes¹

¹University of California, Riverside

BACKGROUND AND AIM: Being understood by others is crucial for people's health and well-being. However, listeners' understanding of speakers is typically measured through self-report ratings, which consider speakers' subjective feelings of understanding but do not capture listeners' objective understanding. Objective linguistic patterns during dyadic disclosure offer an alternative approach for measuring understanding. In this study, we set out to examine the extent to which more objectively similar linguistic styles are associated with subjective feelings of understanding and other important conversation outcomes. **METHODS:** Pairs of friends (n = 64) were recruited. Each completed pre- and post-test measures of closeness and affect, and disclosed stories about their experiences to their partner. Speakers and listeners both described their perceptions of the most salient features of speakers' stories. To measure subjective understanding, speakers rated listeners' understanding by comparing listeners' descriptions to their own. To measure objective understanding, linguistic similarity of speakers' and listeners' descriptions was analyzed through LIWC's Language Style Matching module. **RESULTS:** Data analysis is currently underway. **CONCLUSIONS/PREDICTIONS:** We predict that dyads with more linguistically similar story descriptions will feel more subjectively understood, and will also experience greater closeness and positive affect. Results will shed light on the extent to which linguistic similarity between speakers and listeners can be used as a metric for successful communication.

3-J-37 From virtual to real world: Neural pattern for anxious emotion under virtual reality predicts emotional responses in real interaction task

Keyu Hu¹

¹University of Macau

The emotional responses shape our perception and prediction of others in social interactions. To understand neurophysiological responses during emotional elicitation context and its interaction with emotions in real-life decision, we linked natural emotional responses under virtual reality (VR) to emotional responses and decisions under real interpersonal context. Specifically, we recorded electroencephalograms (EEGs) from VR and reported the relationship between anxiety under VR and the behavioral responses in an independent social interaction task. The linear regression results showed that the theta band EEG features in both the left and right frontal cortex are significant contributors when predicting the reward expectation together with affective experience, prediction error, and the partners' emotional volatility during social interaction. Further, we used inter-subject representational similarity analysis to explore the possible source of the discrepancies across individuals in the behavioral model fitting during social interaction. Results showed that the intersubject similarity of the effect of prediction error on reward expectation could be explained by their similarities of EEG features under VR-induced anxiety emotional experiences. Furthermore, the intersubject similarity of the contributors representing affective experience (valence and arousal) on reward expectation could be explained by the varied score of both trait empathy and mentalizing ability. The current findings might explain how decisions and emotions in choice can be predicted by emotion at longer timescales from the VR to the real world.

3-J-39 The video calls for eye contact, perceptual crossing as path to interpresence

Niclas Kaiser¹, Christian Andersson¹, Johanna Eldeklint¹, Even Krogsæter Bugge-Asperheim¹, Moa Runnman Bäckström¹
¹Umeå University

In efforts to understand experienced differences between online- versus collocated conversations, concepts of Brain-To-Brain Coupling and eye-contact studies has gained traction, supporting the idea of perceptual crossing for connectedness. The Interpresence Institute, Umeå University, has developed the NUNA, a device that allows for natural eye contact and manipulation of eye skewness. The aim of the two studies reported here was to investigate in what ways experiences of connectedness is dependent of true versus perceived perceptual crossing via mutual eye contact. Methods (see Figure 1) Study 1. 36 participants (20 women, 16 men) interacted in a casual conversation with a researcher during three separate 3-5-minute conversations under the belief that the study was about interviewing techniques. The researcher covertly saw the participant with perfect eye contact, with eyes blocked out, or not at all. The researcher appeared identical to the participant on all conditions, and the NUNA upheld the illusion of mutual eye contact, leading the participant to believe there was mutual eye contact although it was one-way only. Measures were psychophysiological arousal and a questionnaire of experienced connectedness. Study 2. 30 participants (17 women, 13 men) in 15 dyads looked into each other's eyes in eight one-minute periods. Except natural eye contact, manipulations during the experiment were eye-direction skewness (as in usual video conversation with the camera outside the screen) and blurred face where it was possible to see the other's movement but not eye-direction. Measures were psychophysiological arousal and post experiment interviews. Results In study 1, participants in the easy-going interaction did not have higher arousal level in any of the conditions, and did not report less contact with the other. But 33% reported that something was off during the condition where the researcher did not see the participant at all. But in study 2, participants in the silent eye-gazing reported that they felt as they were in true engagement with the other and that focus was less on themselves during the mutual eye-contact condition, (even though they did not know this was the condition), and they had slightly but statistically insignificant higher arousal in mutual eye contact than in one sided eye contact. Conclusions The study differentiates between skewing and reducing information, where reduction of eye-information leads to interpretation of face expressions, but skewed gaze-direction distort the intention, as a skewed image was experienced to be looked at rather than interacted with. We discuss that sense of connectedness via mutual eye contact seem to differ from regulation of aggression/intimacy, as it is not eliciting arousal but still is experienced in the intimate eye-contact situation. We also conclude that one-sided eye contact seems feasible for many conversations.

3-J-40 Predicative accuracy of enjoyment following emotionally arousing conversations between strangers

Isabel Leiva¹, Samantha Reisman¹, Alicia Romano¹, Vishnu Murty¹, Johanna Jarcho¹
¹Temple University

BACKGROUND AND AIM: When we converse with someone new for the first time, we often under-estimate how much the person enjoyed the conversation; a phenomenon known as the liking gap. However, in much of the prior work the predictive accuracy of the liking gap-- how well people can predict how much a conversation partner likes them--hasn't been explicitly analyzed. This precludes the ability to characterize what factors influence individual's accuracy in predicting their partner's enjoyment. One factor that we believe may significantly influence predictive accuracy is the affective tone of the conversation, given that negative affect is known to distort both subjective and objective measures of memory. **METHODS:** To study this, we characterized structured conversations between dyadic pairs on a series of topics that draw upon personal experiences that are either negative, neutral, or positive. Participants (N=20 dyads; 80% female) performed two separate sessions over Zoom. In session one, participants filled out a variety of inventories measuring individual and social traits. In session two, a gender-matched pair of participants follow a 9-question prompted conversation randomly presented and evenly split between positive, neutral, and negatively valenced questions about the personal opinions and experiences of the participants. Following the conversation participants rated enjoyment of the overall conversation and the individual prompts on a 7-point Likert scale. We then quantified predictive accuracy by calculating the difference between a person's estimate of their partner's enjoyment with their partner's actual enjoyment. This was estimated both for the entire conversation, and in response to each of the 9 prompts **RESULTS:** We found that participants had significant distortions in the predictive accuracy, such that they underestimated how much their partner enjoyed the entire conversation (M = 0.825; SD = 0.712; p < 0.001). Surprisingly, we found that the valence of the prompt did not influence predictive accuracy (p = 0.466). **CONCLUSIONS:** These preliminary analyses indicate that the positive and negative tones in conversation do not appear to have a significant effect on how much individuals enjoy conversation, how they predict their partners enjoyment, or significantly explains the disparity between the two. Future analyses will test how other features of the conversation, including linguistic tone and facial feedback, influences predictive accuracy. **ACKNOWLEDGEMENTS AND FUNDING:** This work is supported in part by NSF 2123474.

3-J-41 The dynamic affective evaluation of other's help under risk: Asymmetric changes in gratitude when the outcome of help becomes better or worse

Xuqi Liu¹, Xiaolin Zhou¹, Xiaoxue Gao¹
¹East China Normal University

Previous studies have mainly focused on how certain outcomes of help, such as benefactor's cost and beneficiary's benefit, contribute to beneficiary's gratitude. However, in daily life, receiving help may involve a dynamic process in which the benefactor offers to help under uncertain outcome (benefactor's cost or beneficiary's benefit), and then the outcome of help becomes certain (better or worse) after the help is implemented. It remains unclear how the beneficiary's feeling of gratitude dynamically changes during this process. Here, we used an interactive game to induce dynamic changes from uncertainty to certainty, and addressed this question from both the perspectives of dynamic changes in benefactor's cost (Exp. 1) and beneficiary's benefit

(Exp. 2). In each round of the interactive game, the participant (the beneficiary) would receive a noise stimulation and was randomly paired with an anonymous co-player (the benefactor), who could decide whether to help the participant reduce the noise by undertaking an amount of noise. Exp. 1 manipulated the benefactor's cost and fixed the benefit of the beneficiary. The participant was informed that, in the Risk condition, the co-player decided whether to help the participant under uncertain cost (High vs. Low, each 50% probability; Outcome-uncertain phase). Then the final cost that the co-player undertook (High vs. Low) was determined randomly by the computer and shown (Outcome-realization phase). Before or after the Outcome-realization phase, the participant rated the feeling of gratitude to the co-player's help. In addition, a Certain condition was included as the control, where the co-player decided whether to help based on the certain cost (Low vs. Medium vs. High). Exp. 2 was similar as Exp. 1 except that Exp. 2 manipulated the beneficiary's benefit and fixed the cost of the benefactor. The two experiments consistently demonstrated that, under Risk condition, compared with Outcome-uncertain phase, when the final benefactor's cost (or beneficiary's benefit) was high in Outcome-realization phase, the participant's self-reported gratitude significantly enhanced; in contrast, when the final benefactor's cost (or beneficiary's benefit) was low, the participant's gratitude did not decrease significantly, demonstrating an "asymmetric change effect". Post-hoc questionnaire revealed that, the observed asymmetric change in gratitude after the actual outcome was considered as more moral and favorable than symmetric change, indicating the predicted social evaluation as the key psychological component that contribute to this "asymmetric change" in gratitude. These results contribute to understanding the dynamic process of gratitude during social interaction.

3-J-42 Detection of the mental fatigue degree of a human face by human evaluators (CLAVIF study)

Arnaud Rabat¹, Anais Loiseau¹, Aakash Soni², Damien Léger³, Amar Ramdane Chérif⁴, Assia Soukane², Alexandre Lambert²
¹French Armed Forces Biomedical Research Institute, ²Central School of Electronics of Paris, ³Sleep and Vigilance Center-Hôtel-Dieu AP-HP, ⁴University of Versailles Saint-Quentin-en-Yvelines

BACKGROUND AND AIM: Determining the existence of neurophysiological, biological and/or physiognomic patterns associated with a mental fatigue state, at the beginning of many accidents, would facilitate its detection and thus help prevent the risky and maladaptive behaviors associated with this state. Facial physiognomy has the advantage of being easily recorded. But questions remain: Is a human capable, as for emotions, of detecting the mental fatigue degree of a human face? What are the indicators used and is there any expertise in this field? **METHODS:** Among 17 subjects that have been mentally fatigued by 45 minutes of a PVT Task (sustained attention DESFAM-F study) and video-recorded, we randomly selected videos of 4 subjects. 4 sequences of 10s (A, B, C, D) were extracted at different moments of the task (0, 15, 30, and 45 minutes) and were randomly presented to raters (N=80) with the instruction to arrange them in a chronological order. **RESULTS:** A large proportion of evaluators (47% of correct answers) are able to classify the 4 video sequences correctly. They mainly use eyes (96%) and head position (35%) as face indicators. The best evaluators are those who have the most confidence in their ranking (a score 7/10) compared to those who are less efficient in their evaluations (a score of 6/10 and 5/10 respectively for minor and large errors). A better (report) "practical knowledge" of mental fatigue (score $\geq 6/10$) does not confer a better ability to detect the degree of a mental fatigue human face. **CONCLUSIONS:** Our results confirm that human evaluators (both military and civilian) are able to detect the mental fatigue degree of a human face based only on the face physiognomy (possibly with indicators such as eyes and head position). It would be interesting to include more civilian evaluators (currently N = 8 for 80) in order to better compare their capacity detect a mental fatigue face compared to military ones and to look more precisely at the influence of a better knowledge of mental fatigue (theoretical and practical). These results could be used to compare the strength of human evaluators with computer algorithms (neural networks / machine learning). **ACKNOWLEDGEMENTS AND FUNDING:** We specially thank Mrs Clara Lahaine, Solenn Lachèze and Solange Monternier, who are in charge of Crew Resource Management (CRM) at the IRBA, for allowing us to intervene during their training and to solicit military evaluators for this study. We also thank Mrs Véronique Chastres for her help with statistical analyses. This study has been financially support by fundings of the French Directorate for Armement (Contract Number: Biomédef SAN-1-515). **KEYWORDS:** Mental Fatigue, Facial physiognomy, PVT, Sleep debt, Indicators, Video ranking.

3-J-43 There is chemistry in social chemistry

Inbal Ravreby¹
¹Weizmann Institute of Science

Nonhuman terrestrial mammals constantly sniff themselves and each other to decide who is friend or foe. Humans also constantly sniff themselves and each other, but the functional significance of this behavior is unknown. Because humans seek friends who are similar to themselves, we hypothesized that humans may smell themselves and others to subconsciously estimate body odor similarity, which, in turn, may promote friendship. To test this hypothesis, we recruited nonromantic same-sex friend dyads who had initially bonded instantaneously, or so called click-friends, and harvested their body odor. In a series of experiments, we then found that objective ratings obtained with an electronic nose, and subjective ratings obtained from independent human smellers converged to suggest that click-friends smell more similar to each other than random dyads. Then, we recruited complete strangers, smelled them with an electronic nose, and engaged them in nonverbal same-sex dyadic interactions. Remarkably, we observed that dyads who smelled more similar had more positive dyadic interactions. In other words, we could predict social bonding with an electronic nose. We conclude that there is indeed chemistry in social chemistry, and are currently using fMRI to ask what social brain mechanisms are modulated, and how, by this similarity in body-odor.

3-J-44 Learning to understand emotions in humans and machines

Katherine Soderberg¹, Philip Kragel¹
¹Emory University

BACKGROUND AND AIM: Being able to gauge others' feelings is crucial for strong relationships and well-being. To determine a target's emotion, perceivers use a variety of audiovisual signals, including facial expressions. These are conveyed by two neural pathways: one routed through ventral visual cortex that processes static features, and another, anchored in the superior temporal sulcus, which processes dynamics (Haxby 2002). Our understanding of these systems is based on studies that predominantly use unfamiliar targets; less is known about how emotion understanding progresses as perceivers learn the idiosyncrasies of targets' expressions. Perceivers may build person-specific models that are strengthened by experience with a target (Zhao 2022); alternatively, they might use a general model to map sensory signals to emotions. Here we evaluate these distinct accounts by investigating how experience impacts emotion understanding in humans and artificial neural networks.

METHODS: Evidence suggests that convolutional neural networks are one potential model of face perception. One such network, VGG-Face, trained to recognize the identity of static face images, has been found to learn representations related to emotional expression (Zhou 2022), and further to predict activity in the ventral visual pathway (Grossman 2019). Here we examine the effect of experience on emotion recognition in VGG-Face and in humans using naturalistic stimuli from the TV show Friends (Poria 2018). Subjects viewed clips of four characters in visual, auditory, audiovisual, or text format. Next, they rated the emotions they perceived in short audiovisual clips of each character. We simulated learning in VGG-Face by fine-tuning the network to classify images of each character. The effect of this exposure on VGG-Face will be quantified using the differential predictive ability between the fine-tuned and pre-trained networks, using the same stimuli shown to human participants.

PLANNED ANALYSES: We predict that for naïve subjects, the precision of emotion judgments (an index of learning) will vary by condition of exposure, and that this pattern will not be present for expert subjects, who can leverage existing person-specific models of these targets. We predict that the fine-tuned network's activations will better predict human ratings in conditions with visual exposure compared to those without, with no such difference for the pre-trained network. **IMPLICATIONS:** If these results are obtained, they will support the idea that emotion judgments are undergirded by person-specific representations that are refined with experience. If there is no difference in performance, this suggests that a general model may be sufficient, regardless of exposure. These findings will inform theories of the brain systems that give rise to emotion understanding and how they are shaped by experience.

3-J-45 Identity-specific and identity-general coding of object-social outcome associations in orbitofrontal cortex, ventral striatum, and amygdala

James Thompson¹, Margret Howard¹

¹George Mason University

BACKGROUND AND AIM: Social decision-making often relies on knowing the actions, objects, and contexts that lead to positive or negative reactions in other individuals. There is evidence of identity-specific representation of non-social outcomes in ventrolateral prefrontal cortex (VLPFC) and orbitofrontal cortex (OFC). These regions have also been implicated in social decision-making. Here we used fMRI to examine the neural mechanisms associated with the representation of the identity of specific social outcomes and stimuli that predict those outcomes. **METHODS:** Participants (n=27) first learned the association between abstract symbols and either smiles or neutral expressions from two different faces. Two symbols were associated with each expression from the two faces. After learning, participants performed a forced choice preference task and showed a significant preference for the symbols associated with smiles from the faces. During scanning, the participants then viewed the symbols and pressed a response key to a symbol color change, which was followed by the smiling or neutral face. Five runs of BOLD fMRI were acquired, and analyzed using fMRIprep and FSL. Unsmoothed, native space zstat responses to symbols associated with smiles and neutral expressions from the two faces were extracted from 360 HCP-MMP1 cortical atlas regions, as well as amygdala and nucleus accumbens (NAcc) from the Harvard Oxford atlas. Linear support vector machine (SVM) based multivoxel pattern analysis (MVPA), with 5-fold crossvalidation, was used to discriminate between neural patterns from each region from four runs to one set of symbols, and then tested on the neural pattern from the other set of symbols using data from the left out run. Accuracy across participants was then tested against chance using hierarchical Bayesian analysis.

RESULTS: During scanning, reaction times to the symbol color changes were significantly faster to symbols associated with smiles than symbols associated with neutral expressions. A post-scanning preference choice task also revealed preference for the symbols associated with smiles. MPVA analysis revealed that identity-specific decoding accuracy was higher in lateral OFC, VLPFC, and NAcc for symbols associated with smiles from the identities than for symbols associated with neutral expressions. Identity-general coding of symbols associated with smiles (vs neutral) was observed VLPFC, ventromedial prefrontal, medial OFC, and amygdala. Psychophysiological interaction (PPI) analysis revealed identity-general-based correlations between amygdala and ventromedial cortex and lateral OFC. **CONCLUSIONS:** Identity-specific representations of predictors of positive social outcomes in OFC might help guide social decision-making and behavior. The amygdala might interact with OFC to support identity-general representations. **ACKNOWLEDGMENTS AND FUNDING:** This work was supported by NSF #192557

3-J-46 From viewable impressions to neural impressions: Combining EEG and VR to develop measurement standards for responses to media

Juncheng Wu¹, Ralf Schmälzle¹, Gary Bente¹

¹Michigan State University

Measuring message-evoked impressions is difficult and there are many threats to validity, particularly multi-tasking on parallel screens and different screen sizes. Past research has been criticized for failing to measure actual neurocognitive processes in response to messages and in a real viewing environment, relying instead on proxy-metrics like the delivery of messages to the screen device. However, the human brain is the site where the "impression" happens and thus the only valid endpoint for assessing so-called viewable impressions. Thus, the goal of this study is to develop a new measurement approach for measuring viewable impressions through neural evidence. This study uses a 24-channel EEG system to measure message-evoked brain

activity. In order to control the experimental delivery of messages, we use virtual reality (VR) as a methodological tool that optimally combines ecological validity with experimental control. In particular, we created a virtual room in which we can precisely control theoretical variables, such as screen size, distraction, and particularly the experimental delivery of media messages. The 3D room consists of a virtual living room with a big, wall-mounted TV screen (size variable) on which MP4 videos can be displayed. Our design is to bring people into a VR-based living room environment where they are exposed to video ads. Video ads are manipulated to be of different sizes and people can assess likeness with the controller after watching (As shown in figure 1). This approach lets us hold all external factors exactly constant, manipulating only the main theoretical variable. Neural indices of impressions will be probably derived based on: (i) message-evoked activity; and (ii) time-frequency domain. Data collection is currently running and results will be ready for presentation at the SANS conference. Overall, this study will offer a new approach that can be used to study consumption of screen media (TV, online social media) in a controlled experimental setting, integrating the potential for measuring brain responses while also balancing experimental realism and control.

3-K-47 Differences in functional connectivity between inferior frontal gyrus and mentalizing brain regions in autism as compared to developmental coordination disorder and neurotypical populations

Aditya Jayashankar¹, Brittany Bynum¹, Christiana Butera¹, Emily Kilroy¹, Laura Harrison¹, Lisa Aziz-Zadeh¹

¹University of Southern California

BACKGROUND: Understanding others intentions is a primary area of social cognition, and an area in which autistic (ASD) participants commonly display difficulties. Previous studies in typically developing (TD) individuals indicate that understanding why and how people make actions relies on processing and communication between the putative mentalizing network (medial and dorsolateral prefrontal cortex [mPFC; DLPFC], temporoparietal junction [TPJ]), important for cognitively deducing other people's intentions, and the putative mirror neuron system (MNS; inferior frontal gyrus [IFG], ventral premotor cortex; posterior parietal cortex), important for using one's own motor regions to process other's actions. In autism, compared to a typically developing group (TD), there is indication of reduced functional connectivity between the inferior frontal gyrus (IFG) and mentalizing regions (dmPFC) during mentalizing tasks. However, given that the IFG is involved in motor behavior, and about 80% of autistics have motor difficulties, it is necessary to explore if these differences are specific to autism or instead shared with other developmental motor disorders, such as developmental coordination disorder (DCD). In this way, we can better understand if the connectivity differences in autism are related to underlying social issues, or instead related to comorbid motor issues. **METHODS:** Participants (N=29 ASD, 30 DCD; 31 TD; age 8-17) completed a mentalizing task in the 3T fMRI scanner, where they saw a video of someone making an action and were asked to think about why they were performing that action. Psychophysiological interactions (PPI) were analyzed using FSL. **RESULTS:** Results indicated specific connectivity differences in ASD compared to both TD and DCD groups. Specifically in ASD, the left IFG seed had connectivity differences with bilateral TPJ, left insular cortex, and right DLPFC. Connectivity differences using the right IFG seed revealed ASD differences in the left primary motor cortex, left insula, and left DLPFC. **CONCLUSION:** These results indicate that functional connectivity differences between the IFG, mentalizing regions, and emotion processing regions during mentalizing tasks are potentially specific to ASD core social symptomatology, and not a result of potentially comorbid motor differences. **FUNDING:** Research supported by the Eunice Kennedy Shriver National Institute Of Child Health & Human Development of the NIH R01HD079432.

3-L-48 Epigenetic variability of the oxytocin receptor gene in childhood is associated with neural maturation and prosocial development

Amalia Skyberg¹, Sarah Craig², Jessica Connelly², James Morris²

¹University of Oregon, ²University of Virginia

BACKGROUND: Through childhood, children acquire the ability to better understand the thoughts, intentions, and actions of others and develop empathy which enhances successful social integration. While socio-emotional skills consistently improve with age, not all individuals develop these skills at the same rate. Individual differences likely emerge from complex interactions between cognitive skills, the social environment, and biological influence. In this study, we investigated epigenetic regulation of the endogenous oxytocin system as a biological marker of social maturation. DNA methylation in the promoter of the oxytocin receptor gene (OXTRm) regulates expression of the molecule that allows an individual to make efficient use of oxytocin, resulting in social and emotional ramifications. **METHODS:** To assess children's neural processes of social interactions, we employed a naturalistic viewing fMRI paradigm in which both children (N = 79, 5-11 y/o) and adults (N = 28, 25-30 y/o) passively viewed a high valence socio-emotional clip from Finding Nemo. Using inter-subject correlation (ISC) analysis, we generated a neural maturity map that identified regions of the brain that were consistently evoked in both children and adults. Within these regions, a neural maturity score was calculated by averaging each child's ISC value to each adult. Two years later, parents completed the emotion battery from the NIH Toolbox. Fully corrected t-scores for empathetic behaviors were used to investigate the association between neural maturity, OXTRm, and prosocial behavior development. **RESULTS:** We find children show group level synchrony with adults in cortical regions associated with vision, auditory, motor processing and medial parietal areas. In children, we find that OXTRm is curvilinearly associated with adult-like synchrony during the passive viewing of a prosocial movie clip while controlling for chronological age. Children with mid-levels of OXTRm have a higher neural maturity score compared to their lower or higher methylated peers. We also find a significant interaction on children's empathetic behavioral development two years later. Individuals with less neural maturity exhibited a negative association between OXTRm and empathetic behaviors whereas the association between OXTRm and empathetic behaviors was positive for individuals with more neural maturity. **CONCLUSIONS:** The results from this study provide the first evidence for the role of OXTRm in functional neural maturation

during a prosocial movie clip. More OXTRm in children is associated with a more adult-like neural profile, but only to a certain extent. Additionally, neural maturity moderates the association between OXTRm and empathetic behaviors two years later. This suggests that protracted neural development and decreased epigenetic regulation of OXTR are useful biological markers of individual differences in children's social phenotypic behaviors. **FUNDING:** The UVA Brain Institute

3-M-49 The empathic brain on oral contraceptives: Cross-sectional and longitudinal fMRI findings

Ann-Christin Kimmig¹, Dirk Wildgruber¹, Anna Gärtner¹, Bernhard Drotleff¹, Michael Lämmerhofer¹, Inger Sundström-Poromaa², Birgit Derntl¹

¹University of Tübingen, ²University of Uppsala

INTRODUCTION: Endogenous and synthetic sex hormones bind to receptor sites and thereby modulate brain function in brain regions relevant for socio-affective processing. First evidence indicates a role of oral contraceptive (OC) intake on socio-affective functions including (affective) empathic abilities. However, so far, no study has investigated the neural correlates of OC-related differences in empathy. **METHODS:** We followed up a cross-sectional fMRI study comparing OC users (n=46) with naturally cycling women in the early follicular (fNC: n=37) or peri-ovulatory phase (oNC: n=28) with a longitudinal study. In the longitudinal study, OC long-term users (OC: n=25), OC starters (sOC: n=11) and discontinuers (dOC: n=25) performed the same sentence-based empathy task, which included positive and negative emotions equally, twice in the fMRI scanner, 3 to 8 months apart. Depending on the group, measurements took place either twice during active OC intake or once during active OC intake and once in the early follicular phase. **RESULTS:** Independent of the emotional valence, OC users had significantly lower affective empathy ratings than oNC women, which was paralleled by lower whole-brain task-related activation of the left dorsomedial prefrontal gyrus, left precentral gyrus, and left temporoparietal junction. Moreover, empathy-related brain activation was negatively associated with synthetic hormone levels in OC users. Longitudinally, on the other hand, OC intake showed no effect on empathic responses in first exploratory analyses compared to the early follicular phase.

CONCLUSIONS: Overall, the multimodal cross-sectional investigation of empathy suggests a role of OC-intake in affective empathy when compared to women in the periovulatory phase. Preliminary data suggests that when compared with the early follicular phase OC start and discontinuation have no effect on empathic processing. Nevertheless, longitudinal studies with regards to the peri-ovulatory phase are warranted, as OC-related effects on affective empathy could have implications for social functioning and ultimately contraceptive choices.

3-N-50 Perceptions of experienced childhood adversity are associated with beliefs about agency

Bryan Dong¹, Hayley Dorfman¹, Katie McLaughlin¹, Elizabeth Phelps¹

¹Harvard University

Exposure to early-life adversity (ELA) is a strong predictor of psychopathology, but some individuals who experience adversity are less susceptible to these consequences, and the mechanisms underlying these individual differences remain unclear. We know from previous work that one factor that mediates the link between early-life stressors and adverse consequences is whether or not someone believes they have control, or agency, over their environment. Another factor that might influence variability in the association between adversity and psychopathology is the extent to which an individual internalizes their experienced adversity. Previous work suggests that there is a relationship between internalized experiences of abuse and heightened clinical symptoms. To investigate whether perceptions of experienced abuse and beliefs about agency jointly contribute to clinical outcomes, we first sought to test whether there is a relationship between perceptions of experienced adversity and agency. In a sample of adults with (n = 85) and without (n = 85) childhood exposure to adversity, we investigated whether peoples' perceptions of experiences of adversity influenced their behavior on a reinforcement learning task that measured beliefs about agency over outcomes (rewards and losses). To quantify perceptions of experienced adversity, we calculated a ratio score between objective (e.g., "I was punished with a belt") and subjective (e.g., "I think I was physically abused") self-report measures across multiple categories of adversity. We created clusters of participants based on their ratio score using natural breaks optimization, which creates classes by minimizing within-group deviation while maximizing intergroup differences. We then compared beliefs about agency between the three resulting clusters of participants: participants who were not exposed to adversity, participants who were exposed to adversity but who had higher perceived (subjective) experiences of abuse, and participants who were exposed to adversity but who had lower perceived (subjective) experiences of abuse. We found that participants with lower perceived abuse reported significantly increased beliefs in their agency in the behavioral task compared to the other two groups. These results suggest an association between perceptions of experienced abuse and perceptions of agency. This association could be one possible factor influencing the relationship between ELA and psychopathology. Future work will measure clinical outcomes and directly test this hypothesized mechanism.

3-N-51 MPFC subregions differentially mediate social stress-induced increase in generous behavior

Kun Il Kim¹, Jeung-Hyun Lee², Woo-Young Ahn², Hackjin Kim¹

¹Korea University, ²Seoul National University

Previous studies have shown contradictory effects of social stress on prosocial behavior. In this study, by incorporating social stress treatment with a modified social discounting task, we investigated the neural mechanism underlying inter-subject variability in social stress-induced prosocial decision. 41 male participants underwent a stressor task inside a fMRI scanner and their saliva samples were collected. Then, participants performed a modified social discounting task, which was designed to measure money sharing with targets of varying social distance in situations where sharing results in unequal (i.e., disadvantageous unequal condition) or equal (i.e., equal condition) consequence. We used computational modeling and hierarchical Bayesian analysis to identify the three distinct dimensions of motivation: 1) the sensitivity to target's social distance,

2) the sensitivity to reward for self, and 3) the degree of aversion to disadvantageous inequality as measured by the tendency to avoid options that gives more money to the target than to the self. Behavioral results showed that those with higher cortisol level following social stress task showed higher frequency of money sharing decision at the inequal condition and lower degree of inequality aversion. Neuroimaging data revealed that those with higher inequality aversion showed higher and lower degree of sensitivity to rewards for others in the dorsal mPFC and the ventral mPFC, respectively. Such neural underpinnings of social stress-induced decrease in inequality aversion was corroborated by two mediation analyses, where both the dorsal and ventral mPFC indirectly mediated the decreased inequality aversion due to cortisol levels. This work was supported by the National Research Foundation of Korea (NRF) grant funded by the Korea government (MSIT) (No. 2021M3E5D2A0102249311).

3-N-52 Co-creating programmatic developmental neuroscience research with communities under study: The impact of ethnic-racial discrimination on child anxiety

Kalina Michalska¹, Jordan Mullins¹

¹University of California, Riverside

BACKGROUND: Although influential neurodevelopmental work has addressed effects of trauma and other forms of adversity on the neurobiology of threat learning and anxiety in youth, effects of stressful experiences specific to ethnically and racially marginalized groups have received scant consideration in extant research. Our lab is beginning to address this gap with a longitudinal study of effects of ethnic-racial discrimination in 150 10-13-year-old Mexican-origin Latina girls, a historically understudied population that encounters unique and compounding cultural stressors like sexism, racism, and economic marginalization. We plan to use computational fMRI techniques to examine the effects of cumulative stress exposure on neurodevelopment due to ethnic-racial discrimination. This presentation highlights two foundational components of our research program: (1) the creation of a Community Advisory Board (CAB) to formalize researcher-community partnerships by placing the concerns of the community on our agenda and (2) initial evidence documenting links between parental experiences of ethnic-racial discrimination and children's anxiety symptoms. Together, these components will set the stage for subsequent waves assessing longitudinal associations with threat neurocircuitry and anxiety. **METHODS:** Well-validated measures assess parental reports of experiencing ethnic-racial discrimination, including the Perceived Discrimination Scale, the Everyday Discrimination Scale, and the Experiences of Discrimination Scale, assessing the frequency and the appraisal of discriminatory events. Parents also report their children's anxiety symptoms, via the SCARED-Parent total and subscales. A latent discrimination score will be constructed from item-level responses and hierarchical regression analyses will test associations between parental discrimination experiences and children's anxiety symptoms, over and above age, socioeconomic status, and parental education. One hundred and forty-one Mexican-origin caregivers have completed this data wave and we anticipate a full sample by the time of the conference. The presentation will describe efforts by our lab to form a CAB. I will discuss insights gleaned from three meetings and share how community members can act as key collaborators who can help inform research protocols, provide us with real life examples of issues under study, voice the concerns of the community, assist in developing community education resources and help disseminate scientific findings. **DISCUSSION:** Community-based participatory research includes community members in the scientific co-creation at multiple steps in the research process. However, they are rarely, if ever, used in neuroscience research. Fostering a full partnership between the research team and the community under study ensures that researchers gain an understanding of the context in which community members assess the risks and benefits of research.

3-N-53 Social rejection sensitivity predicts acute stress response: An ERP study

Huini Peng¹, Yiqun Gan¹, Jianhui Wu²

¹Peking University, ²Shenzhen University

BACKGROUND AND AIM: The adaptive response to acute stressors in the environment is critical to health and even survival. Appropriate responses to acute stressors can help individuals quickly mobilize physiological and psychological resources to cope with stressors and recover homeostasis. Excessive and persistent acute stress responses impact individuals' cognitive performance and cause pathological consequences such as post-traumatic stress disorder, anxiety disorder, or cardiovascular diseases. However, there are substantial individual differences in the stress reactivity. The present study investigated whether and how the neural sensitivity underlying social rejection word processing as indexed by Event-related potentials (ERP) during a non-stressful state predicted hypothalamic-pituitary-adrenal axis (cortisol) activity and sympathetic adrenal medulla (Heart rate) activity to acute stress. **METHODS:** Sixty participants came to the laboratory twice, with the first for baseline neural sensitivity assessment of social rejection word processing using a lexical decision task, and the second for acute stress assessment using Trier Social Stress Test (TSST). **RESULTS:** 1) Compared with the neutral words, the rejection-related words induced larger P3 amplitudes. 2) TSST significantly induced acute stress response, which was psychologically manifested as increased state anxiety level and negative emotion level, and physiologically manifested as increased heart rate and increased salivary cortisol. 3) Participants with larger amplitude of P3 towards rejecting words relative to neutral words performed higher heart rate and cortisol reactivity induced by the acute stressor. **CONCLUSIONS:** Baseline neural sensitivity in social rejection could serve as a biological predictor for physiological response to an acute stressor, i.e., the more neural sensitive towards social rejection stimulus, the larger hypothalamic-pituitary-adrenal axis reactivity and sympathetic adrenal medulla (Heart rate) reactivity towards acute stress. **ACKNOWLEDGEMENTS AND FUNDING:** The authors would like to thank Yutong Liu, Huihua Fang, Qian Liu and Jiaomeng Feng for data collection. This work was supported by the National Natural Science Foundation of China [grant numbers 31771246, 31530031 and 31920103009]; the National Natural Science Foundation of China under grant number 32171076.

3-F-54 Trait impressions of faces shape subsequent mental state inferences

Chujun Lin¹, Umit Keles², Mark Thorton¹, Ralph Adolphs²

¹*Dartmouth College*, ²*California Institute of Technology*

Understanding other people is key to social interactions. Humans do so by inferring other's enduring characteristics (traits) and momentary thoughts and feelings (mental states). Prior work showed that trait impressions formed from faces influence decision-making in situations where trait information is patently important (e.g., judging who will be a good leader or a good romantic partner). Here we investigate whether trait impressions of faces have much broader impact on decision-making through a different mechanism: influencing how people infer others' moment-to-moment mental states in given situations. That is, how does the way a person looks influence the cognitive or affective states people expect them to experience in a given scenario? We addressed this question in a large-scale, pre-registered project by connecting three important types of social information: trait, mental state, and context. To maximize generalizability, we representatively sampled all stimuli using novel computational approaches. This produced comprehensive sets of faces, traits, mental states, and contexts, that represent the natural variation of stimuli in the real world. Participants (N = 3,010) viewed the target people's neutral faces and imagined how strongly the target people would experience a mental state (e.g., hesitant) in a given context (e.g., thinking about dining out during a pandemic). Independent sets of participants also rated the target people on various traits (N = 496) and states (N = 253) based on their faces alone. We found that trait impressions of faces predicted mental state inferences in a wide range of contexts. Inferences of all 60 representatively sampled mental states were significantly predicted by trait impressions of faces (mean $r = 0.88$). Variance partitioning analyses showed that the inferred states of the faces alone (e.g., how angry the face looked in the photo) did not explain any additional variance in the context-based mental state inferences beyond the trait impressions of the faces. We showed that this association between trait impressions and context-based mental state inferences was in fact causal by digitally manipulating the trait impressions of the faces. Using exploratory factor analysis, we showed that seeing the targets' faces modified the overall representation of mental states in the perceivers' mind. Specifically, we found four dimensions that summarized the mental organization of mental states when faces were present. They can be interpreted as describing mental state inferences that were sensitive to the targets' facial femininity, seriousness/age, competence, and threat. These four dimensions were different from, but partially overlapped with, mental state dimensions previously discovered when no faces were present. Together, these findings reveal a novel mechanism through which the biases and stereotypes of first impressions from faces influence moment-to-moment real-world behavior in a wide range of contexts.